



Industria y Comercio
SUPERINTENDENCIA

PCT

SOLICITUD

PATENTE DE INVENCION

03-35666

EXPEDIENTE N° _____

TÍTULO _____

4, SEQUEDRO-1,2,4-TRIAZOL-5-ONAS, 1,2,4-TRIAZOL-5-ONAS Y SU

USO COMO FUNGICIDAS E INSECTICIDAS

CLASIFICACIÓN INTERNACIONAL **AOIN 43/707**

SOLICITANTE **DOW AGROSCIENCES LLC.**

DOMICILIO **Indianapolis, Indiana, Estados Unidos de América.**

APODERADO **WILLIO FERRER**

Código No. 1092

BOGOTÁ, D. C. _____


Industria y Comercio
 SUPERINTENDENTE



03 036666 01

PETITORIO

Radicación : 0303666 00000000
 Fecha (ANI) : 2003-04-29 17:36:30
 Trámite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTAC
 Dependencias 2020 DIVISION DE NUEVAS CREACIONES

Folios: 104

**FORMULARIO UNICO DE SOLICITUD DE PATENTE
 PCT
 ENTRADA EN FASE NACIONAL**

1 SOLICITUD DE			
☒ Patente de Invención		☐ Patente de Modelo de Utilidad	
☐ Capítulo I		☒ Capítulo II	
2 SOLICITANTE (71)	Nombre DOW AGROSCIENCES LLC sociedad constituida y existente bajo las leyes del Estado de Delaware, Estados Unidos de América Dirección 9330 Zionsville Road Indianápolis, Indiana 46268, Estados Unidos de América Domicilio Indianápolis, Indiana Estados Unidos de América	IDENTIFICACION C C ☐ NIT ☐ C E ☐ Otro ☐ Cual _____ Número _____	
3 REPRESENTANTE O APODERADO	Nombre EMILIO FERRERO Dirección Carrera 4ª No 72-35 Teléfono 347 38 11 Fax 217 92 11 E-mail <u>clientes@camyp.com</u> Domicilio Bogotá, Colombia	IDENTIFICACION C C ☒ NIT ☐ C E ☐ Otro ☐ Cual _____ Numero <u>438 019</u> T P <u>31 929</u>	
4 INVENTOR (ES) (72)	1- Martha Jean KELLY 1475 Little Creek Lane Collegeville Pennsylvania 19426 Estados Unidos de América 3- James Joseph GALLACHER 530 Meadowbrook Avenue Ambler Pennsylvania 19002 Estados Unidos de América		
	2- Karen Anderson EVANS 701 Marlbrook Lane Lansdale Pennsylvania 19446 Estados Unidos de América 4- Mark Joseph MULVIHILL 2801 Navajo Path Ambler Pennsylvania 19002 Estados Unidos de América		
5 PCT (86)			
Solicitud Internacional No <u>PCT/US01/50363</u>		Fecha <u>26 de octubre de 2001</u>	
Publicación Internacional No <u>WO 02/067675 A2</u>		Fecha <u>6 de septiembre de 2002</u>	
6 Título (54) <u>4,5-DIHIDRO-1,2,4-TRIAZIN-6-ONAS, 1,2,4-TRIAZIN-6-ONAS Y SU USO COMO FUNGICIDAS E INSECTICIDAS</u>			
7 Clasificación Internacional (51) <u>A01N 243/707</u>			
8 Prioridad	(33) País de Origen	(32) Fecha	(31) Número de Solicitud
SI ☒ NO ☐	<u>US</u>	<u>27 de octubre de 2000</u>	<u>60/243 803</u>

9

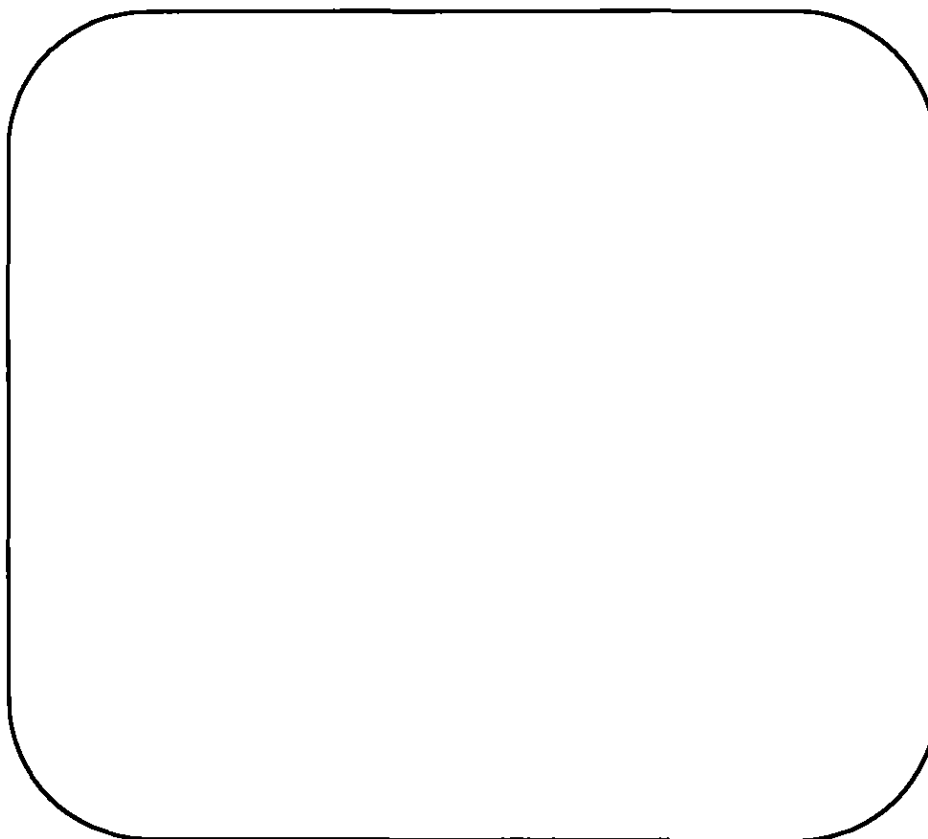
Comprobante de pago No 03-26.224 Fecha 14 de abril de 2003

10

Anexos

- ☒ Comprobante de pago de la tasa de presentación de la solicitud por \$ 400 000 oo
- ☐ Comprobante de pago por reivindicación de prioridad
- ☒ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica
- ☒ Poderes si fuere el caso
- ☒ Documento de cesión del inventor al solicitante o a su causante
- ☐ Declaraciones
- ☒ Copia de la solicitud internacional (Resumen descripción, reivindicaciones, dibujos)
- ☐ Traducción de la solicitud internacional al castellano (Resumen, descripción, reivindicaciones dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA.
- ☐ Traducción del examen preliminar efectuado por la IPEA
- ☐ De ser el caso copia del contrato de acceso
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas
- ☐ De ser el caso certificado de depósito del material biológico
- ☐ Arte final 12x12
- ☐ De ser el caso información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud
- ☐ Otros

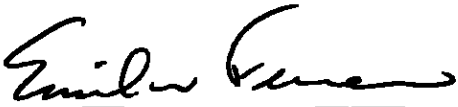
11

FIGURA CARACTERISTICA.

12

Solicito la concesión de la patente

NOMBRE EMILIO FERRERO

FIRMA 
C C 438 019 de Usaquén T P 31 929

JBP/mrm-ld-131

CAVE LER

ABOGADOS

EDIFICIO SISRI

CARRERA # 72-35

BOGOTÁ, COLOMBIA

REPRESENTACION, RATIFICACION Y PODER

For patents, utility models, industrial designs, trademarks, commercial names, trade emblems, slogans.

Para patentes, modelos de utilidad, diseños industriales, marcas de fábrica, nombres comerciales, enseñas, lemas comerciales.

REPRESENTATION, RATIFICATION AND POWER OF ATTORNEY

I (we) the undersigned / Yo (nosotros) abajo firmado (s)

Dow AgroSciences LLC

of/domiciliado (s) en 9330 Zionsville Road,
Indianapolis, Indiana 46268, United
States of America,

por el presente ratificamos la

presentada por

como agente oficioso ante

en

el

y por el presente nombramos a GERMAN CAVELIER, tpa. 832, GONZALO PERDOMO, tpa. 831, EMILIO FERRERO, tpa. 31929 y LUZ CLEMENCIA DE PAEZ, tpa. 23555; domiciliados en la Carrera 4ª N° 72-35 Bogotá, Colombia, en obediencia a lo dispuesto en el parágrafo 1º del Artículo 543 del Código de Comercio, el primero como principal y los demás como suplentes, en su orden, como mis (nuestros) representantes en todos los asuntos de propiedad industrial con facultad para recibir notificaciones y nombrar apoderados judiciales o extrajudiciales. El primer representante suplente reemplazará al principal en caso de ausencia o impedimento temporal o definitivo de aquél. La misma regla se aplicará cuando el segundo representante suplente haya de reemplazar al primero, o el tercero al segundo. En tales casos el representante principal, o el primero o segundo suplente, en su caso o ambos, declararán su intención de no ejercer la representación mediante declaración autenticada por Notario Público en Colombia, o por Notario u otro Funcionario Público, o Cónsul de Colombia, en el extranjero y el se tratare de impedimento, con el certificado respectivo. Si alguno de los nombrados faltare definitivamente, el siguiente tomará su lugar. Cuando cesare la ausencia o impedimento del representante principal, o de su primero o segundo suplentes, en su caso, podrán ejercer la representación, en su orden, uno u otros según el caso, asumiéndola por el solo hecho de ejercerla, cesando en ese momento el ejercicio de la representación por el primero, segundo o tercer suplente en su caso.

Además, confiero (conferimos) poder a los abogados arriba nombrados, para obtener la protección de mi (nuestra) propiedad industrial y contra la competencia desleal, a cuyo efecto autorizo (amos) a los dichos apoderados para que me (nos) representen ante cualesquiera entidades o personas, ejerzan o no jurisdicción, especialmente ante las del orden administrativo, contencioso-administrativo y judicial, así como los tribunales de arbitramento, en todo lo concerniente a los siguientes asuntos: a) Obtención de patentes de invención, modelos de utilidad y diseños industriales, el registro de marcas de fábrica, colectivas, defensivas, de servicio, lemas comerciales, nombres comerciales, enseñas, variedades vegetales y denominaciones de origen, su renovación, traspaso, cambio de nombre o domicilio, cancelación voluntaria, y el registro de licencias de uso de esos derechos, b) Las acciones de competencia desleal, protección del consumidor, oposiciones u observaciones, cancelación administrativa o judicial, nulidad,

hereby ratify the

filed without a Power of Attorney by

before

in

on and do hereby appoint GERMAN CAVELIER, tpa. 832, GONZALO PERDOMO, tpa. 831, EMILIO FERRERO, tpa. 31929 and LUZ CLEMENCIA DE PAEZ, tpa. 23555; domiciled at Carrera 4ª N° 72-35, Bogotá, Colombia, in due compliance with the terms of Paragraph 1st of Article 543 of the Commercial Code the first as principal and the others as alternates, in the order of their appointment, as our representatives for all industrial property matters with faculty to receive notifications and to appoint attorneys in and out of Court. The first alternate shall replace the principal in case of his absence or of temporal or definitive impediment. The same rule will apply when the second alternate representative is to replace the first one, or when the third is to replace the first or second alternates in their turn, or both of them, second in such cases, the principal representative, or the shall state their intention not to act as representatives through a declaration given before a Notary Public in Colombia, or before a Notary or another Public Official or a Colombian Consul abroad, and in case of impediment, the appropriate certificate shall suffice. If any of the appointees were to be definitely absent, the following alternate shall take his place. When the absence or impediment of the principal representative, or of the first or second alternate in their turn ceases, the representation can be taken again in their sequence, by the principal, the first or second alternate depending on case, and the mere fact or its exercise will suffice. The exercise of the representation by the first, second or third alternates in their turn shall end at such time.

In addition, we grant to the above-named attorneys-at-law that they may obtain the protection of my (our) industrial property against the unfair competition, for which purpose I (we) authorize the said attorneys to represent me (us) before any entities or persons, with or without jurisdiction, specially those administrative, administrative contencioso and judicial, as well as before Arbitration Court, in all matters concerning the following: a) Obtainment of patents, utility models and industrial designs, the registration of trademarks, collective trademarks and service marks, slogans, commercial names, trade emblems, vegetal varieties and denominations of origin, its renewal, assignment, change of name or domicile, voluntary cancellation, and the registration of licenses of use of the above rights. b) Actions of

A la vuelta →

Over →

© CAVELIER ABOGADOS
WPPDRE-21 (MINUTA N° 12.1 12.9 r USA)

medidas cautelares, concesión de licencias, la tutela, la protección de secretos industriales, y en general los juicios civiles, penales, administrativos o contencioso-administrativos relacionados con estos derechos, acciones y procesos que promovamos o se nos promuevan. Y para que en todos los asuntos arriba determinados puedan sustituir este mandato, transigir, conciliar, admitir los hechos del proceso, desistir, cancelar, recibir, renunciar, y ratificar los actos de agentes oficiosos

unfair competition, protection to the consumer oppositions or observations, administrative or Court cancellation, nullity infringement, granting of licenses, the action for writ mandamus the protection of trade secrets, and in general the civil, penal, and administrative suits relating to those rights; actions and suits instituted by me (us) or against me (us) And that in all the above matters they may substitute this Power of Attorney compromise, conciliate, admit the facts of the case, desist, cancel, receive resign, and ratify acts done by representatives without a power of attorney

Given and signed this/Dado y firmado hoy _____

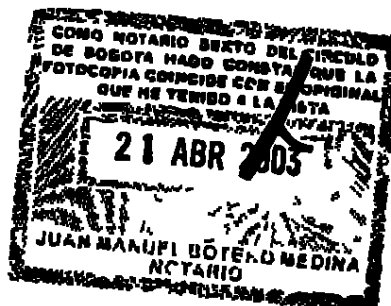
February 6, 1978

in/en Indianapolis, Indiana 46268

United States of America

Kenneth L. Loertscher Firma

Kenneth L. Loertscher
Assistant Secretary
& General Patent Counsel





Consulado General de Colombia

500 NORTH MICHIGAN AVENUE, SUITE 2040
CHICAGO ILLINOIS 60611

TEL (312) 923-1186 FAX (312) 923-1187

No 254

Chicago, FEB 20 1998

El suscrito Cónsul General de Colombia, CERTIFICA, que el señor (a) MARY REEVER, quien como SECRETARIA DELEGADA ESTADO, IN, autenticó la firma del signatario del poder precedente, ejercía en la fecha las funciones indicadas y su firma corresponde a la registrada en este Consulado, que la compañía DOW AGROSCIENCES LLC es una sociedad constituida de acuerdo con las leyes de DELAWARE y cumple su objeto conforme a las mismas, que el (a) señor (a) KENNETH L. WERTSCHER, quien en su carácter de REPRESENTANTE LEGAL de la citada compañía confiere el poder precedente, es su representante legal en este país

El Cónsul General no asume responsabilidad alguna por el contenido del documento

PAGADO IMPUESTO DE TIMBRE Y DERECHOS CONSULARES
US\$56 oo (Cincuenta y seis dólares)



SF JU

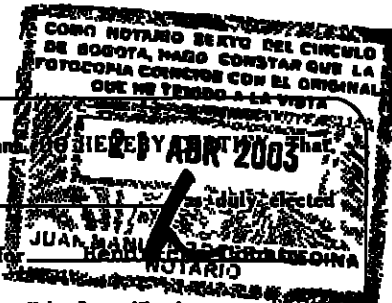
UNITED STATES OF AMERICA CERTIFICATE OF OFFICE STATE OF INDIANA

I, Sue Anne Gilroy Secretary of State of Indiana, according to records on file in my office Lydia S. Owens or appointed to the office of Notary Public in and for JUAN MANUEL REVERA and that the term of said office included the date of February 6, 1998 that to all his/her official acts as said official

cial full faith and credit ought to be given in all Courts of Justice and elsewhere. In testimony whereof I have hereunto set my hand and affixed the Great Seal of the State of Indiana, at Indianapolis, this Tenth day of February 1998



Sue Anne Gilroy
Secretary of State
by Mary Reever
Notary



NO SE ASUME
RESPONSABILIDAD

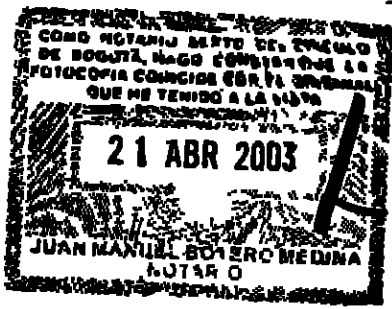
148 MAR 11 11 55

JEFE DE LEGALIZACIONES
SANTO DOMINGO

Bernardo R. de Alvarado
Traductora e Intérprete Oficial
Resolución 633 Ministerio 1991

MINISTERIO D. I. Y C. O. P. -
EXTERIORES

321224
21/2/2003
RECEIVED
EN EL
MINISTERIO DE JUSTICIA
ON 11-03-2003



CERTIFICADO NOTARIAL (INDIVIDUO)

A los 6 días del mes de FEBRERO de 19 98
ante mí, Notario Público de ESTADO DE INDIANA
compareció(eron) personalmente KENNETH L LOERTSCHER

a quien(es) doy fe de conocer y me consta que es(son) la(s)
persona(s) firmante(s) del documento que precede y quien(es)
tiene(n) capacidad legal para otorgarlo.

Notario Público — Notary Public

CERTIFICADO NOTARIAL (SOCIEDAD)

Hoy 6 de FEBRERO de 19 98
compareció(eron) ante mí
KENNETH L LOERTSCHER

a quien(es) conozco personalmente y que firma(n) este documen-
to en representación de la Sociedad/compañía
denominada Dow AgroSciences LLC

Certifico:

1 Que he visto los siguientes documentos *
CERTIFICADO DE CONSTITUCION, FECHADO 1 JULIO 1997
CERTIFICADO DE MODIFICACION, FECHADO 1 OCT 1997
RESOLUCION JUNTA DIRECTIVA, FECHADO 23 OCT, 1997
CONSENTIMIENTO ESCRITO DE LA JUNTA, 1 JULIO 1997

2 Que dichos documentos prueban lo siguiente

2.1 Que Dow AgroSciences LLC
es una Sociedad/Compañía legalmente constituida y existente
de acuerdo con las leyes de 1 Estado de Delaware,
Estados Unidos de América

2.2 Que el domicilio de dicha Sociedad/Compañía es
9330 Zionsville Road, Indianapolis, Indiana
46268, Estados Unidos de América.

2.3 Que el objeto u objeto para los cuales se otorga el presente
poder están comprendidos dentro del objeto social de la
mencionada Sociedad/Compañía.

2.4 Que el(los) Sr.(Sres.) KENNETH L LOERTSCHER
SECRETARIO ASISTENTE y ASESOP LEGAL PATENTES

está(n) autorizado(s) para otorgar el presente Poder

Ciudad INDIANAPOLIS

Estado INDIANA

Hoy 6 FEB de 19 98

Notario Público — Notary Public

* Los documentos deben identificarse con fecha y origen.

NOTARIAL CERTIFICATE (INDIVIDUAL)

On this 6th day of February 19 98
before me a Notary Public of State of Indiana
personally appeared Kenneth L Loertscher

to me known, and known to me to be the person(s) who
executed that foregoing document, and who has(have) legal
capacity to execute it.

NOTARIAL CERTIFICATE (CORPORATION)

On this 6th day of February 19 98
appeared before me
Kenneth L. Loertscher

who(m) I know personally and who(m) signed this document as
representative(s) of the Dow AgroSciences LLC Limited
named Dow AgroSciences LLC Liability
Company.

I Certify

1 That I have seen the following documents:

Certificate of formation, dated July 1, 1997
Certificate of amendment, dated October 1, 1997
Board resolution, dated October 23, 1997
Board written consent, dated July 1, 1997

2 That the above documents duly prove the following:

2.1 That Dow AgroSciences LLC
Limited Liability
is a LLC Company legally constituted and in existence

In accordance with the laws of the State of Delaware
United States of America

2.2 That the domicile of said Company is
9330 Zionsville Road, Indianapolis, Indiana
46268, United States of America.

2.3 That the purpose or purposes for which the present Power
of Attorney is granted is comprised within the corporation
purposes set forth in the Charter of the mentioned
Dow AgroSciences LLC Limited Liability Company.

2.4 That Mr (Messrs) Kenneth L. Loertscher
Assistant Secretary and General Counsel

is(are) authorized to grant the present Power of Attorney

City Indianapolis

State Indiana

This 6th day of Feb 19 98

Lydia S Owens

Lydia S Owens
Notary Public State of Indiana
Hendricks County
My Commission Expires 03/03/00

* Documents must be identified with date and origin.

**CERTIFICACION NOTARIAL
Y AUTENTICACION CONSULAR**

1 Es necesaria la legalización con certificado notarial. El Notario Público debe certificar

1.1 Que la compañía está legalmente constituida y actualmente existente

1.2 Su domicilio

1.3. Que el propósito del poder está incluido en el objeto social de la compañía

1.4 Que el poderdante está autorizado para dar el poder en nombre de la compañía

2 Los documentos que hay que mostrarle al Notario Público para probar los puntos anteriores, deben estar expresados en el Certificado Notarial con fecha y origen

2.1 Respecto a los puntos 1.1, 1.2 y 1.3 sugerimos referirse a los artículos de constitución con fecha y lugar de otorgamiento; y

2.2 Para el punto 1.4 sugerimos mencionar la resolución de la Junta Directiva o los estatutos según los cuales la persona que otorga el poder está autorizada para ello

3 Enseguida el Señor Cónsul de Colombia debe autenticar la firma del Notario Público

**NOTARIAL CERTIFICATION AND
CONSULAR AUTENTICATION**

1 Notarial legalization is necessary The Notary Public must certify

1.1 That the company is legally constituted and presently existent

1.2 Its place of business

1.3. That the purpose of the Power-of-Attorney is included in the activities of the company

1.4 That the grantor is empowered to give the Power of Attorney in the name of the company he represents

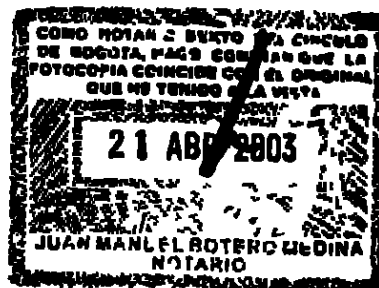
2 The documents which the Notary Public had before him to prove the above points must be listed by him in the Notarial Certificate with dated and origin

2.1 In connection with points 1.1, 1.2 and 1.3 we suggest referring to the articles of incorporation with date and place of execution

2.2 For point 1.4 we suggest to mention the resolution of the Board of Directors and/or the by-laws whereby the person who grants the Power of Attorney has been authorized to give it

3 Then the Colombian Consul must legalize the signature of the Notary Public

NOTA PARA EL SEÑOR CONSUL COLOMBIANO Según el artículo 259 del C de P C el Señor Cónsul debe autenticar la última precedente autenticación

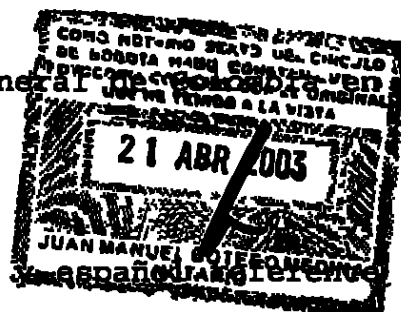


TRADUCCION OFICIAL No 03 075 98 de un documento escrito en inglés el cual para su identificación se sella con el sello del Traductor al mismo tiempo que la presente Esta traducción ha sido preparada por Bernarda R de Martínez, Traductora Oficial debidamente reconocida por el Ministerio de Relaciones Exteriores y aprobada por el Ministerio de Justicia de Colombia mediante Resolución No 683 de 1991

(Se traducen sellos y legalizaciones que aparecen a continuación de un documento escrito en inglés y español por medio del cual Dow AgroSciences LLC, otorga Poder a favor de GERMAN CAVELIER, GONZALO PERDOMO, EMILIO FERRERO y LUZ CLEMENCIA DE PAEZ)

Dado y firmado hoy 6 de febrero de 1998, en Indianápolis, Indiana, E E U U , por Kenneth L Loertscher, Subsecretario y Asesor General de Patentes

(Sellos parciales en tinta del Consulado General de Colombia en Chicago)



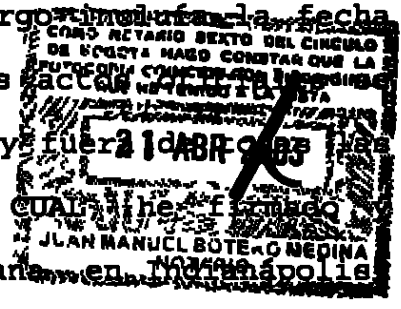
CERTIFICADO NOTARIAL (INDIVIDUO), en inglés y español referente a la capacidad legal que tenía KENNETH L LOERTSCHER para otorgar el documento antes mencionado, expedido el 6 de febrero de 1998 en el Estado de Indiana

CERTIFICADO NOTARIAL (SOCIEDAD), en inglés y español referente a la existencia legal de la sociedad Dow AgroSciences LLC, expedido en la Ciudad de Indianápolis, Indiana, E E U U , el 6 de febrero de 1998

(Firmado), Lydia S Owens, Notario Público
(Sello notarial en tinta), LYDIA S OWENS Notario Público,
Estado de Indiana, Condado de Hendricks Mi comisión expira el
03/05/00
(Sello notarial seco), LYDIA S OWENS NOTARIO PUBLICO INDIANA
(Sello parcial en tinta del Consulado General de Colombia en
Chicago)

ESTADO UNIDOS DE AMERICA
CERTIFICADO DEL CARGO
ESTADO DE INDIANA

Yo, SUE ANN GILROY, Secretario de Estado de Indiana, POR EL
PRESENTE CERTIFICO que, de acuerdo con los archivos que obran
en mi oficina, LYDIA S OWENS fue debidamente elegido y
nombrado para el cargo de NOTARIO PUBLICO en y para el Condado
de Hendricks y que el término de dicho cargo ~~termina~~ ^{incluye la fecha}
del 6 de febrero de 1998 que a todos sus ~~actos~~ ^{actos}
les debe dar completa fe y crédito dentro y fuera ^{del Estado}
Corte de Justicia EN TESTIMONIO DE LO CUAL ^{he firmado}
estampado el Gran Sello del Estado de Indiana ^{en Indianapolis}
hoy 10 de febrero de 1998



(Firma facsimilar), Sue Ann Gilroy
Secretario de Estado
(Firmado), Por Mary Reeve
Suplente

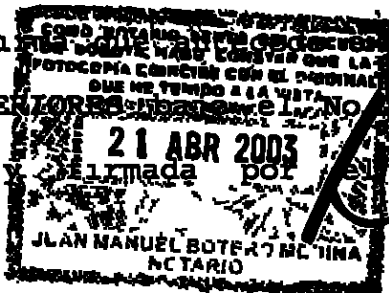
(Adherido se encuentra sello de oblea dorado con texto en
relieve), SELLO DEL ESTADO DE INDIANA 1816

(Sello parcial en tinta del Consulado General de Colombia en Chicago)

(En español), Certificación de la firma y cargo de MARY REEVER, de la existencia legal de la compañía DOW AGROSCIENCES LLC y de la autoridad que tenía su representante Legal, KENNETH L LOERTSCHER, para otorgar el poder mencionado arriba Esta certificación fue expedida por el CONSULADO GENERAL DE COLOMBIA EN CHICAGO, ILLINOIS, bajo el N° 254, de fecha 20 de febrero de 1998 y firmada por Carlos Alfonso Negret Mosquera, Cónsul General Pagados Impuesto de Timbre y Derechos Consulares por valor de veintiún dólares

(Sello parcial en tinta del Consulado General de Colombia en Chicago)

(al dorso), Legalización de la firma y cargo de MARY REEVER, expedida por el MINISTERIO DE RELACIONES EXTERIORES, No 221220, de fecha 11 de marzo de 1998 y firmada por Jefe de Legalizaciones



Es traducción fiel y completa de la cual se deja copia en los archivos de esta oficina para su confrontación y a la cual se remito

Bogotá, 17 de marzo de 1998

COLO 6641-801-001-3

BRM 137

Bernarda R de Martínez
Traductora e Interprete Oficial
Reconocida en el Ministerio 1991

David Le Clerk

LA NI-CLADOS CC, CC No (5)

ኢ-ፖርቲንግ ሳህተዲን፡/ርሳሊ

SANTAFE DE BOGOTA

17 MAR 1998

STATE DEPT
RECEIVED
JAN 20 1954

**NO SE ASUME
RESPONSABILIDAD DEL TEXTO**

~~35 MAY 81 05TH 66~~

**JEFE DE LA CALIFICACIONES
SANTIAFE DE BOGOTA**

COMO NOTARIO PERTU LO CENSO DE SUOFA, 1/50 CONSTAR QUE LA FOTOCOFIA CONCIPE CON EL NOMBRE QUE ME TIENDO A LA VIDA

21 ABR 2003

JUAN MANUEL ROTERO MEDINA
NOTARIO

**MINISTERIO DE RELACIONES
EXTERIORES**

022682

**CUYA FIRMA APARECE EN
DOCUMENTO DESEMPLE
LAS FUNCIONES INDICADAS**

12

CAVELIER

ABOGADOS

TENET 9
CABLES CAVELEYES
TELEX 45479 CAVE CO
TELEX (PJ) 7407375 CAVE UC

EDIFICIO SISKI
CARRERA 4 No 72 J5
BOGOTÁ B COLOMBIA

TELEFONOS (57) (1) 347 36 11
(57) (1) 212-01 00
TELEFAX (57) (1) 217 92 11
(57) (1) 235 88 50

Señor Jefe de la
DIVISION DE NUEVAS CREACIONES
Superintendencia de Industria y Comercio
E S D

Poderdante DOW AGROSCIENCES LLC

Poder conferido el 06-02-98

Yo, GERMAN CAVELIER, obrando en mi calidad de apoderado principal del poderdante arriba mencionado, atentamente manifiesto a Usted que sustituyo el poder que me ha sido conferido en la persona del doctor EMILIO FERRERO, Abogado con Tarjeta Profesional No 31 929, con todas las facultades que me fueron conferidas

Hago la anterior sustitucion conforme al articulo 66 delCodigo de Procedimiento Civil ya que los otros sustitutos faltan en este momento

Señor Jefe,


GERMAN CAVELIER

T P A No 832

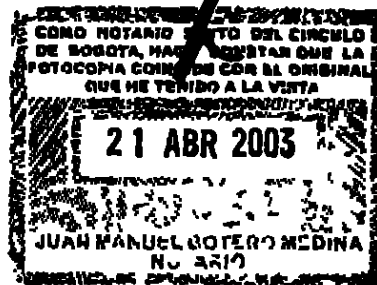
C C No 2 877 924 de Bogota

Acepto


EMILIO FERRERO

T P A No 31 929

C C No 438 019 de Usaquen



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E-MAIL C USA A TELEMAIL O SPRINTCOL FN CAVE S\ABO

INTERNET CAVEABO@sprintcol.sprint.com

VIT 860.041 36-3

NOTARIA SEXTA DE BOGOTA

REGISTRACION Y PRESENTACION PERSONAL

BOGOTA D.C. 25 FEB 1998

PAULO MENDEZ BARRALAS S

SEXTO ENCARGADO DEL CIRCULO DE BOGOTA

Comprobo que el Sr. Paulo Mendez Barralas

Paulo Mendez Barralas

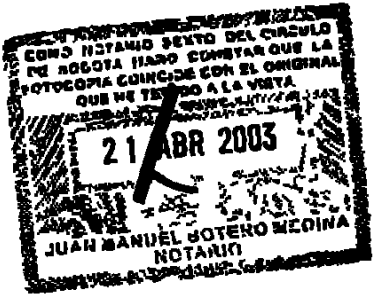
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aparece(n) en el presente documento es(son) la(s) suya(s) y
que el contenido de mismo es cierto
En consecuencia se firma esta Diligencia

Paulo Mendez Barralas



Paulo Mendez Barralas

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TO ALL TO WHOM THESE PRESENTS SHALL COME,

I Do Hereby Certify that the annexed document(s) are TRUE COPIES of the original document(s) which I have compared

at Indianapolis, Indiana 46268, USA
this 12th day of March 2003,


Michele Lyons
Office Professional
DOW AGROSCIENCES LLC

NOTARIAL CERTIFICATE

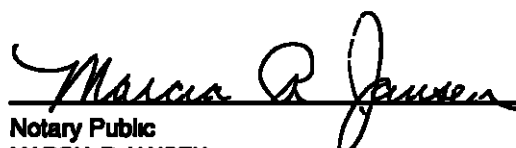
STATE OF INDIANA)
County/Parish of MARION) SS

On this 12th day of March 2003, personally appeared before me,

Michele Lyons

known or identified to me to be the individual who executed the foregoing document and acknowledged the same as a free act and deed for uses and purposes therein expressed

SEAL


Notary Public
MARCIA R JANSEN
NOTARY PUBLIC MARION COUNTY INDIANA
MY COMMISSION EXPIRES AUGUST 27 2008

14

INDIVIDUAL ASSIGNMENT AND INVENTOR'S DECLARATION
(with Priority Rights)

I verily believe I am/we are the original first and sole/joint inventor(s) of the subject matter which is embraced by and for which a patent is sought on the invention entitled

SUBSTITUTED 4,5-DIHYDRO-1,2,4-TRIAZIN-6-ONES, 1,2,4-TRIAZIN-6-ONES AND THEIR USE AS FUNGICIDES AND INSECTICIDES

which invention was made and invented by me/us while in the course of my/our employment with Rohm and Haas Company I/We acknowledge that I/we hold the invention and all patents and other rights and powers obtainable or exercisable in respect thereof in trust for Dow AgroSciences LLC which purchased such invention patents and related rights from Rohm and Haas Company

As trustee(s) and for good and valuable consideration and/or the remuneration received for my work I/we sell assign and transfer unto

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, Indiana 46268
United States of America

a limited liability company organized and existing under the laws of the State of Delaware U S A (hereinafter referred to as the Assignee) my/our entire right title and interest throughout the world in and to the invention and all rights and powers to make applications for Letter Patent in its own name or in the name of its designee (or nominee(s)) and all rights and powers to file any corresponding or equivalent applications in any and all countries including all rights to claim priority under all International Conventions(s) and Treaties in the name of Assignee and all rights in and to any Letters Patent that may be issued for the invention in any and all countries

I/we do hereby agree to assist Assignee in the prosecution of the application(s) and in any interference conflict opposition or litigation which may arise involving the invention or the patent or patents thereon and to execute for any and all countries any document relating to applications derived from corresponding to or equivalent to the above identified application as Assignee may request

I/we do hereby authorize Assignee or its designee to insert here the application number filing date, and country for the first patent application filed on the invention

Application No _____ Filing Date _____
In country _____

To facilitate recordal of this assignment in connection with other patent applications on the invention I/we do hereby authorize Assignee or its designee to insert here the application number filing date and country for any such patent application

Application No _____ Filing Date _____
In country _____

I/we authorize Assignee or its designee to translate this Assignment into all languages necessary and we request that any such Letters Patent be issued to Assignee and consent to the recordal of this Assignment or a Notarial True Copy thereof being under covenant not only that I/we have full power to make the same but also that such assigned rights are not encumbered by any grant license or other right heretofore given
Subscribed and Declared by me/us

At Center Square, PA

This 5 day of December 2001
Effective as of October 28 2001

Signature Martha Jean Kelly

Full Name Martha Jean Kelly
Residence 1475 Little Creek Lane
Collegeville Pennsylvania 19426

Country United States of America
Citizenship United States of America
P O Address Same as Residence
Of Country United States of America

At Lansdale, PA

This 8 day of January 2002
Effective as of October 26, 2001

Signature Karen Anderson Evans

Full Name Karen Anderson Evans
Residence 701 Marlbrook Lane
Lansdale Pennsylvania 19446

Country United States of America
Citizenship United States of America
P O Address Same as Residence
Of Country United States of America

RHA01070 ASSIGNMENT

(X) Additional names and signatures are attached

Additional names addresses and signatures to be attached to Form No 110
Entitled INDIVIDUAL ASSIGNMENT AND INVENTOR S DECLARATION

At <u>Concord, MA</u> <u>01742</u>	At <u>Tarrytown, New York</u> <u>10591</u>
This <u>29</u> day of <u>October</u> <u>2001</u>	This <u>29</u> day of <u>October</u> <u>2001</u>
Effective as of October 28, 2001	Effective as of October 26 2001
Signature <u>James J. Gallagher</u>	Signature <u>Mark Joseph Mulvihill</u>
Full Name <u>James Joseph Gallagher</u>	Full Name <u>Mark Joseph Mulvihill</u>
Residence <u>530 Meadowbrook Avenue</u>	Residence <u>3037B Ferncrest Drive</u>
<u>Ambler Pennsylvania 19002</u>	<u>Yorktown Heights New York 10598</u>
Country <u>United States of America</u>	Country <u>United States of America</u>
Citizenship <u>United States of America</u>	Citizenship <u>United States of America</u>
P O Address <u>Same as Residence</u>	P O Address <u>Same as Residence</u>
Of Country <u>United States of America</u>	Of Country <u>United States of America</u>

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FORM 222

NOTARIAL CERTIFICATE (Individual)

Martin Sean Kelly
Martin Sean Kelly

UNITED STATES OF AMERICA)
STATE OF PENNSYLVANIA)
COUNTY/PARISH of *Montgomery*)

on this *22nd* Day of *November* 2001 personally appeared
before me *Doris E. Kelly*
known or identified to me to be the individual described in and who
executed the foregoing document and acknowledged the same as a free act and
deed for uses and purposes therein expressed

SEAL *[Signature]* Notary Public
Resident of *Montgomery* County
My Commission Expires *12-1-02*

NOTARIAL CERTIFICATE (Individual)

UNITED STATES OF AMERICA)
STATE OF ~~PENNSYLVANIA~~ *MASSACHUSETTS*)
COUNTY/PARISH of *Middlesex*)

on this *24th* Day of *December* 2001 personally appeared
before me *James Joseph Gallagher*
known or identified to me to be the individual described in and who
executed the foregoing document and acknowledged the same as a free act and
deed for uses and purposes therein expressed

SEAL *[Signature]* Notary Public
Resident of *MASSACHUSETTS* County
My Commission Expires

TANYA LI ACENTE Notary Public
My Commission Expires January 17, 2003

NOTARIAL CERTIFICATE (Individual)

UNITED STATES OF AMERICA)
STATE OF PENNSYLVANIA)
COUNTY/PARISH of *Montgomery*)

on this *8* day of *January* 20*02*, personally appeared
before me *Karen Anderson Evans*
known or identified to me to be the individual described in and who
executed the foregoing document and acknowledged the same as a free act and
deed for uses and purposes therein expressed

SEAL *[Signature]* Notary Public
Resident of *Montgomery* County
My Commission Expires *1-12-02*

Notarial Seal
Catherine B. Boccuti Notary Public
Lower Gwynedd Twp., Montgomery County
My Commission Expires Nov. 12, 2002
Member, Pennsylvania Association of Notaries

(19) World Intellectual Property Organization
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(71) Applicant (for all designated States except US) DOW AGROSCIENCES LLC [US/US] 9330 Zionsville Road Indianapolis IN 46268 (US).

(72) Inventors and
(75) Inventors/Applicants (for US only) KELLY Martha, Jean [US/US] 1475 Little Creek Lane Collegeville, PA 19426 (US) EVANS, Karen Anderson [US/US] 701 Marlbrook Lane Lansdale PA 19446 (US) GALLAGHER James, Joseph [US/US] 530 Meadowbrook Avenue Ambler PA 19002 (US) MULVIHILL, Mark, Joseph [US/US] 2801 Navajo Path Ambler PA 19002 (US)

(74) Agent CORVIN Carl Dean Dow AgroSciences LLC, 9330 Zionsville Road Indianapolis, IN 46268 (US)

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For two-letter codes and other abbreviations refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title SUBSTITUTED 4,5 DIHYDRO 1,2,4-TRIAZIN 6-ONES 1,2,4-TRIAZIN-6-ONES AND THEIR USE AS FUNGICIDES AND INSECTICIDES

(57) Abstract: This invention relates to dihydrotiazinones triazinones and related compounds compositions comprising such compounds and an agronomically acceptable carrier and the use thereof as broad spectrum fungicides and insecticides. This invention also teaches methods of preparing these compounds as well as methods of using the compounds as fungicides and insecticides.

WO 02/067675 A2

SUBSTITUTED 4,5-DIHYDRO-1,2,4-TRIAZIN-6-ONES, 1,2,4-TRIAZIN-6-ONES, AND THEIR USE AS FUNGICIDES AND INSECTICIDES

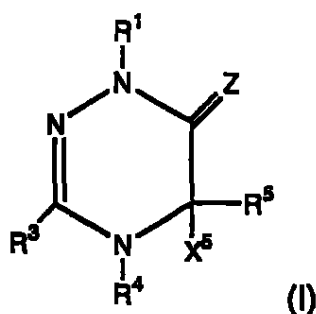
This application claims priority from U S provisional application 60/243,803, which was filed on October 27, 2000

The need continues for novel and improved broad spectrum, agrochemical fungicides and insecticides This is particularly so since the targets of fungicides and insecticides can become resistant to known fungicides and insecticides over time and after use of such compounds and their compositions Additionally, economic and environmental considerations can favor fungicides and insecticides having different modes of performance than those currently used This invention relates to dihydrotriazinones, triazinones and related compounds, compositions comprising such compounds and an agronomically acceptable carrier, and the use thereof as broad spectrum fungicides and insecticides This invention also teaches methods of preparing these compounds as well as methods of using the compounds as fungicides and insecticides

Certain methylated 3-phenyl-4,5-dihydro-1,2,4-triazin-6(1H)-ones are disclosed by Collins et al , *Aust J Chem* , 52, 379-385 (1999) as having potential as crop potential agents, however, the fungicidal and insecticidal dihydrotriazinones and triazinones of the present invention are not suggested Other 4,5-dihydro-1,2,4-triazin-6(1H)-ones are presented in a review by Neunhoeffer et al , "Chemistry of 1,2,3-Triazines and 1,2,4-Triazines, Tetrazines, and Pentazines", 605-607, John Wiley and Sons, Inc , New York, NY (1978), no utility for these compounds is suggested Various aryl triazinones and aryl triazinophthalazines are disclosed by Kutscher et al in ZA 938799, November 24, 1993 as drugs for the

treatment of bronchial asthma, allergies of the most varied origin, inflammatory processes, cardiac insufficiency and hypertension, no pesticidal utilization for these compounds is suggested. Some triazinones, among other nitrogen containing heterocycles, are disclosed by Kanellakopoulos et al. in US 5,814,645, September 29, 1998 as having insecticidal activity, but the compounds of the present invention are not disclosed. Sanière et al., in *Tetrahedron Letters*, 41, 671-674 (2000), exemplify certain 4,5-dihydro 1,2,4-triazin-6(1H)-ones for use as scaffolds for combinatorial chemistry, the compounds of the present invention and their uses are not disclosed.

One embodiment of this invention relates to a compound of the formula (I)



wherein

R¹ is alkyl, haloalkyl, cyanoalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkylalkynyl, alkoxyalkyl, alkylthioalkyl, cycloalkyl, cycloalkylalkyl, trialkylsilylalkyl where the three alkyl groups may be the same or different, alkoxycarbonyl, alkylcarbonyl, alkoxycarbonylalkyl, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of alkyl, halo, nitro, alkoxy, alkylthio, haloalkyl, haloalkylthio and haloalkoxy, phenalkyl or

phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, pyndyl or pyndyl substituted with from one to two substituents independently selected from the group consisting of alkyl and halo, furyl, thienyl, thenyl or furyl, thienyl or thenyl substituted with halo or alkyl on the furyl or thienyl ring, benzothienyl, benzofuranyl or benzothienyl or benzofuranyl substituted with halo, alkyl or haloalkyl,

R^3 is alkyl, cycloalkyl, cycloalkylalkyl, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, aryl selected from phenyl, naphthyl, and phenyl and naphthyl substituted with from one to five substituents independently selected from the group consisting of halo, alkyl, haloalkyl, haloalkoxy, alkylthio, haloalkylthio, alkylsulfinyl, alkylsulfonyl, nitro, cyano, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or phenyl and naphthyl substituted with a heteroaryl group selected from furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, pyridyl, pyridaziny, pyrimidiny, pyraziny, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl, and furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, pyndyl, pyndaziny, pyrimidiny, pyraziny, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, nitro and cyano, phenyl, phenoxy,

and phenyl and phenoxy substituted with one or two substituents independently selected from the group consisting of halo, alkyl, alkoxy, haloalkyl, haloalkoxy, alkylthio, nitro and cyano, heteroaryl selected from furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, pyndyl, pyndaziny, pynmidiny, pyraziny, pyrazoly, 1,2,3-thiadiazol-4-yl, thiazoly, triazoly, triaziny, isoxazoly and oxazoly, and furyl, thienyl, pyndyl, pyridaziny, pynmidiny, pyraziny, 1,2,3-thiadiazol-4-yl and oxazoly substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, haloalkylthio, nitro and cyano,

R^4 is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, cycloalkyl, cycloalkylalkyl, cycloalkylcarbonyl, alkylsulfonyl, alkylthio, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, cyano, alkenyl, alkenylsulfonyl, haloalkenyl, alkenylcarbonyl, alkynyl, haloalkynyl, alkoxycarbonyl, haloalkoxycarbonyl, alkoxycarbonylalkyl, alkoxycarbonylthio, (alkylthio)carbonyl, alkyl(thiocarbonyl), alkylthiothiocarbonyl, alkenyloxycarbonyl, alkenylthiothiocarbonyl, alkynyloxycarbonyl, alkynylthiothiocarbonyl, alkoxyoxalyl, alkylcarbonyloxyalkoxy-carbonyl, aralkyl, arylcarbonyl, arylsulfonyl, arylsulfonylalkenyl, aryloxycarbonyl, aryloxythiocarbonyl, arylthiothiocarbonyl or aralkyl, arylcarbonyl, arylsulfonyl, arylsulfonylalkenyl, aryloxycarbonyl, aryloxythiocarbonyl, arylthiothiocarbonyl substituted on an aromatic ring with from one to two substituents independently selected from halo and alkyl, or thenyl or thenyl substituted on the thienyl ring

with from one to two substituents independently selected from halo and alkyl,

R^5 is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, formyl, alkoxy, alkoxycarbonyl, alkoxycarbonyloxy, alkylcarbonyloxy, alkoxycarbonylthio, alkylcarbonylthio, alkylthio, hydroxy, mercapto, alkenyl, alkynyl, cyano, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, aryl, aralkyl, aryloxy, arylthio, arylcarbonylthio or aryl, aralkyl, aryloxy, arylthio, arylcarbonylthio substituted on the aryl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl, haloalkoxy, amino, alkylamino and dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or

R^4 can form a fused ring to the R^3 substituent when the R^3 substituent is aryl or heteroaryl wherein R^4 is selected from $-CH(R)-$, $-O-$, $-S-$, $-N(R)-$, $-C(=O)-$, $-O(C=O)-$, $-C(=O)O-$, $-CH_2CH_2-$, $-CH=CH-$, $-N(R)CH_2-$, $-C(R)=N-$, $-N=C(R)-$, $-CH(R)O-$, $-OCH(R)-$, $-CH(R)S-$ and $-SCH(R)-$, or

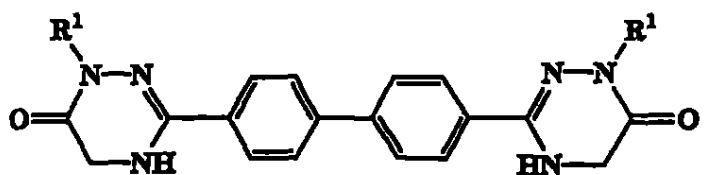
R^3 and R^4 taken together can form a substituted pyridazinyl ring,

R^5 and X^5 taken together can form a carbonyl, or

X^5 is a hydrogen atom or taken together with R^4 forms a nitrogen-carbon bond,

Z is an oxygen atom, a sulfur atom or NR,

R is H or alkyl, or a compound of the formula



or the agronomically acceptable salts, isomers, tautomers, enantiomers and mixtures thereof, provided that

when R^1 is an aralkyl or a heteroaralkyl, R^4 is not cyano, alkylsulfonyl, arylsulfonyl or polyhaloalkyl,

when R^1 is acetyl and R^3 is 2-pyridyl, R^5 and X^6 taken together can not form a carbonyl, and

when R^3 is phenyl, methyl or cyclohexyl, R^1 is not phenyl, methyl, nitrophenyl, ethoxycarbonyl, benzyl or benzyloxymethyl

The term "alkyl" includes both branched and straight chain alkyl groups. Typical alkyl groups are methyl, ethyl, *n*-propyl, isopropyl, *n*-butyl, *sec*-butyl, isobutyl, *tert*-butyl, *n*-pentyl, isopentyl, *n*-hexyl, *n*-heptyl, isooctyl, nonyl, decyl, undecyl, dodecyl and the like.

The term "halo" refers to fluoro, chloro, bromo or iodo.

The term "haloalkyl" refers to an alkyl group substituted with one or more halo groups, for example chloromethyl, 2-bromoethyl, 3-iodopropyl, trifluoromethyl, 2,2,2-trifluoroethyl, perfluoropropyl, 8-chlorononyl and the like

The term "cyanoalkyl" refers to an alkyl group substituted with a cyano group, for example cyanomethyl, 2-cyanoethyl and the like

The term "alkoxy" includes both branched and straight chain alkyl groups attached to a terminal oxygen atom. Typical alkoxy groups include methoxy, ethoxy, *n*-propoxy, isopropoxy, *tert*-butoxy and the like

The term "alkoxyalkyl" refers to an alkyl group substituted with an alkoxy group, for example isopropoxymethyl

The term "haloalkoxy" refers to an alkoxy group substituted with one or more halo groups, for example chloromethoxy, trifluoromethoxy, difluoromethoxy, perfluoroisobutoxy and the like

The term "haloalkoxycarbonyl" refers to an alkoxy group substituted with one or more halo groups attached to a carbonyl group, for example chloromethoxycarbonyl, trifluoromethoxycarbonyl, difluoromethoxycarbonyl, perfluoroisobutoxycarbonyl and the like

The term "alkylthio" includes both branched and straight chain alkyl groups attached to a terminal sulfur atom, for example methylthio

The term "haloalkylthio" refers to an alkylthio group substituted with one or more halo groups, for example trifluoromethylthio

The term "alkylthioalkyl" refers to a straight chain or branched alkyl as defined hereinbefore substituted with an alkylthio group, for example methylthiomethyl, 3-(isobutylthio)heptyl and the like

The term "alkylsulfinyl" refers to a sulfinyl moiety substituted with an alkyl group, for example methylsulfinyl, *n*-propylsulfinyl and the like

The term "alkylsulfonyl" refers to a sulfonyl moiety substituted with an alkyl group, for example mesyl, *n*-propylsulfonyl and the like

The term "alkylamino" refers to an alkyl group attached to a nitrogen atom, for example methylamino, isopropylamino and the like

The term "dialkylamino" refers to two alkyl groups, which may be the same or different, attached to a nitrogen atom, for example dimethylamino, *N*-ethyl-*N*-methylamino and the like

The term "trialkylsilylalkyl" refers to three alkyl groups, which may be the same or different, attached to a silicon atom which is in turn attached to an alkyl group, for example trimethylsilylmethyl

The term "alkoxycarbonyl" refers to a straight chain or branched alkoxy attached to a carbonyl group, for example ethoxycarbonyl, methoxycarbonyl and the like

The term "aryloxy" refers to an unsubstituted or substituted aryl group attached to an oxygen atom, for example phenoxy, 4-(trifluoromethyl)phenoxy, 2-chlorophenoxy, 4-fluoro-1-naphthoxy and the like

The term "arylthio" refers to an unsubstituted or substituted aryl group attached to a sulfur atom, for example phenylthio, 4-(trifluoromethyl)phenylthio, 2-chlorophenylthio, 4-fluoro-1-naphthylthio and the like

The term "aryloxy carbonyl" refers to an aryloxy attached to a carbonyl group, for example phenoxycarbonyl and the like

The term "alkoxyoxalyl" refers to a straight chain or branched alkoxy attached to a oxalyl group, for example ethoxyoxalyl, methoxyoxalyl and the like

The term "alkylcarbonyloxyalkoxycarbonyl" refers to a straight chain or branched alkoxyalkoxycarbonyl, for example acetoxymethoxycarbonyl and the like

The term "alkoxycarbonylthio" refers to a straight chain or branched alkoxy attached to a carbonyl group which is in turn attached to a sulfur atom, for example ethoxycarbonylthio, methoxycarbonylthio and the like

The term "alkylcarbonyl" refers to an alkylketo functionality, for example acetyl, *n*-butyryl and the like

The term "arylcarbonyl" refers to an arylketo functionality, for example benzoyl and the like

The term "alkylcarbonylalkyl" refers to an alkylketoalkyl functionality, for example acetylmethyl and the like

The term "cycloalkylcarbonyl" refers to an cycloalkylketo functionality, for example cyclopropylcarbonyl and the like

The term "alkyl(thiocarbonyl)" refers to an alkyl functionality attached to a thiocarbonyl group, for example thioacetyl and the like

The term "(alkylthio)carbonyl" refers to an alkylthio functionality attached to a carbonyl group, for example methylthiocarbonyl and the like

The term "aryl(thiocarbonyl)" refers to an aryl functionality attached to a thiocarbonyl group, for example thiobenzoyl and the like

The term "(arylthio)carbonyl" refers to an arylthio functionality attached to a carbonyl group, for example phenylthiocarbonyl and the like

The term "alkylthiothiocarbonyl" refers to an alkylthio functionality attached to a thiocarbonyl group, for example propylthiothiocarbonyl and the like

The term "alkenylthiothiocarbonyl" refers to an alkenylthio functionality attached to a thiocarbonyl group, for example allylthiothiocarbonyl and the like

The term "alkynylthiothiocarbonyl" refers to an alkynylthio functionality attached to a thiocarbonyl group, for example propargylthiothiocarbonyl and the like

The term "aryloxythiocarbonyl" refers to an aroxy functionality attached to a thiocarbonyl group, for example phenoxythiocarbonyl and the like

The term "aryliothiocarbonyl" refers to an arylthio functionality attached to a thiocarbonyl group, for example phenylthiocarbonyl and the like

The term "alkoxycarbonylalkyl" refers to a straight chain or branched alkyl substituted with an alkoxycarbonyl, for example ethoxycarbonylmethyl, 2-(methoxycarbonyl)propyl and the like

The term "alkenyl" refers to an ethylenically unsaturated hydrocarbon group, straight or branched chain, having 1 or 2 ethylenic bonds, for example vinyl, allyl, 1-butenyl, 2-butenyl, isopropenyl, 2-pentenyl, allenyl and the like

The term "haloalkenyl" refers to an alkenyl group substituted with one or more halo groups

The term "alkenyloxycarbonyl" refers to a straight chain or branched alkenyloxy attached to a carbonyl group, for example allyloxycarbonyl, vinyloxycarbonyl and the like

The term "alkynyl" refers to an unsaturated hydrocarbon group, straight or branched, having 1 or 2 acetylenic bonds, for example ethynyl, propargyl and the like

The term "haloalkynyl" refers to an alkynyl group substituted with one or more halo groups

The term "alkynyloxycarbonyl" refers to a straight chain or branched alkynyloxy attached to a carbonyl group, for example propargyloxycarbonyl and the like

The term "cycloalkyl" refers to a cyclic aliphatic ring structure, optionally substituted with alkyl, hydroxy and halo, such as cyclopropyl, methylcyclopropyl, cyclobutyl, 2-hydroxycyclopentyl, cyclohexyl, 4-chlorocyclohexyl, cycloheptyl, cyclooctyl and the like

The term "cycloalkylalkyl" refers to a cycloalkyl group as defined hereinbefore attached to an alkyl group, for example cyclopropylmethyl, cyclohexylethyl and the like

The term "cycloalkylalkynyl" refers to a cycloalkyl group as defined hereinbefore attached to an alkynyl group, for example cyclopropylpropargyl, 4-cyclopentyl-2-butyne and the like

The term "aryl" refers to phenyl or naphthyl which may be optionally substituted. Typical aryl substituents include, but are not limited to, phenyl, 4-chlorophenyl, 4-fluorophenyl, 4-bromophenyl, 3-nitrophenyl, 2-methoxyphenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-ethylphenyl, 2-methyl-3-methoxyphenyl, 2,4-dibromophenyl, 3,5-difluorophenyl, 3,5-dimethylphenyl, 2,4,6-trichlorophenyl, 4-methoxyphenyl, 4-(trifluoromethoxy)phenyl, naphthyl, 2-chloronaphthyl, 2,4-dimethoxyphenyl, 4-(trifluoromethyl)phenyl and 2-iodo-4-methylphenyl

The term "heteroaryl" refers to a substituted or unsubstituted 5 or 6 membered unsaturated ring containing one, two or three heteroatoms, preferably one or two heteroatoms independently selected from oxygen, nitrogen and sulfur or to a bicyclic unsaturated ring system containing up to 10 atoms including one heteroatom selected from oxygen, nitrogen and sulfur. Examples of heteroaryls include, but are not limited to, 2-, 3- or 4-

pyridinyl, pyrazinyl, 2-, 4-, or 5-pyrimidinyl, pyridazinyl, triazolyl, imidazolyl, 2- or 3-thienyl, 2- or 3-furyl, pyrrolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, oxadiazolyl, thiadiazolyl, quinolyl, isoquinolyl, benzofuranyl and benzothiofuranyl (benzothienyl) The heterocyclic ring may be optionally substituted with up to two substituents such as, but not limited to, alkyl, halo and haloalkyl

The term "aralkyl" is used to describe a group wherein the alkyl chain can be branched or straight chain with the aryl portion, as defined hereinbefore, forming a terminal portion of the aralkyl moiety Examples of aralkyl groups include, but are not limited to, optionally substituted benzyl and phenethyl such as 4-chlorobenzyl, 2,4-dibromobenzyl, 2-methylbenzyl, 2-(3-fluorophenyl)ethyl, 2-(4-methylphenyl)ethyl, 2-(4-(trifluoromethyl)phenyl)ethyl, 2-(2-methoxyphenyl)ethyl, 2-(3-nitrophenyl)ethyl, 2-(2,4-dichlorophenyl)ethyl, 2-(3,5-dimethoxyphenyl)ethyl, 4-(trifluoromethoxy)benzyl and the like

The term "heteroaralkyl" is used to describe a group wherein the alkyl chain can be branched or straight chain with the heteroaryl portion, as defined hereinbefore, forming a terminal portion of the heteroaralkyl moiety, for example 3-furylmethyl, thenyl (thienylmethyl), furfuryl and the like

The term "arylsulfonyl" refers to a sulfonyl moiety substituted with an aryl group, for example toluenesulfonyl and the like

The term "alkylcarbonyloxy" refers to a straight chain or branched alkyl attached to a carbonyl group which is in turn attached to a oxygen atom, for example acetoxyl, *tert*-butylcarbonyloxy and the like

The term "alkylcarbonylthio" refers to a straight chain or branched alkyl attached to a carbonyl group which is in turn attached to a sulfur atom, for example ethylcarbonylthio, methylcarbonylthio and the like

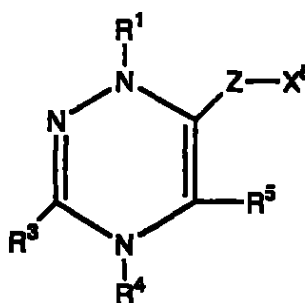
The term "alkoxycarbonyloxy" refers to a straight chain or branched alkoxy attached to a carbonyl group which is in turn attached to a oxygen atom, for example ethoxycarbonyloxy, methoxycarbonyloxy and the like

The term "alkoxycarbonylthio" refers to a straight chain or branched alkoxy attached to a carbonyl group which is in turn attached to a sulfur atom, for example ethoxycarbonylthio, methoxycarbonylthio and the like

The term "arylcarbonyloxy" refers to an unsubstituted or substituted aryl attached to a carbonyl group which is in turn attached to a oxygen atom, for example benzoyloxy and the like

The term "arylcarbonylthio" refers to an unsubstituted or substituted aryl attached to a carbonyl group which is in turn attached to a sulfur atom, for example 4-chlorophenylcarbonylthio and the like

The compounds of formula (I) also embrace the tautomeric forms of the invention, for example



wherein X^5 is a hydrogen atom and R^1 , R^3 , R^4 , R^5 and Z are as previously defined

A preferred mode of this first embodiment are compounds of formula (I) wherein

R^1 is (C₁-C₁₂)alkyl, halo(C₁-C₄)alkyl, (C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkynyl, halo(C₂-C₈)alkynyl, cyclo(C₃-C₇)alkyl(C₂-C₈)alkynyl, (C₁-C₄)alkoxy(C₁-C₄)alkyl, cyclo(C₃-C₇)alkyl, cyclo(C₃-C₇)alkyl(C₁-C₈)alkyl, tr(C₁-C₈)alkylsilyl(C₁-C₄)alkyl where the three alkyl groups may be the same or different, (C₁-C₈)alkoxycarbonyl, (C₁-C₈)alkylcarbonyl, (C₁-C₈)alkoxycarbonyl(C₁-C₄)alkyl, phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phen(C₁-C₄)alkyl or phen(C₁-C₄)alkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, furyl, thienyl, benzothienyl or benzofuranyl,

R^3 is (C₁-C₁₂)alkyl, benzyl, phenethyl or benzyl or phenethyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, halo(C₁-C₄)alkoxy, (C₁-C₄)alkylthio, halo(C₁-C₄)alkylthio, (C₁-

C₄)alkylsulfinyl, (C₁-C₄)alkylsulfonyl, nitro, cyano, di(C₁-C₄)alkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, quinoliny, isoquinoliny, benzofurany, benzothiény, or quinoliny, isoquinoliny, benzofurany or benzothiény substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

R⁴ is a hydrogen atom, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, (C₁-C₄)alkylcarbonyl, (C₁-C₄)alkylcarbonyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkyl, cyclo(C₃-C₈)alkyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkylcarbonyl, (C₁-C₄)alkylsulfonyl, (C₂-C₈)alkenyl, (C₂-C₈)alkenylsulfonyl, phenylsulfonyl(C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkenylcarbonyl, (C₂-C₈)alkynyl, (C₁-C₄)alkoxycarbonyl, halo(C₁-C₄)alkoxycarbonyl, (C₁-C₄)alkoxycarbonyl(C₁-C₄)alkyl, (C₁-C₄)alkylcarbonyloxymethoxycarbonyl, (C₁-C₄)alkoxycarbonylthio, ((C₁-C₄)alkylthio)carbonyl, (C₁-C₄)alkylthiothiocarbonyl, (C₂-C₈)alkenylloxycarbonyl, (C₂-C₈)alkenylthiothiocarbonyl, (C₂-C₈)alkynylloxycarbonyl, (C₂-C₈)alkynylthiothiocarbonyl, (C₁-C₄)alkoxyoxalyl, (C₁-C₄)alkylcarbonyloxy(C₁-C₄)alkoxycarbonyl, phen(C₁-C₄)alkyl, benzoyl, phenoxycarbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl or phen(C₁-C₄)alkyl, benzoyl, phenoxycarbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl substituted on the phenyl ring with from one to two substituents independently selected from halo and (C₁-C₄)alkyl, or thenyl or thenyl substituted on the thienyl ring with from one to two substituents independently selected from halo and (C₁-C₄)alkyl,

R^5 is a hydrogen atom, (C₁-C₄)alkoxy, (C₁-C₄)alkylthio, hydroxy, mercapto, cyano, phenyl or phenyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy,

Z is an oxygen atom or a sulfur atom, and

X^5 is a hydrogen atom or taken together with R^4 forms a nitrogen-carbon bond

A more preferred mode of this embodiment are compounds of formula (I) wherein

R^1 is (C₁-C₁₀)alkyl, halo(C₁-C₁₀)alkyl, (C₂-C₈)alkenyl, (C₂-C₈)alkynyl, cyclo(C₃-C₈)alkyl(C₁-C₂)alkyl, tr(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R^3 is phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₂)alkyl and halo(C₁-C₂)alkoxy,

R^4 is a hydrogen atom, (C₁-C₄)alkylsulfonyl, (C₁-C₄)alkoxycarbonylthio, (C₂-C₄)alkenyloxycarbonyl, (C₂-C₈)alkynyl, (C₂-C₄)alkynyloxycarbonyl or (C₁-C₄)alkoxyoxalyl, and

R^5 is a hydrogen atom, (C₁-C₄)alkoxy or (C₁-C₄)alkylthio

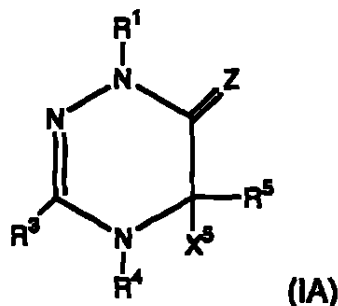
An even more preferred mode of this first embodiment are compounds of formula (I) wherein

R^1 is (C_1-C_{10}) alkyl, halo (C_1-C_{10}) alkyl, (C_2-C_8) alkenyl, halo (C_2-C_8) alkenyl, (C_2-C_8) alkynyl, cyclo (C_3-C_8) alkyl (C_1-C_2) alkyl, tri (C_1-C_4) alkylsilyl (C_1-C_2) alkyl where the three alkyl groups may be the same or different,

R^3 is dihalosubstitutedphenyl, di (C_1-C_4) alkylsubstitutedphenyl, di(halo (C_1-C_2) alkyl)substitutedphenyl, monohalomono (C_1-C_4) alkylsubstitutedphenyl or monohalomono(halo (C_1-C_4) alkyl)substitutedphenyl,

R^4 and R^5 are hydrogen

A second embodiment of this invention relates to a fungicidal composition comprising a fungicidally effective amount of a compound of the formula (IA)



wherein

R^1 is a hydrogen atom, alkyl, haloalkyl, cyanoalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkylalkynyl, alkoxyalkyl, alkylthioalkyl, cycloalkyl, cycloalkylalkyl, trialkylsilylalkyl where the

three alkyl groups may be the same or different, alkoxycarbonyl, alkylcarbonyl, alkoxycarbonylalkyl, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of alkyl, halo, nitro, alkoxy, alkylthio, haloalkyl, haloalkylthio and haloalkoxy, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, pyndyl or pyndyl substituted with from one to two substituents independently selected from the group consisting of alkyl and halo, furyl, thienyl, thenyl or furyl, thienyl or thenyl substituted with halo or alkyl on the furyl or thienyl ring, benzothieryl, benzofuranyl or benzothieryl or benzofuranyl substituted with halo, alkyl or haloalkyl,

R^3 is alkyl, cycloalkyl, cycloalkylalkyl, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, aryl selected from phenyl, naphthyl, and phenyl and naphthyl substituted with from one to five substituents independently selected from the group consisting of halo, alkyl, haloalkyl, haloalkoxy, alkylthio, haloalkylthio, alkylsulfinyl, alkylsulfonyl, nitro, cyano, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or phenyl and naphthyl substituted with a heteroaryl group selected from furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothieryl, pyndyl, pyndaziny, pyrimidiny, pyraziny, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl, and furyl, thienyl, quinoliny,

isoquinoliny, benzofuranyl, benzothienyl, pyridyl, pyridaziny, pyrimidiny, pyraziny, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, nitro and cyano, phenyl, phenoxy, and phenyl and phenoxy substituted with one or two substituents independently selected from the group consisting of halo, alkyl, alkoxy, haloalkyl, haloalkoxy, alkylthio, nitro and cyano, heteroaryl selected from furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, pyridyl, pyridaziny, pyrimidiny, pyraziny, pyrazolyl, 1,2,3-thiadiazol-4-yl, thiazolyl, triazolyl, triaziny, isoxazolyl and oxazolyl, and furyl, thienyl, pyndyl, pyridaziny, pyrimidiny, pyraziny, 1,2,3-thiadiazol-4-yl and oxazolyl substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, haloalkylthio, nitro and cyano,

R^4 is a hydrogen atom, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, cycloalkyl, cycloalkylalkyl, cycloalkylcarbonyl, alkylsulfonyl, alkoxy, alkylthio, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, cyano, alkenyl, alkenylsulfonyl, haloalkenyl, alkenylcarbonyl, alkynyl, haloalkynyl, alkoxycarbonyl, haloalkoxycarbonyl, alkoxycarbonylalkyl, alkoxycarbonylthio, (alkylthio)carbonyl, alkyl(thiocarbonyl), alkylthiothiocarbonyl, alkenyloxycarbonyl, alkenylthiothiocarbonyl, alkynyloxycarbonyl, alkynylthiothiocarbonyl, alkoxyoxalyl, alkylcarbonyloxyalkoxycarbonyl, aralkyl, arylcarbonyl, arylsulfonyl, arylsulfonylalkenyl, aryloxycarbonyl, aryloxythiocarbonyl, arylthiothiocarbonyl or aralkyl, arylcarbonyl,

arylsulfonyl, arylsulfonylalkenyl, aryloxycarbonyl, aryloxythiocarbonyl, arylthiothiocarbonyl substituted on an aromatic ring with from one to two substituents independently selected from halo and alkyl,

R^5 is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, formyl, alkoxy, alkoxycarbonyl, alkoxycarbonyloxy, alkylcarbonyloxy, alkoxycarbonylthio, alkylcarbonylthio, alkylthio, hydroxy, mercapto, alkenyl, alkynyl, cyano, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy, arylcarbonylthio, or aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy, arylcarbonylthio substituted on the aryl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl, haloalkoxy, amino, alkylamino and dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or

R^4 can form a fused ring to the R^3 substituent when the R^3 substituent is aryl or heteroaryl wherein R^4 is selected from $-CH(R)-$, $-O-$, $-S-$, $-N(R)-$, $-C(=O)-$, $-O(C=O)-$, $-C(=O)O-$, $-CH_2CH_2-$, $-CH=CH-$, $-N(R)CH_2-$, $-C(R)=N-$, $-N=C(R)-$, $-CH(R)O-$, $-OCH(R)-$, $-CH(R)S-$ and $-SCH(R)-$, or

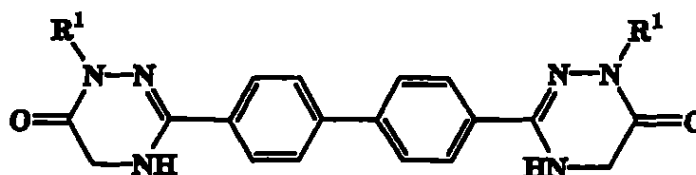
R^3 and R^4 taken together can form a substituted pyridaziny ring,

R^5 and X^6 taken together can form a carbonyl, or

X^6 is a hydrogen atom or taken together with R^4 forms a nitrogen-carbon bond,

Z is an oxygen atom, a sulfur atom or NR,

R is H or alkyl, or a compound of the formula



or the agronomically acceptable salts, isomers, tautomers, enantiomers and mixtures thereof, and an agronomically acceptable carrier

A preferred mode of this second embodiment are fungicidal compositions comprising a compound of formula (IA) wherein

R^1 is (C_1-C_{12}) alkyl, halo (C_1-C_4) alkyl, (C_2-C_8) alkenyl, halo (C_2-C_8) alkenyl, (C_2-C_8) alkynyl, halo (C_2-C_8) alkynyl, cyclo (C_3-C_7) alkyl (C_2-C_8) alkynyl, (C_1-C_4) alkoxy (C_1-C_4) alkyl, cyclo (C_3-C_7) alkyl, cyclo (C_3-C_7) alkyl (C_1-C_8) alkyl, tri (C_1-C_8) alkylsilyl (C_1-C_4) alkyl where the three alkyl groups may be the same or different, (C_1-C_8) alkoxycarbonyl, (C_1-C_8) alkylcarbonyl, (C_1-C_8) alkoxycarbonyl (C_1-C_4) alkyl, phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of (C_1-C_4) alkyl, halo, (C_1-C_4) alkoxy, halo (C_1-C_4) alkyl and halo (C_1-C_4) alkoxy, phen (C_1-C_4) alkyl or phen (C_1-C_4) alkyl substituted on the phenyl ring with from one to three substituents independently selected from

the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, furyl, thienyl, benzothienyl or benzofuranyl,

R³ is (C₁-C₁₂)alkyl, benzyl, phenethyl or benzyl or phenethyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, halo(C₁-C₄)alkoxy, (C₁-C₄)alkylthio, halo(C₁-C₄)alkylthio, (C₁-C₄)alkylsulfinyl, (C₁-C₄)alkylsulfonyl, nitro, cyano, di(C₁-C₄)alkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, or quinoliny, isoquinoliny, benzofuranyl or benzothienyl substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

R⁴ is a hydrogen atom, halo(C₁-C₄)alkyl, (C₁-C₄)alkylcarbonyl, (C₁-C₄)alkylcarbonyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkyl, cyclo(C₃-C₈)alkyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkylcarbonyl, (C₁-C₄)alkylsulfonyl, (C₂-C₈)alkenyl, (C₂-C₈)alkenylsulfonyl, phenylsulfonyl(C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkenylcarbonyl, (C₂-C₈)alkynyl, (C₁-C₄)alkoxycarbonyl, halo(C₁-C₄)alkoxycarbonyl, (C₁-C₄)alkoxycarbonyl(C₁-C₄)alkyl, (C₁-C₄)alkylcarbonyloxymethoxy-

carbonyl, (C₁-C₄)alkoxycarbonylthio, ((C₁-C₄)alkylthio)carbonyl, (C₁-C₄)alkylthiothiocarbonyl, (C₂-C₈)alkenyloxycarbonyl, (C₂-C₈)alkenylthiothiocarbonyl, (C₂-C₈)alkynyloxycarbonyl, (C₂-C₈)alkynylthiothiocarbonyl, (C₁-C₄)alkoxyoxalyl, (C₁-C₄)alkylcarbonyloxy(C₁-C₄)alkoxycarbonyl, phen(C₁-C₄)alkyl, benzoyl, phenoxy carbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl or phen(C₁-C₄)alkyl, benzoyl, phenoxy carbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl substituted on the phenyl ring with from one to two substituents independently selected from halo and (C₁-C₄)alkyl,

R⁵ is a hydrogen atom, (C₁-C₄)alkoxy, (C₁-C₄)alkylthio, hydroxy, mercapto, cyano, phenyl or phenyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy,

Z is an oxygen atom or a sulfur atom, and

X⁵ is a hydrogen atom or taken together with R⁴ forms a nitrogen-carbon bond

A more preferred mode of this second embodiment are fungicidal compositions comprising a compound of formula (IA) wherein

R¹ is (C₁-C₁₀)alkyl, halo(C₁-C₄)alkyl, (C₂-C₈)alkenyl, (C₂-C₈)alkynyl, cyclo(C₃-C₈)alkyl(C₁-C₂)alkyl, tri(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R^3 is phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₂)alkyl and halo(C₁-C₂)alkoxy,

R^4 is a hydrogen atom, (C₁-C₄)alkylsulfonyl, (C₁-C₄)alkoxycarbonylthio, (C₂-C₄)alkenyloxycarbonyl, (C₂-C₈)alkynyl, (C₂-C₄)alkynyloxycarbonyl or (C₁-C₄)alkoxyoxalyl, and

R^5 is a hydrogen atom, (C₁-C₄)alkoxy or (C₁-C₄)alkylthio

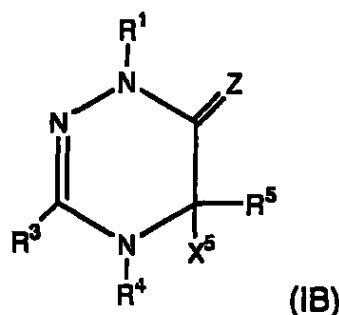
An even more preferred mode of this second embodiment are fungicidal compositions comprising a compound of formula (IA) wherein

R^1 is (C₁-C₁₀)alkyl, halo(C₁-C₁₀)alkyl, (C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkynyl, cyclo(C₃-C₈)alkyl(C₁-C₂)alkyl, tri(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R^3 is dihalosubstitutedphenyl, di(C₁-C₄)alkylsubstitutedphenyl, di(halo(C₁-C₂)alkyl)substitutedphenyl, monohalomono(C₁-C₄)alkylsubstituted or monohalomono(halo(C₁-C₄)alkyl)substitutedphenyl,

R^4 and R^5 are hydrogen

A third embodiment of this invention relates to an insecticidal composition comprising an insecticidally effective amount of a compound of the formula (IB)



wherein

- R¹** is a hydrogen atom, alkyl, haloalkyl, cyanoalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkylalkynyl, alkylthioalkyl, cycloalkyl, cycloalkylalkyl, trialkylsilylalkyl where the three alkyl groups may be the same or different, alkylcarbonyl, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, furyl, thienyl, thenyl or furyl, thienyl or thenyl substituted with halo on the furyl or thienyl ring, benzothienyl or benzofuranyl,
- R³** is alkyl, cycloalkyl, cycloalkylalkyl, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, aryl selected from phenyl and phenyl substituted with from one to five substituents independently selected from the group consisting of halo, alkyl, haloalkyl, haloalkoxy, alkylsulfinyl, alkylsulfonyl, nitro, cyano, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-

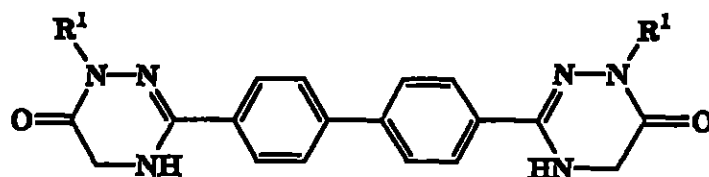
membered heterocyclic ring, heteroaryl selected from furyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl and pyridyl, and benzofuranyl, benzothienyl and pyridyl substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, nitro and cyano,

R^4 is a hydrogen atom, alkyl, alkylcarbonyl, alkoxy, alkylthio, alkylamino, cyano, alkenyl, alkynyl, haloalkynyl, haloalkoxycarbonyl, alkoxycarbonylthio, alkenyloxycarbonyl, alkynyloxycarbonyl, alkoxyoxaly, alkylcarbonyl, alkylcarbonyloxy, alkoxycarbonyl, arylcarbonyl, arylsulfonyl, aryloxythiocarbonyl, or arylcarbonyl, arylsulfonyl, aryloxythiocarbonyl substituted on the aryl ring with from one to two substituents independently selected from halo and alkyl, or thenyl or thenyl substituted on the thienyl ring with from one to two substituents independently selected from halo and alkyl,

R^5 is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, formyl, alkoxy, alkoxycarbonyl, alkoxycarbonyloxy, alkylcarbonyloxy, alkoxy-carbonylthio, alkylcarbonylthio, alkylthio, mercapto, alkenyl, alkynyl, cyano, dialkylamino, aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy, arylcarbonylthio or aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy or arylcarbonylthio substituted on the aryl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy,

X^5 is a hydrogen atom or taken together with R^4 forms a nitrogen-carbon bond,

Z is an oxygen atom, or a compound of the formula



or the agronomically acceptable salts, isomers, tautomers, enantiomers and mixtures thereof and an agronomically acceptable carrier, provided that when R¹ is an aralkyl or a heteroaralkyl, R¹ is not cyano, alkylsulfonyl, arylsulfonyl or polyhaloalkyl

A preferred mode of this third embodiment are insecticidal compositions comprising a compound of formula (IB) wherein

R¹ is a hydrogen atom, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, (C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkynyl, halo(C₂-C₈)alkynyl, cyclo(C₃-C₇)alkyl(C₂-C₈)alkynyl, cyclo(C₃-C₇)alkyl, cyclo(C₃-C₇)alkyl(C₁-C₈)alkyl, tr(C₁-C₈)alkylsilyl(C₁-C₄)alkyl where the three alkyl groups may be the same or different, (C₁-C₈)alkylcarbonyl, phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phen(C₁-C₄)alkyl or phen(C₁-C₄)alkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, furyl, thienyl, benzothienyl or benzofuranyl,

R² is (C₁-C₁₂)alkyl, benzyl, phenethyl or benzyl or phenethyl substituted on the phenyl ring with from one to three substituents

independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, halo(C₁-C₄)alkoxy, (C₁-C₄)alkylsulfinyl, (C₁-C₄)alkylsulfonyl, nitro, cyano, di(C₁-C₄)alkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, benzofuranyl, benzothienyl or benzofuranyl or benzothienyl substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

R⁴ is a hydrogen atom, (C₁-C₄)alkylcarbonyl, (C₁-C₄)alkylsulfonyl, (C₂-C₈)alkynyl, halo(C₂-C₈)alkynyl, halo(C₁-C₄)alkoxycarbonyl, (C₁-C₄)alkylcarbonyloxymethoxycarbonyl, (C₁-C₄)alkoxycarbonylthio, (C₂-C₈)alkenylloxycarbonyl, (C₂-C₈)alkynylloxycarbonyl or (C₁-C₄)alkoxyoxalyl, and

R⁵ is a hydrogen atom, (C₁-C₄)alkylthio, (C₁-C₄)alkoxy, cyano, phenyl or phenyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy

A more preferred mode of this third embodiment are insecticidal compositions comprising a compound of formula (IB) wherein

R¹ is (C₁-C₁₀)alkyl, halo(C₁-C₁₀)alkyl, (C₂-C₈)alkynyl, cyclo(C₃-C₈)alkyl(C₁-C₂)alkyl, tr(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R³ is phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₂)alkyl and halo(C₁-C₂)alkoxy, or benzothienyl substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

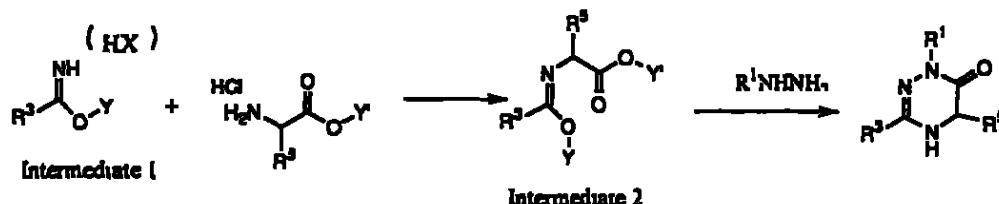
R⁴ is a hydrogen atom, (C₁-C₄)alkylsulfonyl, (C₁-C₄)alkoxy-carbonylthio, (C₂-C₄)alkenyloxycarbonyl, (C₂-C₄)alkynyloxycarbonyl or (C₁-C₄)alkoxyoxalyl, and

R⁵ is a hydrogen atom, (C₁-C₄)alkoxy or (C₁-C₄)alkylthio

A fourth embodiment of the present invention relates to a method of controlling a fungus comprising applying a fungicidally effective amount of a fungicidal composition comprising a compound of formula (IA) to the fungus, to the locus of the fungus or to the growth medium of said fungus

A fifth embodiment of the present invention relates to a method of controlling an insect comprising applying an insecticidally effective amount of an insecticidal composition comprising a compound of formula (IB) to the insect, to the locus of the insect or to the growth medium of said insect.

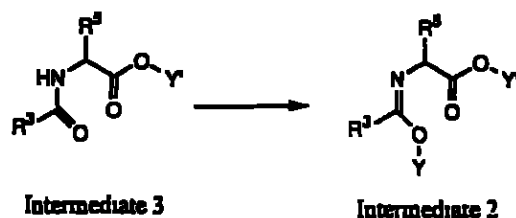
The compounds of this invention can be made by the using methods A-K

Method A

The imidic esters (intermediate 1) can be formed by standard methods (for example, Neilson, D G in "The Chemistry of Amidines and Imidates", (S Patai, ed), Wiley Publishing Co , New York, NY (1975) pp 385-413 and references therein, Klessling, A J and McClure, C K, *Synthetic Communications* 27(5), 923-927 (1997), and Schafer, F C and Peters, G A, *J Org Chem* (1961) 26, 412) In the above equation, X is a counter ion such as chloride or bromide, and Y is alkyl or aryl. The imidic esters may be neutral, or they may be salts, in the case of salts, roughly one equivalent of base is added to the reaction. The reactions can be run in methylene chloride, dioxane with a small amount of ethanol, alcohol solvents such as ethanol, methanol or isopropanol, or preferably in methylene chloride with 5% ethanol. The reactions can be run at room temperature or heated. The product intermediate 2 is reacted with a hydrazine to give the desired product. Solvents for this reaction include tetrahydrofuran, dioxane, or preferably an alcohol such as ethanol, propanol, etc.

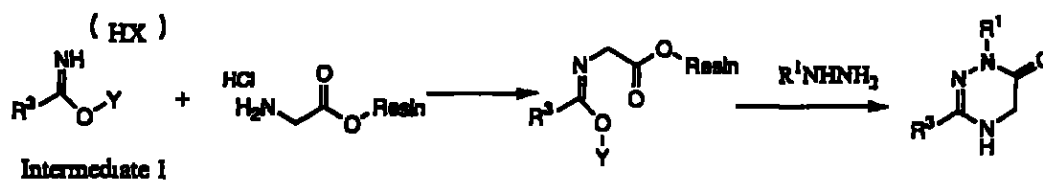
Alternatively, intermediate 2 can be prepared from an acylated amino acid as shown, using triethyloxonium tetrafluoroborate (or related derivatives) or methyl triflate, as shown for method B.

Method B



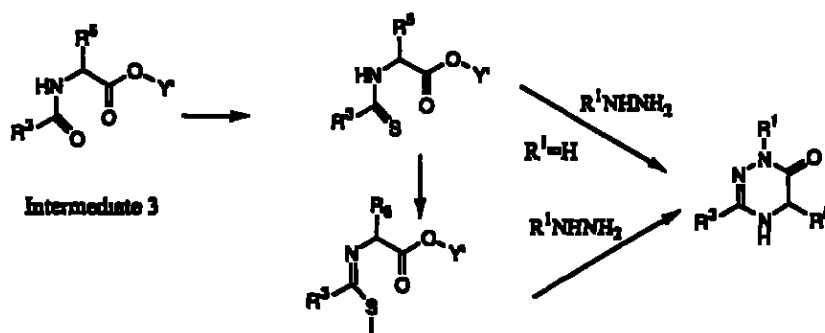
Method C

Solid phase synthesis can be used to make compound of this invention



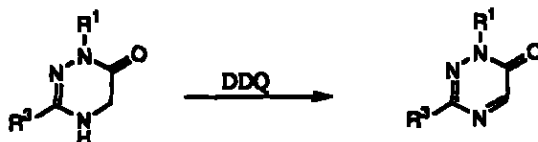
Method D

Compounds described in this invention can be made from acylated amino acids by the reaction shown in the scheme below. The preparation of the thioamide was carried out with phosphorous pentasulfide in toluene at 90°C, however, other reagents such as Lawesson's reagent and other solvents can be used. The alkylation of the thioamide was carried out using methyl iodide in methanol with sodium methoxide or in acetone with potassium carbonate as the base. The reaction of the intermediates with hydrazines is preferably run in alcohol solvents.



Method E

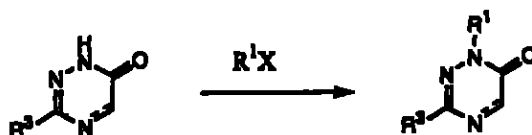
The dihydrotriazinones may be oxidized to the triazinones by using 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (DDQ). The reaction is preferably run in ethyl acetate, although other solvents, such as aromatic hydrocarbons, can be used.



Occasionally, oxidation of a dihydrotriazinone to a triazinone occurs spontaneously during a reaction or during purification.

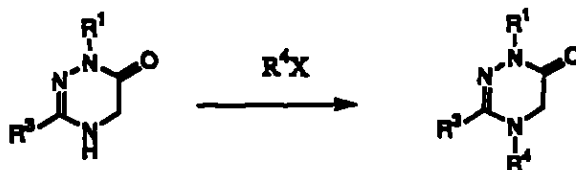
Method F

Compounds can be alkylated at N¹ using a strong base such as sodium hydride or potassium *t*-butoxide in solvents such as DMF or THF. R¹X is any alkylating agent.



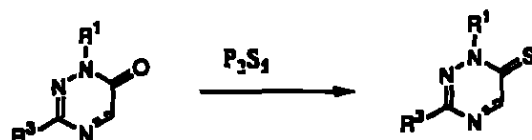
Method G

N⁴ can be derivatized using a strong base such as sodium hydride or potassium *t*-butoxide and an electrophile. For reactive electrophiles such as di-*tert*-butyl dicarbonate, either no base or a mild base, such as triethylamine, is required.



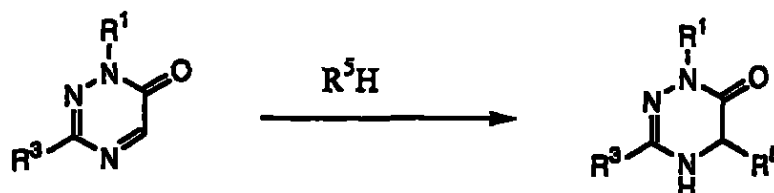
Method H

The carbonyl can be converted to a thiocarbonyl using phosphorus pentasulfide in toluene. Both other reagents, such as Lawesson's reagent, and other solvents could be used.



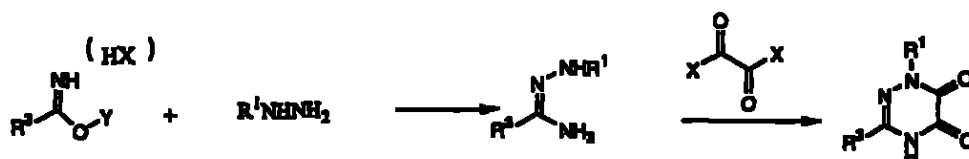
Method I

The 1,2,4-triazin-6-ones can react with nucleophiles such as alcohols or thiols to form 5-substituted derivatives.



Method J

1,2,4-Triazin-5,6-diones can be prepared by from the amidrazones by reaction with oxalyl chloride or diethyl oxalate.



Method K

A Grignard reagent can be added to a 1,2,4-triazin-6-one in a suitable solvent, such as ether or THF to give a 5-substituted dihydrotriazinone.



Examples Demonstrating the Methods

All reactions were run under a blanket of nitrogen. Chromatographic purifications were carried out using silica gel under air or preferably nitrogen pressure, or under reduced pressure, or by reverse phase liquid chromatography (LC).

Method A

Preparation of 1-(2,2,2-trifluoroethyl)-3-(3-chloro-4-fluorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 1)

A slurry of 17.7 grams of O-ethyl 3-chloro-4-fluorobenzimidate hydrochloride (74 mmol), 12.6 grams of ethyl glycine hydrochloride (90 mmol), 140 mL of methylene chloride and 7 mL of dry ethanol was prepared. After ten minutes of stirring 9.60 grams of triethylamine (95 mmol) was added over three minutes. No significant exotherm resulted. The reaction was allowed to stir overnight at room temperature. The reaction was diluted with 100 mL of methylene chloride and washed with two 70 mL portions of water. The organic phase was dried and concentrated under reduced pressure to yield 15.9 grams of O-ethyl N-(ethyl 2-acetate)-3-chloro-4-fluorobenzimidate as a dark amber oil. The material was reacted without further purification.

2,2,2-Trifluoroethylhydrazine (2.17 grams, 70% solution in water, 13.3 mmol) was added dropwise over two minutes to a solution of 3.82 grams O-ethyl N-(ethyl 2-acetate)-3-chloro-4-fluorobenzimidate (13.2 mmol) in 25 mL of dry ethanol. The reaction was allowed to stir overnight at room temperature. The reaction was refluxed for one hour, allowed to cool, diluted with 10 mL of water. The solid was collected on a Buchner funnel, rinsed with several mL of methanol, and dried. The yield was 1.3 grams of

1-(2,2,2-trifluorethyl)-3-(3-chloro-4-fluorophenyl)-4,5-dihydro-1,2,4-triazin-6-one

Method B

Preparation of 1-butyl-3-(2,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 2)

Ethyl 2,4-dichlorobenzoylglycine (6.28 grams, 22.7 mmol) was dissolved in 40 mL of methylene chloride. Methyl triflate (4.89 grams, 30 mmol) was added at once and the reaction was allowed to stir at room temperature for 3 days. The reaction was concentrated under reduced pressure. Then 30 mL of toluene was added and removed under reduced pressure to yield 10.6 grams of O-methyl-N-(ethyl 2-acetate)-2,4-dichlorobenzimidate trifluoromethanesulfonate as a clear liquid.

A solution of 5.3 grams of O-methyl-N-(ethyl 2-acetate)-2,4-dichlorobenzimidate trifluoromethanesulfonate (12 mmol) in 30 mL of dry ethanol was chilled in ice water bath. *n*-Butylhydrazine oxalate (2.05 grams, 11.5 mmol) was added, then 5.1 grams of triethylamine (50 mmol) was added in small portions over five minutes. The reaction was allowed to warm to room temperature for one hour and then heated to reflux overnight. The reaction was concentrated under reduced pressure and partitioned between 125 mL of ethyl acetate and 70 mL of water. The organic phase was concentrated under reduced pressure and chromatographed with ethyl acetate/hexanes. The yield was 2.0 grams of 1-butyl-3-(2,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one as an oil.

Method C

Preparation of 1-Butyl-3-(4-phenoxyphenyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 3)

Preparation of the Fmoc-gly-Wang resin

Wang resin (70 g, 119 mmol, PL-Wang, Polymer Labs, 1.7 mmol/g) was swollen in 550 mL of methylene chloride and 100 mL of DMF and stirred for 30 min with an overhead stirrer. 71 g (238 mmol) of Fmoc-glycine were added, followed by 60 g (476 mmol) of diisopropylcarbodiimide and 2.4 g (19.7 mmol) of 4-dimethylaminopyridine. The reaction was stirred for 3.5 h at room temperature, the resin was filtered, washed with alternating methanol and methylene chloride and dried in a vacuum oven.

Preparation of the dihydrotriazinone

Fmoc-gly-Wang resin (1.3 g) was conditioned with DMF (2x6 mL) and then treated with piperidine (20% in DMF, 5 mL) for 20 min. The resin was filtered and washed with DMF (x2), methylene chloride (x2) and methanol (x2). Then 874 mg (3 mmol) of ethyl 4-phenyloxybenzimidate hydrochloride was added as a solid, followed by 5 mL methylene chloride and 1.7 mL of a solution of triethylamine in methanol (at 82 mg triethylamine/mL). The resin was shaken for 4 h at room temperature and then filtered and washed alternatively with methylene chloride and methanol. The resin was conditioned with methylene chloride and 532 mg (3 mmol) of butylhydrazine oxalate were added, followed by 581 mg of triethylamine and 1.5 mL of ethanol. The reaction was shaken at room temperature for 48 h, and the resin was filtered and washed with methylene chloride (x3). The collected filtrates were evaporated to dryness and the crude material is purified by low pressure chromatography on silica. Evaporation of the solvent gave 159 mg of a yellow solid.

Method D

Preparation of 1-(2,2,2-trifluoroethyl)-3-(4-chlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 4)

To a slurry of 4.54 g of 4-chlorobenzoyl methyl glycine (20 mmol) in 60 ml of toluene under an atmosphere of nitrogen was added 0.89 g (20 mmol) of phosphorus pentasulfide. The reaction was heated to 90°C for 3 hours. An additional 0.18 g of phosphorus pentasulfide was added, and the reaction was heated for an additional 1 hour, then cooled to room temperature. The product was filtered, the slurry was washed with ethyl acetate, and the combined filtrates were run through silica gel on Celite, then stripped. The product was chromatographed on a silica gel column to give 3.3 g (68% yield) of 4-chlorothiobenzoyl methylglycine, melting point 72-73°C.

A solution of 2.9 g 4-chlorothiobenzoyl methylglycine (11.9 mmol) in 20 ml of methanol under an atmosphere of nitrogen was cooled in an ice bath and treated with 0.67 g of sodium methoxide (12.4 mmol). Excess methyl iodide (5 g, 35 mmol) was added, and the reaction was stirred. An additional 1.15 g of sodium methoxide was added in two portions, and the reaction was allowed to warm to room temperature. Water was added, and the reaction mixture was extracted with ethyl acetate. The organic phase was washed with brine, dried over magnesium sulfate, filtered and stripped to give 2.87 g of N-2-acetic acid methyl ester-4-chlorophenyl (methylthio)imino ether.

A mixture of 1.63 g (6.3 mmol) of N-2-acetic acid methyl ester-4-chlorophenyl (methylthio)imino ether and 2.26 g of 2,2,2-trifluoroethylhydrazine (70%, 13.8 mmol) in ethanol was stirred overnight at room temperature, then heated to reflux. The reaction was cooled, and

the ethanol was stripped. The residue was extracted with ethyl acetate. Column chromatography gave 0.33 g of 1-(2,2,2-trifluoroethyl)-3-(4-chlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one, melting point 178-180°C.

Preparation of 3-(4-Chlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one

(Compound 5)

4-Chlorothiobenzoyl methyl glycine (4.87 g, 20 mmol), 2.2 g of hydrazine hydrate (44 mmol) and 20 mL of methanol were combined and stirred at room temperature overnight, then heated to reflux. The reaction mixture was cooled and filtered. The solids were washed, then dried, giving 3-(4-chlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one.

Preparation of 1-*t*-Butyl-3-(4-chlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one

(Compound 6)

A solution of 7.2 grams of crude N-2-acetic acid ethyl ester-4-chlorophenyl (methylthio)imino ether (28 mmol) in 40 mL of dry ethanol was cooled in an ice bath and treated with 5.3 grams of *t*-butyl hydrazine hydrate (74 mmol). The reaction was allowed to stir overnight at room temperature, then refluxed for 7.5 hours and allowed to cool. One half of the reaction mixture was concentrated under reduced pressure, then dissolved in 20 mL of xylenes. The reaction was heated to 120°C-130°C for six hours. The reaction was diluted with 100 mL of ethyl acetate and washed with 60 mL of water, dried and concentrated under reduced pressure. After chromatography 50 mg of 1-*t*-butyl-3-(4-chlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one was obtained.

Method E

Preparation of 1-(2,2,2-trifluoroethyl)-3-phenyl-1,2,4-triazin-6-one
(Compound 7)

A mixture of 0.51 g of 1-(2,2,2-trifluoroethyl)-3-phenyl-4,5-dihydro-1,2,4-triazin-6-one (2.0 mmol) and 0.48 g of DDQ (2.1 mmol) in 20 mL of ethyl acetate was stirred at room temperature overnight, then heated to 70°C for 2 hours. The reaction mixture was cooled and washed with aqueous potassium carbonate, water (2 times) and brine, dried over magnesium sulfate, filtered and stripped. The product was dissolved in ethyl acetate/methylene chloride and treated with silica gel, then filtered through silica gel over Celite to give 0.40 g of 1-(2,2,2-trifluoroethyl)-3-phenyl-1,2,4-triazin-6-one, melting point 129-131°C.

Method F

Preparation of 1-(2-pentynyl)-3-(4-chlorophenyl)-1,2,4-triazin-6-one
(Compound 8)

A mixture of 2.00 g of 3-(4-chlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (9.6 mmol) and 2.28 g of DDQ in 120 mL of ethyl acetate was stirred at room temperature overnight, then heated to reflux for 3 hours. The reaction mixture was cooled and filtered to give 0.4 g of a tan solid which dried in a vacuum oven and used without further purification.

The 0.4 g of 3-(4-chlorophenyl)-1,2,4-triazin-6-one (1.9 mmol) was placed in 10 mL of DMF and cooled in an ice bath. Sodium hydride (NaH) (0.8 g of 60% dispersion, 2 mmol) was added, and the reaction mixture was held for 15 minutes. Excess 1-chloro-2-pentyne was added, the bath was removed, and the reaction mixture was allowed to warm to room temperature. Water and ethyl acetate were added. The organic phase was washed with water and brine, dried over magnesium sulfate, filtered

and stripped. The crude product was chromatographed on silica gel to give 0.05 g of 1-(2-pentynyl)-3-(4-chlorophenyl)-1,2,4-triazin-6-one.

Preparation of 1-Cyclopropylmethyl-3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 9)

To a solution of 0.82 grams of 3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (2.9 mmol), prepared by method A, in 10 mL of N,N-dimethylformamide (DMF) was added 0.14 grams of 60% NaH (3.5 mmol) coated with mineral oil. After 30 minutes of stirring, 0.46 grams of bromomethylcyclopropane (3.4 mmol) was added and the reaction was allowed to stir overnight at room temperature.

The reaction was diluted with 60 mL of water and 150 mL of ethyl acetate. The organic phase was washed with 60 mL of water, dried and concentrated under reduced pressure. The crude product was chromatographed on silica gel with ethyl acetate/hexane to yield 0.23 grams of 1-cyclopropylmethyl-3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one.

Method G**Preparation of 1-(2,2,2-trifluoroethyl)-3-(3,5-dichlorophenyl)-4-allyloxycarbonyl-4,5-dihydro-1,2,4-triazin-6-one (Compound 10)**

To a solution of 1-(2,2,2-trifluoroethyl)-3-(3,5-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (110mg, 0.34 mmol) in 5 mL tetrahydrofuran at was added sodium hydride (30 mg, 0.67 mmol). After the reaction stirred 5 min, the allyl chloroformate (0.07 mL, 0.67 mmol) was added dropwise. After the reaction was heated at reflux for 6 h, it was quenched with water and diluted with ethyl acetate. The two layers were separated and the aqueous phase was extracted with ethyl acetate (3 x 5 mL). The combined organic extracts were dried over MgSO₄, filtered, and concentrated *in vacuo*. Flash column chromatography (100% hexanes - 10% ethyl acetate/hexanes) afforded the acylated product 1-(2,2,2-trifluoroethyl)-3-(3,5-dichlorophenyl)-4-allyloxycarbonyl-4,5-dihydro-1,2,4-triazin-6-one (130 mg, 93%) as a yellow oil in 100% purity by gas chromatography (GC).

Preparation of 1,4-di-(*t*-butoxycarbonyl)-3-(3,5-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 11)

To a solution of 3-(3,5-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (40mg, 0.16 mmol) in 3 mL 1:1 dichloromethane/ethyl acetate at 0°C was added N,N-dimethylaminopyridine (10 mg, 0.02 mmol) and di-*tert*-butylcarbonylanhydride (40 mg, 0.18 mmol). After the reaction stirred for 2 h at room temperature, it was quenched with water and diluted with ethyl acetate. The two layers were separated and the organic phase was washed with water (1 x 5 mL), dried over MgSO₄, filtered, and concentrated *in vacuo*. After flash column chromatography (10% ethyl acetate/hexanes) the acylated product 1,4-di-(*t*-butoxycarbonyl)-3-(3,5-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (50 mg, 71%) was afforded.

Preparation of 1-*n*-butyl-3-(3,4-dichlorophenyl)-4-methylthiothiocarbonyl-4,5-dihydro-1,2,4-triazin-6-one (Compound 12)

To a solution of 1-*n*-butyl-3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (310 mg, 1.03 mmol) dissolved in 5 mL tetrahydrofuran (THF) was added sodium hydride (40 mg, 1.03 mmol). After cooling the mixture to 0°C, carbon disulfide (0.09 mL, 1.45 mmol) was added. After the reaction was stirred at 0°C for 20 min, iodomethane (0.19 mL, 3.0 mmol) was added. After the reaction was stirred at 0°C for 1 h, it was quenched with water and diluted with ethyl acetate. The aqueous layer was extracted with ethyl acetate (3 x 5 mL), and the combined organic extracts were dried over magnesium sulfate, filtered, and concentrated *in vacuo*. The crude material was subjected to flash column chromatography (10% ethyl acetate/hexanes) to afford 1-*n*-butyl-3-(3,4-dichlorophenyl)-4-methylthiothiocarbonyl-4,5-dihydro-1,2,4-triazin-6-one (310 mg, 78%) as an orange solid in 98% purity.

Preparation of 1-*n*-butyl-3-(3,4-dichlorophenyl)-4-(2-phenylsulfonyl)ethene)-4,5-dihydro-1,2,4-triazin-6-one (Compound 13)

To a solution of 1-*n*-butyl-3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (400 mg, 1.33 mmol) in 10 mL THF at 0°C was added lithium bis(trimethylsilyl)amide (LHMDS) (250 mg, 1.47 mmol) and *trans*-1,2-bis(phenylsulfonyl)ethylene (450 mg, 1.47 mmol). After the reaction was stirred at 0 °C for 30 min, it was allowed to warm to room temperature and then stirred for 2 h. The reaction was quenched with water and diluted with ethyl acetate. The aqueous layer was extracted with ethyl acetate (3 x 5 mL), and the combined organic extracts were dried over magnesium sulfate, filtered, and concentrated *in vacuo*. Most of the crude material was subjected to gradient flash column chromatography (20% ethyl acetate/1% triethylamine/79% hexanes to 50% ethyl acetate/1%

triethylamine/49% hexanes) to afford the product (260 mg) as a brown solid. The remaining insoluble crude product was filtered, washed with ethyl acetate, and dried to afford the product (100mg). The two portions were combined to afford 1-*n*-butyl-3-(3,4-dichlorophenyl)-4-(2-phenylsulfonyl)ethene)-4,5-dihydro-1,2,4-triazin-6-one (350 mg) in 56% yield.

Preparation of 1-(2,2,2-trifluoroethyl)-3-(3,5-dichlorophenyl)-4-

(methoxycarbonylthio)-4,5-dihydro-1,2,4-triazin-6-one (Compound 14)

To a solution of 1-(2,2,2-trifluoroethyl)-3-(3,5-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (110 mg, 0.34 mmol) dissolved in 5 mL tetrahydrofuran was added triethylamine (0.06 mL, 0.40 mmol) and methoxycarbonylsulfonyl chloride (0.04 mL, 0.40 mmol). After 30 min, the reaction was quenched with water and diluted with ethyl acetate. The aqueous layer was extracted with ethyl acetate (2 x 5 mL), and the combined organic extracts were dried over magnesium sulfate, filtered, and concentrated *in vacuo*. The crude material was subjected to flash column chromatography (10% ethyl acetate/hexanes) to afford 1-(2,2,2-trifluoroethyl)-3-(3,5-dichlorophenyl)-4-(methoxycarbonylthio)-4,5-dihydro-1,2,4-triazin-6-one (60 mg, 43%) in 80% purity by LC.

Preparation of 1-(*n*-butyl)-3-(3,5-dichlorophenyl)-4-

(chloromethyloxycarbonyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 15)

1-(*n*-Butyl)-3-(3,5-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one was acylated with chloromethyl chloroformate in a similar manner to the reaction described to make compound 14 except that pyridine was used as a base. The product 1-(*n*-butyl)-3-(3,5-dichlorophenyl)-4-(chloromethyloxycarbonyl)-4,5-dihydro-1,2,4-triazin-6-one was isolated in 51% yield.

Preparation of 1-(*n*-butyl)-3-(3,5-dichlorophenyl)-4-

(iodomethyloxycarbonyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 16)

1-(*n*-Butyl)-3-(3,5-dichlorophenyl)-4-(chloromethyloxycarbonyl)-4,5-dihydro-1,2,4-triazin-6-one was treated with sodium iodide in acetone as described in Folkmann, M , Lund, F J *Synthesis* 1990, 1159 to give 1-(*n*-butyl)-3-(3,5-dichlorophenyl)-4-(iodomethyloxycarbonyl)-4,5-dihydro-1,2,4-triazin-6-one

Method H

Preparation of 1-Butyl-3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-thione (Compound 17)

To a solution of 1.31 grams of 1-butyl-3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-one (4.4 mmol) in 12 mL of toluene was added 0.37 gram of phosphorus pentasulfide (8.3 mmol). The reaction was heated to 95°C for seven hours. After cooling 1.4 grams of flash grade silica gel was added. The reaction was filtered through Celite and concentrated under reduced pressure. The oil was chromatographed with 22% ethyl acetate/hexanes and 0.95 grams of 1-butyl-3-(3,4-dichlorophenyl)-4,5-dihydro-1,2,4-triazin-6-thione was isolated.

Method I

Preparation of 1-(2,2,2-Trifluoroethyl)-3-(3,5-dichlorophenyl)-5-methoxy-4,5-dihydro-1,2,4-triazin-6-one (Compound 18)

To a solution of 1-(2,2,2-trifluoroethyl)-3-(3,5-dichlorophenyl)-1,2,4-triazin-6-one (70 mg, 0.21 mmol) dissolved in 3 mL of a 1:1 mixture of ethyl acetate and methanol was added a small scoopula of neutral alumina. After stirring for 20 minutes, the mixture was filtered through a small plug

of glass wool and concentrated The product (80 mg) was afforded in 96% purity and 100% yield

Preparation of 1-(2,2,2-trifluoroethyl)-3-(4-chlorophenyl)-5-propylthio-4,5-dihydro-1,2,4-triazin-6-one (Compound 19)

A solution of 1-(2,2,2-trifluoroethyl)-3-(4-chlorophenyl)-1,2,4-triazin-6-one (0.40 g, 1.4 mmol), prepared in a similar manner to Compound 7 in 5 mL of ethyl acetate was treated with excess propanethiol at room temperature. The reaction mixture was stirred for 1 hour, then more ethyl acetate was added. The reaction mixture was washed with aqueous potassium carbonate (twice), water and brine, dried over magnesium sulfate, filtered and stripped. The resultant solid was recrystallized from methylene chloride/hexane to give 0.28 g of pale yellow crystals (55% yield), mp 99-100°C.

Preparation of 1-(2,2,2-Trifluoroethyl)-3-(4-chlorophenyl)-5-(2-propanone)-4,5-dihydro-1,2,4-triazin-6-one (Compound 20)

A solution of 0.63 grams of 1-(2,2,2-trifluoroethyl)-3-(4-chlorophenyl)-1,2,4-triazin-6-one (1.9 mmol) in 20 mL of acetone and 1.5 mL of pH 10 phosphate buffer was stirred for eight days at room temperature. The reaction was diluted with 50 mL of water and 125 mL of ethyl acetate. The organic phase was separated, dried, and concentrated under reduced pressure. The crude was triturated with 50 mL of ethyl acetate and the insolubles were discarded. The material was chromatographed with 50-100% ethyl acetate/hexanes to give 0.17g of 1-(2,2,2-trifluoroethyl)-3-(4-chlorophenyl)-5-(2-propanone)-4,5-dihydro-1,2,4-triazin-6-one.

Method J**Preparation of 1-(2,2,2-Trifluoroethyl)-3-(3,5-dichlorophenyl)-1,2,4-triazin-5,6-dione (Compound 21)**

To an ice-cooled solution of ethyl 3,5-dichlorobenzimidate hydrochloride (2.46 g, 9.65 mmol) dissolved in 100 mL ethanol was added an aqueous solution of trifluoroethylhydrazine (70 wt%, 9.65 mmol). The reaction was stirred 4 h at room temperature, and then quenched with saturated sodium bicarbonate solution and diluted with ethyl acetate. The organic layer was dried over magnesium sulfate, filtered and concentrated *in vacuo* to afford 2.7 g of the amidrazone as a light brown oil which is 58% pure. To a solution of the amidrazone in 10 mL of toluene was added triethylamine (2.9 mL, 20.8 mmol). The reaction was cooled to 0 °C and oxalyl chloride (0.9 mL, 10.4 mmol) was added over 10 min. After the reaction stirred for 30 min at 0 °C, it was quenched with water and diluted with ethyl acetate. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and concentrated *in vacuo*. The crude reaction mixture was subjected to flash column chromatography (10% ethyl acetate/hexanes - 100% ethyl acetate) to afford the diketone (250 mg, 8% yield) in 74% purity.

Method K.**Preparation of 1-Butyl-3-methyl-5-(4-methylphenyl)-4,5-dihydro-1,2,4-triazin-6-one (Compound 22)**

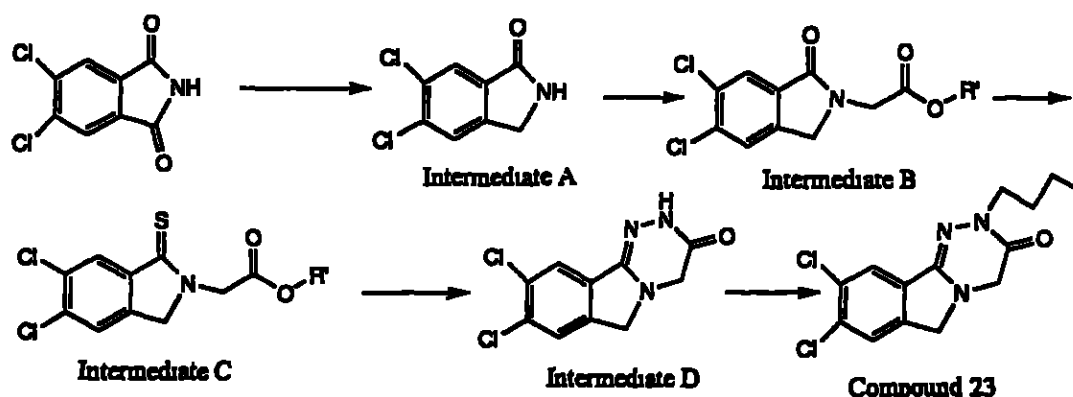
4-Methylphenylmagnesium bromide (1.64 mL, 1.0 M in ether) was added all at once via syringe to a well-stirred solution of 1-*n*-butyl-3-methyl-1,2,4-triazin-6-one (178 mg, 1.06 mmol) in ether (9.85 mL) under N₂ at room temperature. After stirring the resulting mixture overnight, saturated aqueous NH₄Cl (10 mL) and ethyl acetate (10 mL) were added, the organic phase was separated, and the aqueous layer was extracted once

more with ethyl acetate. The combined organic layers were dried over Na_2SO_4 and evaporated to dryness. The crude product was purified by flash chromatography on silica gel (5 g, 4:1 hexanes/ethyl acetate) to afford Compound 22 as a tan solid (236 mg, 86 % yield).

Miscellaneous

9,10-Dichloro-2-butyl-1,2,4-triazino[3,4-a]isoindol-3(4H)-one (Compound 23)

Compound 23 was prepared in 5 steps from 4,5-dichlorophthalimide as shown in the scheme below.



A mixture of 6 g of 4,5-dichlorophthalimide and 13.8 g of zinc dust in 200 mL of acetic acid was refluxed for 6 hours. It was cooled to 70°C, then filtered through Celite and stripped. Methylene chloride and saturated aqueous sodium bicarbonate solution were added, and the mixture was stirred overnight. The solids were filtered and dried in a vacuum oven. This product (intermediate A) was used without further purification.

To 1.03 g of intermediate A (5.1 mmol) in 5 mL of DMF was added 0.21 g of sodium hydride (60%, 5.25 mmol). The reaction mixture was stirred 0.5 hour, then 0.92 g of ethyl bromoacetate (5.25 mmol) was added. The reaction mixture was stirred overnight, then it was diluted with water and

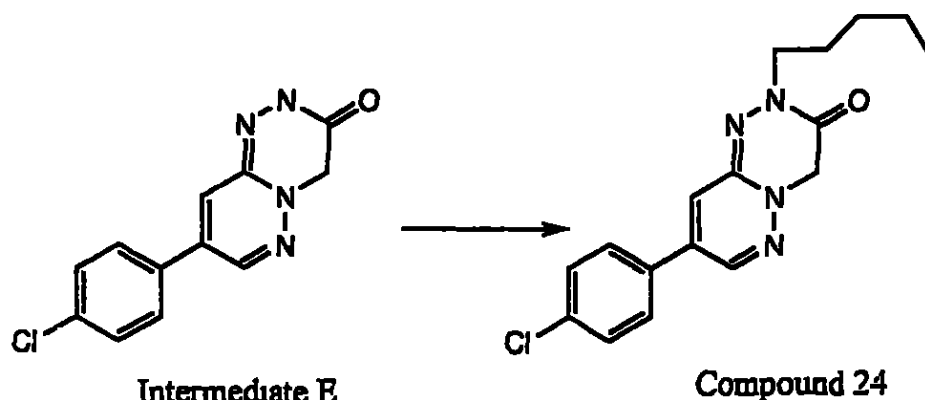
extracted with ethyl acetate. The phases were separated, the organic phase was washed with water and brine and dried over magnesium sulfate, then stripped. Column chromatography gave 0.42 g of intermediate B.

Intermediate B (0.69 g, 2.4 mmol) and 0.13 g (2.9 mmol) of phosphorus pentasulfide were heated to 90°C in toluene. The product was cooled and filtered through silica gel to give 0.6 g of product which was 5:1 intermediate C to intermediate B. This material was used without further purification.

Intermediate C (0.6 g, 2 mmol) and 0.13 g of hydrazine hydrate (2.6 mmol) in 5 mL of ethanol were refluxed to give intermediate D. This material could be purified by chromatography.

Intermediate D (0.07 g, 0.3 mmol) was deprotonated with 0.02 g of sodium hydride (60%, 0.5 mmol) in DMF. After 15 minutes, *n*-butyl iodide was added, and the reaction was stirred overnight. The reaction mixture was diluted with water and extracted with ethyl acetate. The phases were separated, the organic phase was washed with water and brine and dried over magnesium sulfate, then stripped. Chromatography gave 0.02 g of Compound 23.

2-Pentyl-7-(4-chlorophenyl)-pyridazino[6,1-c][1,2,4]triazin-3(4H)one
(Compound 24)



2-H-7-(4-chlorophenyl)-pyridazino[6,1-c][1,2,4]triazin-3(4H)one (Intermediate E) was prepared from 6-(4-chlorophenyl)-pyridazin-3-one (for synthesis, see Steck et al, *J Amer Chem Soc* (1953), 75, 1117, or Coates, W J, McKillop, A *Synthesis*, (1993), 334-342, or Tisler, M, Stanovnik, B in "Comprehensive Heterocyclic Chemistry", Katritzky and Rees, ed, Volume 3, Part 2B, Pergamon Press, 1984, p1) in three steps by a similar sequence to the one used to convert Intermediate A into Intermediate D in the example above

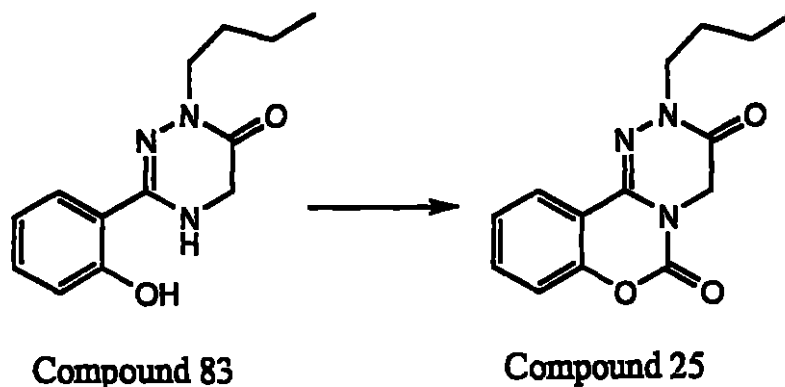
To a solution of Intermediate E (130 mg, 0.50 mmol) in 5 mL DMF was added potassium carbonate (80 mg, 0.60 mmol) and iodopentane (0.08 mL, 0.60 mmol). The mixture was stirred at room temperature for 45 min and then at 65°C for 1.5 h. After stirring at room temperature overnight, the reaction was quenched with water and diluted with ethyl acetate. The aqueous layer was extracted with ethyl acetate (3 x 5 mL), and the combined organic extracts were dried over magnesium sulfate, filtered, and concentrated *in vacuo*. The crude material was subjected to flash

column chromatography twice (20% ethyl acetate/hexanes) to afford the product (120 mg, 75%) as an orange solid

1-*n*-Butyl-3-(2-hydroxyphenyl)-4,5-dihydro-1,2,4-triazin-6-one
(Compound 83)

To a solution of Compound 195 (1.53 g, 5.86 mmol), prepared by the reactions described for Method B, dissolved in 10 ml DMF, was added ethanethiol, sodium salt (1.97 g, 23.5 mmol) as a free-flowing solid. The resulting mixture was heated at 100 °C for 4.5 h. After it was allowed to stir overnight, the reaction was quenched with water and diluted with ethyl acetate. The aqueous layer was extracted with ethyl acetate (3 x 5 ml). The combined organic layers were dried over magnesium sulfate, filtered and concentrated *in vacuo*. After flash column chromatography (20-50% ethyl acetate/hexanes), Compound 83 was afforded (0.79 g, 54% yield) as a brown solid.

3-*n*-Butyl-3H-9-oxa-3,10a-diaza-phenanthrene-2,10-dione
(Compound 25)

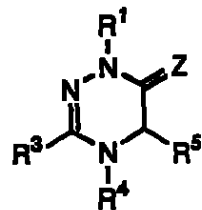


To a solution of Compound 83 (0.21 g, 0.85 mmol) dissolved in 5 mL dichloromethane, was added triethylamine (0.13 mL, 0.94 mmol). The

solution was cooled to 0°C in an ice bath, and triphosgene (0.28 g, 0.94 mmol) was added. After 15 min, the cooling bath was removed. After the reaction stirred for 45 minutes at room temperature, the reaction was complete by TLC. The reaction was quenched with saturated sodium bicarbonate solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered and concentrated *in vacuo*. Flash column chromatography (15-20% ethyl acetate/hexanes) afforded 90 mg (39% yield) of Compound 25 as a yellow oil.

By similar methods the following compounds were prepared as shown in Table 1.

Table 1 4,5-Dihydro-1,2,4-triazin-6-ones



#	R ¹	R ³	R ⁴	R ⁵	Z
26	2,2,2-trifluoroethyl	4-chlorophenyl	hydrogen	methoxy	○
27	methyl	4-chlorophenyl	hydrogen	hydrogen	○
28	phenyl	4-chlorophenyl	hydrogen	hydrogen	○
29	phenyl	4-chlorophenyl	hydrogen	hydrogen	○
30	benzyl	4-chlorophenyl	hydrogen	hydrogen	○
31	methyl	phenyl	hydrogen	hydrogen	○
32	hydrogen	phenyl	hydrogen	hydrogen	○
33	2,2,2-trifluoroethyl	phenyl	hydrogen	hydrogen	○
34	2,2,2-trifluoroethyl	phenyl	methyl	hydrogen	○
35	2,2,2-trifluoroethyl	4-methoxyphenyl	hydrogen	hydrogen	○
36	n-butyl	4-methoxyphenyl	hydrogen	hydrogen	○
37	2,2,2-trifluoroethyl	3-chlorophenyl	hydrogen	hydrogen	○

v5

38	n-butyl	4-methoxyphenyl	hydrogen	methyl	O
39	2,2,2-trifluoroethyl	4-methoxyphenyl	hydrogen	methoxy	O
40	2,2,2-trifluoroethyl	4-chlorophenyl	acetyl	hydrogen	O
41	2,2,2-trifluoroethyl	4-methylphenyl	hydrogen	hydrogen	O
42	2,2,2-trifluoroethyl	4-chlorophenyl	methanesulfonyl	hydrogen	O
43	2,2,2-trifluoroethyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
44	2,2,2-trifluoroethyl	benzyl	hydrogen	hydrogen	O
45	2,2,2-trifluoroethyl	cyclohexyl	hydrogen	hydrogen	O
46	2,2,2-trifluoroethyl	3-methoxyphenyl	hydrogen	hydrogen	O
47	2,2,2-trifluoroethyl	3,5-dichloro-4-methylphenyl	hydrogen	hydrogen	O
48	2-butyl	cyclohexyl	hydrogen	hydrogen	O
49	n-pentyl	3,5-dichloro-4-methylphenyl	hydrogen	hydrogen	O
50	n-butyl	4-chlorophenyl	hydrogen	hydrogen	O
51	2,2,2-trifluoroethyl	4-trifluoromethylphenyl	hydrogen	hydrogen	O
52	2,2,2-trifluoroethyl	2-pyridyl	hydrogen	hydrogen	O
53	2,2,2-trifluoroethyl	2-pyridyl	hydrogen	hydroxy ^(B)	O
54	n-pentyl	4-chlorophenyl	hydrogen	hydrogen	O
55	n-hexyl	4-chlorophenyl	hydrogen	hydrogen	O
56	n-octyl	4-chlorophenyl	hydrogen	hydrogen	O
57	n-decyl	4-chlorophenyl	hydrogen	hydrogen	O
58	3-methylphenyl	4-chlorophenyl	hydrogen	hydrogen	O
59	2-pyridyl	4-chlorophenyl	hydrogen	hydrogen	O
60	cyanomethyl	4-chlorophenyl	hydrogen	hydrogen	O
61	trimethylsilyl methyl	4-chlorophenyl	hydrogen	hydrogen	O
62	2-(5-chlorothiophene)-methyl	4-chlorophenyl	hydrogen	hydrogen	O

63	2-(5-chloro thiophene)- methyl	4-chlorophenyl	2-(5-chloro thiophene)-methyl	hydrogen	O
64	hydrogen	3,5-dichlorophenyl	hydrogen	hydrogen	O
65	2-chloroallyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
66	3-chloroallyl ^(a)	3,5-dichlorophenyl	3-chloroallyl ^(a)	hydrogen	O
67	3-chloroallyl ^(a)	3,5-dichlorophenyl	hydrogen	hydrogen	O
68	n-butyl	5-(2-methyl-4- trifluoro methylthio- phenyl)	hydrogen	hydrogen	O
69	n-butyl	3,4-difluorophenyl	hydrogen	hydrogen	O
70	2,2,2- trifluoroethyl	2,5- dichlorophenyl	hydrogen	hydrogen	O
71	2,2,2- trifluoroethyl	3,5- dichlorophenyl	methoxycarbonyl	hydrogen	O
72	2,2,2- trifluoroethyl	3,5- dichlorophenyl	acetyl	hydrogen	O
73	2,2,2- trifluoroethyl	2,4- dichlorophenyl	hydrogen	hydrogen	O
74	n-butyl	2,5- dichlorophenyl	hydrogen	hydrogen	O
75	n-butyl	methyl	hydrogen	4-methyl phenyl	O
76	n-butyl	methyl	hydrogen	2-methyl phenyl	O
77	n-butyl	methyl	hydrogen	3-methyl phenyl	O
78	n-butyl	methyl	hydrogen	3-amino phenyl	O
79	n-butyl	methyl	hydrogen	4- methoxy phenyl	O
80	n-butyl	methyl	hydrogen	3- methoxy phenyl	O
81	n-butyl	methyl	hydrogen	4-chloro phenyl	O
82	n-butyl	methyl	hydrogen	2,4,6- trimethyl phenyl	O

83	n-butyl	2-hydroxyphenyl	hydrogen	hydrogen	O
84	2,2,2-trifluoroethyl	3-fluorophenyl	hydrogen	hydrogen	O
85	n-butyl	3,4-dichlorophenyl	methyloxalate	hydrogen	O
86	cyclopropylmethyl	3-trifluoromethyl phenyl	hydrogen	hydrogen	O
87	propargyl	3-trifluoromethyl phenyl	propargyl	hydrogen	O
88	propargyl	3-trifluoromethyl phenyl	hydrogen	hydrogen	O
89	2,2,2-trifluoroethyl	3-trifluoromethyl phenyl	propargyl	hydrogen	O
90	2,2,2-trifluoroethyl	3,5-(bis)trifluoro methyl phenyl	hydrogen	hydrogen	O
91	2,2,2-trifluoroethyl	3-trifluoro methyl phenyl	allenyl	hydrogen	O
92	n-butyl	methyl	hydrogen	phenyl	O
93	n-butyl	methyl	hydrogen	4-fluoro phenyl	O
94	n-butyl	methyl	hydrogen	3-methyl-4-fluoro phenyl	O
95	n-butyl	methyl	hydrogen	4-t-butyl phenyl	O
96	2,2,2-trifluoroethyl	2-fluorophenyl	hydrogen	hydrogen	O
97	2,2,2-trifluoroethyl	2-chlorophenyl	hydrogen	hydrogen	O
98	2,2,2-trifluoroethyl	3,4-difluorophenyl	hydrogen	hydrogen	O
99	2,2,2-trifluoroethyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
100	ethyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
101	n-butyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
102	ethoxycarbonyl methyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
103	benzyl	3,4-dichlorophenyl	hydrogen	hydrogen	O

104	n-butyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
105	2,2,2-trifluoroethyl	2-methylphenyl	hydrogen	hydroxy	O
106	n-butyl	3-chloro-4-fluorophenyl	hydrogen	hydrogen	O
107	propyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
108	2-ethoxyethyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
109	c,clopropylmethyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
110	n-butyl	3-chlorophenyl	hydrogen	hydrogen	O
111	phenyl	3-chlorophenyl	hydrogen	hydrogen	O
112	3-methylphenyl	3-chlorophenyl	hydrogen	hydrogen	O
113	2,2,2-trifluoroethyl	3,5-dichlorophenyl	vinylloxycarbonyl	hydrogen	O
114	n-butyl	3-methoxyphenyl	hydrogen	hydrogen	O
115	n-butyl	3-trifluoromethyl phenyl	hydrogen	hydrogen	O
116	n-butyl	4-ethoxyphenyl	hydrogen	hydrogen	O
117	n-butyl	4-trifluoromethyl phenyl	hydrogen	hydrogen	O
118	n-butyl	3,5-dichlorophenyl	acetoxymethoxy carbonyl	hydrogen	O
119	n-butyl	2-naphthyl	hydrogen	hydrogen	O
120	n-butyl	3,5-dibromo-4-methoxyphenyl	hydrogen	hydrogen	O
121	n-butyl	3,5-dichloro-4-pyridyl	hydrogen	hydrogen	O
122	methyl	4-trifluoromethyl phenyl	hydrogen	hydrogen	O
123	2,2,2-trifluoroethyl	3,5-dichlorophenyl	methyloxalate	hydrogen	O
124	hydrogen	2-naphthyl	hydrogen	hydrogen	O
125	ethoxycarbonyl methyl	3,4-difluorophenyl	hydrogen	hydrogen	O
126	2,2,2-trifluoroethyl	3,5-dichlorophenyl	2-chloroethyl	hydrogen	O
127	n-butyl	3,5-dichlorophenyl	vinylloxycarbonyl	hydrogen	O

128	allyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
129	n-butyl	3,5-dichlorophenyl	(methylthio) carbonyl	hydrogen	O
130	n-butyl	3,5-dichlorophenyl	methoxycarbonyl	hydrogen	O
131	n-butyl	3,5-dichlorophenyl	propargyl	hydrogen	O
132	n-butyl	3,5-dichlorophenyl	allyloxycarbonyl	hydrogen	O
133	n-butyl	3,5-dichlorophenyl	propargyloxy carbonyl	hydrogen	O
134	2,2,2-trifluoroethyl	3,5-dichlorophenyl	2-propenyloxy carbonyl	hydrogen	O
135	n-butyl	3,5-dichlorophenyl	2-propenyloxy carbonyl	hydrogen	O
136	n-butyl	3,2-dichlorophenyl	vinylloxycarbonyl	hydrogen	O
137	2,2,2-trifluoroethyl	3,5-dichlorophenyl	acryloyl	hydrogen	O
138	n-butyl	3,5-dichlorophenyl	acryloyl	hydrogen	O
139	benzyl	3,4-difluorophenyl	hydrogen	hydrogen	O
140	2,2,2-trifluoroethyl	2-furyl	hydrogen	hydrogen	O
141	2,2,2-trifluoroethyl	3-quinoline	hydrogen	hydrogen	O
142	2,2,2-trifluoroethyl	4-(4-nitrophenyl)-phenyl	hydrogen	hydrogen	O
143	2,2,2-trifluoroethyl	2-naphthyl	hydrogen	hydrogen	O
144	2,2,2-trifluoroethyl	4-(4-1,2,3-thiadiazole) phenyl	hydrogen	hydrogen	O
145	2,2,2-trifluoroethyl	4-propoxyphenyl	hydrogen	hydrogen	O
146	2,2,2-trifluoroethyl	4-phenylphenyl	hydrogen	hydrogen	O
147	2,2,2-trifluoroethyl	4-methyl thiophenyl	hydrogen	hydrogen	O

148	n-propyl	4-fluorophenyl	hydrogen	hydrogen	O
149	2,2,2-trifluoroethyl	4-fluorophenyl	hydrogen	hydrogen	O
150	2,2,2-trifluoroethyl	4-ethylphenyl	hydrogen	hydrogen	O
151	n-propyl	4-propoxyphenyl	hydrogen	hydrogen	O
152	hydrogen	4-propoxyphenyl	hydrogen	hydrogen	O
153	2,2,2-trifluoroethyl	3-trifluoromethyl phenyl	hydrogen	hydrogen	O
154	2,2,2-trifluoroethyl	3-methylphenyl	hydrogen	hydrogen	O
155	2,2,2-trifluoroethyl	4-butyloxyphenyl	hydrogen	hydrogen	O
156	methyl	4-phenoxyphenyl	hydrogen	hydrogen	O
157	2,2,2-trifluoroethyl	4-nitro-3-methylphenyl	hydrogen	hydrogen	O
158	2,2,2-trifluoroethyl	3,5-dibromo-4-methoxyphenyl	hydrogen	hydrogen	O
159	2,2,2-trifluoroethyl	3,5-dichloro-4-pyridyl	hydrogen	hydrogen	O
160	2-cyanoethyl	4-butyloxyphenyl	hydrogen	hydrogen	O
161	4-chlorophenyl	4-ethoxyphenyl	hydrogen	hydrogen	O
162	n-butyl	2-benzothiophene	hydrogen	hydrogen	O
163	2,2,2-trifluoroethyl	2-benzothiophene	hydrogen	hydrogen	O
164	n-propyl	3,5-dichlorophenyl	hydrogen	hydrogen	O
165	ethoxycarbonylmethyl	3-methylphenyl	hydrogen	hydrogen	O
166	2-cyanoethyl	4-(4-nitrophenyl)phenyl	hydrogen	hydrogen	O
167	2,2,2-trifluoroethyl	3-nitrophenyl	hydrogen	hydrogen	O
168	n-butyl	3,4-dichlorophenyl	propargyl	hydrogen	O
169	2,2,2-trifluoroethyl	3,5-dichlorophenyl	propargyl	hydrogen	O
170	n-butyl	3,4-dichlorophenyl	2-propen-1-oxycarbonyl	hydrogen	O
171	n-butyl	3,4-dichlorophenyl	propargyloxy carbonyl	hydrogen	O

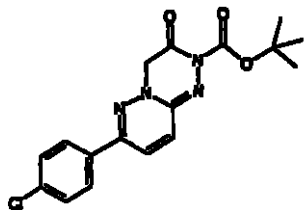
172	n-butyl	3,4-dichlorophenyl	allyloxycarbonyl	hydrogen	O
173	n-butyl	3,4-dichlorophenyl	phenoxycarbonyl	hydrogen	O
174	hydrogen	3,4-dichlorophenyl	hydrogen	hydrogen	O
175	n-butyl	3-cyanophenyl	hydrogen	hydrogen	O
176	2,2,2-trifluoroethyl	3-cyanophenyl	hydrogen	hydrogen	O
177	n-butyl	3,4-dichlorophenyl	1-crotonyl	hydrogen	O
178	n-butyl	3,4-dichlorophenyl	phenoxythio carbonyl	hydrogen	O
179	n-butyl	3,4-dichlorophenyl	2-chloroethyloxy carbonyl	hydrogen	O
180	n-butyl	3,4-dichlorophenyl	2-pentylnyl	hydrogen	O
181	n-butyl	3,4-dichlorophenyl	cyclopropylcarbonyl	hydrogen	O
182	n-butyl	3,4-dichlorophenyl	benzyl	hydrogen	O
183	n-butyl	3,4-dichlorophenyl	butynyl	hydrogen	O
184	benzyl	3-nitrophenyl	hydrogen	hydrogen	O
185	benzyl	2-pyridyl	hydrogen	hydrogen	O
186	3-methylphenyl	4-phenylphenyl	hydrogen	hydrogen	O
187	3-methylphenyl	4-methylthiophenyl	hydrogen	hydrogen	O
188	3-methylphenyl	6-(2,2,2-trifluoroethoxy)-3-pyridyl	hydrogen	hydrogen	O
189	2-phenethyl	4-ethylphenyl	hydrogen	hydrogen	O
190	benzyl	4-(2,6-dichloro pyridine)	hydrogen	hydrogen	O
191	n-butyl	3,4-dichlorophenyl	allylthiothio carbonyl	hydrogen	O
192	n-butyl	3,4-dichlorophenyl	propargylthio thiocarbonyl	hydrogen	O
193	2,2,2-trifluoroethyl	3,5-dichlorophenyl	phenoxycarbonyl	hydrogen	O
194	n-butyl	3,5-dichlorophenyl	phenoxycarbonyl	hydrogen	O

195	n-butyl	2-methoxyphenyl	hydrogen	hydrogen	O
196	3-chloropropyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
197	n-pentyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
198	ethoxycarbonyl	3-chlorophenyl	hydrogen	hydrogen	O
199	n-butyl	3,4-dichlorophenyl	4-methoxybenzyl	hydrogen	O
200	n-butyl	3,4-dichlorophenyl	3,4-dimethoxybenzyl	hydrogen	O
201	n-butyl	3,4-dichlorophenyl	cyclobutylmethyl	hydrogen	O
202	n-butyl	3,4-dichlorophenyl	hydrogen	vinyl	O
203	n-butyl	3,4-dichlorophenyl	hydrogen	1-methylethene	O
204	4-chlorophenyl	n-butyl	hydrogen	hydrogen	O
205	2,2,2-trifluoroethyl	phenethyl	hydrogen	hydrogen	O
206	n-butyl	4-(4-carboethoxyphenyl)phenyl	hydrogen	hydrogen	O
207	n-butyl	3-bromo-4-fluorophenyl	hydrogen	hydrogen	O
208	2,2,2-trifluoroethyl	3-bromo-4-fluorophenyl	hydrogen	hydrogen	O
209	2-pentynyl	3,4-dichlorophenyl	2-pentynyl	hydrogen	O
210	2-pentynyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
211	n-butyl	3-bromophenyl	hydrogen	hydrogen	O
212	2,2,2-trifluoroethyl	3-bromophenyl	hydrogen	hydrogen	O
213	n-butyl	2-benzyloxyphenyl	hydrogen	hydrogen	O
214	2,2,2-trifluoroethyl	3,5-dichlorophenyl	ethoxycarbonyl	methoxy	O
215	propargyl	3,4-dichlorophenyl	hydrogen	hydrogen	O
216	propargyl	3,4-dichlorophenyl	propargyl	hydrogen	O

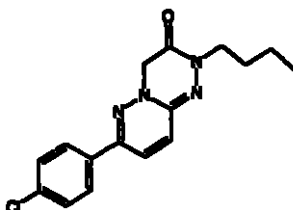
217	propargyl	3-bromo-4-fluorophenyl	propargyl	hydrogen	O
218	propargyl	3-bromo-4-fluorophenyl	hydrogen	hydrogen	O
219	cyclopropylmethyl	3-bromo-4-fluorophenyl	cyclopropylmethyl	hydrogen	O
220	cyclopropylmethyl	3-bromo-4-fluorophenyl	hydrogen	hydrogen	O
221	n-butyl	3-fluorophenyl	hydrogen	hydrogen	O
222	cyclopropylmethyl	3-fluorophenyl	cyclopropylmethyl	hydrogen	O
223	cyclopropylmethyl	3-fluorophenyl	hydrogen	hydrogen	O
224	cyclopropylmethyl	3-bromophenyl	cyclopropylmethyl	hydrogen	O
225	propargyl	3-fluorophenyl	hydrogen	hydrogen	O
226	propargyl	3-bromophenyl	propargyl	hydrogen	O
227	propargyl	3-bromophenyl	hydrogen	hydrogen	O
293	2,2,2-trifluoroethyl	3-chloro-4-methylphenyl	hydrogen	hydrogen	O
294	n-butyl	3-chloro-4-methylphenyl	hydrogen	hydrogen	O
295	n-butyl	3,5-dimethylphenyl	hydrogen	hydrogen	O
296	2,2,2-trifluoroethyl	3,5-dimethylphenyl	hydrogen	hydrogen	O

^(a) *Cis/trans* isomers

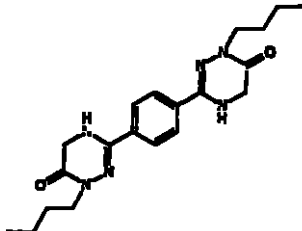
^(b) Ethoxy also present



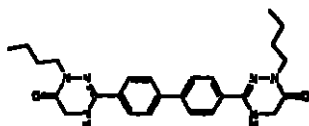
Compound 228



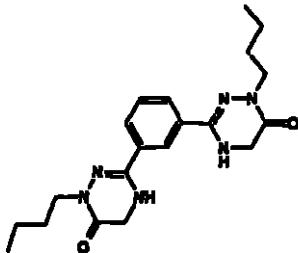
Compound 229



Compound 230

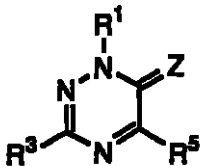


Compound 231



Compound 232

Table 2 1,2,4-Triazin-6-ones



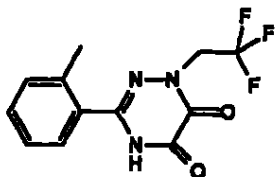
#	R ¹	R ³	R ⁵	Z
233	2,2,2-trifluoroethyl	4-chlorophenyl	hydrogen	O
234	n-pentyl	4-chlorophenyl	hydrogen	O
235	ethyl	4-chlorophenyl	hydrogen	O
236	allyl	4-chlorophenyl	hydrogen	O
237	2-pentynyl	4-chlorophenyl	methyl	O
238	methyl	4-chlorophenyl	hydrogen	O
239	2,2,2-trifluoroethyl	4-chlorophenyl	methyl	O
240	benzyl	4-chlorophenyl	hydrogen	O
241	t-butyl	4-chlorophenyl	hydrogen	O
242	methyl	phenyl	hydrogen	O
243	hydrogen	phenyl	hydrogen	O
244	n-butyl	4-methoxyphenyl	hydrogen	O
245	2,2,2-trifluoroethyl	3-chlorophenyl	hydrogen	O
246	2,2,2-trifluoroethyl	3-chlorophenyl	hydrogen	S
247	2,2,2-trifluoroethyl	4-methylphenyl	hydrogen	O
248	2,2,2-trifluoroethyl	3,5-dichlorophenyl	hydrogen	O
249	2,2,2-trifluoroethyl	benzyl	hydrogen	O

250	ethoxycarbonyl methyl	4-chlorophenyl	hydrogen	O
251	2,2,2-trifluoroethyl	cyclohexyl	hydrogen	O
252	2,2,2-trifluoroethyl	3-methoxyphenyl	hydrogen	O
253	2,2,2-trifluoroethyl	3,5-dichloro-4- methylphenyl	hydrogen	O
254	2-pentyl	4-chlorophenyl	hydrogen	O
255	2-butyl	cyclohexyl	hydrogen	O
256	cyclohexyl	4-chlorophenyl	hydrogen	O
257	n-pentyl	3,5-dichloro-4- methylphenyl	hydrogen	O
258	n-butyl	4-chlorophenyl	hydrogen	O
259	n-octyl	4-chlorophenyl	hydrogen	O
260	n-decyl	4-chlorophenyl	hydrogen	O
261	2-pyridyl	4-chlorophenyl	hydrogen	O
262	n-hexyl	4-chlorophenyl	hydrogen	O
263	2,2,2-trifluoroethyl	2-fluorophenyl	hydrogen	O
264	cyanomethyl	4-chlorophenyl	hydrogen	O
265	trimethylsilylmethyl	4-chlorophenyl	hydrogen	O
266	2-(5-chloro thiophene)-methyl	4-chlorophenyl	hydrogen	O
267	2,2,2-trifluoroethyl	2-chlorophenyl	hydrogen	O
268	n-butyl	5-(2-methyl-4- trifluoromethylthiazole)	hydrogen	O
269	n-butyl	2,5-dichlorophenyl	hydrogen	O
270	n-butyl	3,4-dichlorophenyl	hydrogen	O
271	n-butyl	3,5-dichlorophenyl	hydrogen	O
272	cyclopropylmethyl	3,4-dichlorophenyl	hydrogen	O
273 ^a	n-butyl	4-methylphenyl	hydrogen	O
274	4-chlorophenyl	4-ethoxyphenyl	hydrogen	O
275	ethoxycarbonyl methyl	3-methylphenyl	hydrogen	O
276	2-cyanoethyl	4-(4-nitrophenyl)phenyl	hydrogen	O
277	n-butyl	3-chlorophenyl	hydrogen	O
278	3-methylphenyl	3-chlorophenyl	hydrogen	O
279	4-chlorophenyl	4-(4- hexyloxyphenoxy)phenyl	hydrogen	O
280	n-propyl	4-butyloxyphenyl	hydrogen	O
281	2,2,2-trifluoroethyl	4-propoxyphenyl	hydrogen	O
282	methyl	4-phenoxyphenyl	hydrogen	O
283	n-butyl	2-methoxyphenyl	hydrogen	O

284	n-butyl	methyl	4-methylphenyl	○
285	n-butyl	methyl	3-methylphenyl	○
286	n-butyl	methyl	4-methoxyphenyl	○
287	n-butyl	2-hydroxyphenyl	hydrogen	○
288	n-butyl	3,5-bis(trifluoromethyl)phenyl	hydrogen	○
289	n-butyl	3-bromo-4-fluorophenyl	hydrogen	○
290	2,2,2-trifluoroethyl	3-bromo-4-fluorophenyl	hydrogen	○

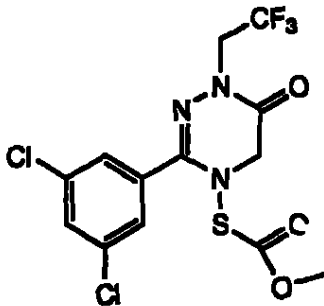
^aCompound 273 was prepared and tested as a 1:1 mixture with its unoxidized (dihydro) form

The diketone, compound 291 was obtained as a side product from an attempted preparation of 6-(2-methylphenyl)-1-(2,2,2-trifluoroethyl)-4,5-dihydro-1,2,4-triazin-6-one



Compound 291

Compound 292 was also prepared by Method G as previously described



Compound 292

Table 3 Spectral Characterization for Compounds 1-292

#	HPLC/MS	NMR DATA (300 MHZ)
1		(DMSO-d6) 4 01 (s, 2H), 4 47 (q, 2H), 7 54 (t, 1H), 7 75 (m, 1H), 7 84 (br s, 1H), 7 93 (d, 1H)
2		(CDCl ₃) 0 95 (t, 3H), 1 37 (hexet, 2H), 1 69 (pentet, 2H), 3 73 (t, 2H), 4 04 (d, 2H), 5 09 (br s, 1H), 7 30 (dd, 1H), 7 45 (d, 1H), 7 50 (d, 1H)
3	98%, 324(M+H)	
4		(CDCl ₃) 4 15 (d, 2H), 4 39 (q, 2H), 5 0 (bs, 1H), 7 41 (d, 2H), 7 60 (d, 2H)
5		(DMSO-d6) 3 87 (s, 2H), 7 53 (d, 2H), 7 66 (d, 2H), 10 50 (s, 1H)
6		(CDCl ₃) 1 58 (s, 9H), 3 97 (d, 2H), 4 9 (bs, 1H), 7 38 (d, 2H), 7 60 (d, 2H)
7		(CDCl ₃) 4 77 (q, 2H), 7 48 (m, 3H), 8 14 (m, 2H), 8 56 (s, 1H)
8		(CDCl ₃) 1 14 (t, 3H), 2 22 (dq, 2H), 4 89 (t, 2H), 7 45 (d, 2H), 8 13 (d, 2H), 8 48 (s, 1H)
9		(CDCl ₃) 0 30 (m, 2H), 0 44 (m, 2H), 1 18 (m, 1H), 3 55 (d, 2H), 3 98 (d, 2H), 5 60 (br s, 1H), 7 40 (d, 1H), 7 47 (dd, 1H), 7 73 (d, 1H)
10		(CDCl ₃) 4 46 (s, 2H), 4 48 (q, 2H), 4 55 (d, 2H), 5 12 (d, 1H), 5 20 (d, 1H), 5 65 (m, 1H), 7 43 (m, 3H)
11		(CDCl ₃) 1 23 (s, 9H), 1 63 (s, 9H), 4 38 (s, 2H), 7 50 (m, 3H)
12		(CDCl ₃) 0 96 (t, 3H), 1 36 (m, 2H), 1 72 (m, 2H), 2 58 (s, 3H), 3 86 (t, 2H), 4 94 (s, 2H), 7 39 (dd, 1H), 7 47 (d, 1H), 7 73 (d, 1H)
13		(CDCl ₃) 0 95 (t, 3H), 1 35 (m, 2H), 1 68 (m, 2H), 3 78 (t, 2H), 4 08 (s, 2H), 5 63 (d, 1H), 7 33 (dd, 1H), 7 56 (m, 6H), 7 82 (d, 2H)
14		(CDCl ₃) 3 88 (s, 3H), 4 35 (s, 2H), 4 45 (br q, 2H), 7 45 (m, 3H)
15		(CDCl ₃) 0 96 (t, 3H), 1 36 (m, 2H), 1 71 (m, 2H), 3 84 (t, 2H), 4 39 (s, 2H), 5 64 (s, 2H), 7 42 (t, 1H), 7 47 (d, 2H)

65

5

16		(CDCl ₃) 0.96 (t, 3H), 1.36 (m, 2H), 1.83 (t, 2H), 4.37 (s, 2H), 5.84 (s, 2H), 7.44 (m, 3H)
17		(CDCl ₃) 0.99 (t, 3H), 1.42 (m, 2H), 1.86 (m, 2H), 4.31 (t, 2H), 4.46 (d, 2H), 5.00 (br s, 1H), 7.52 (s, 2H), 7.80 (s, 1H)
18		(CDCl ₃) 3.45 (s, 3H), 4.39 (m, 1H), 4.57 (m, 1H), 5.10 (d, 1H), 6.56 (br, 1H), 7.47 (t, 1H), 7.61 (d, 2H)
19		(Acetone-d ₆) 0.95 (t, 3H), 1.6 (hexet, 2H), 2.75 (dt, 2H), 4.3-4.8 (m, 2H), 5.3 (s, 1H), 7.55 (d, 2H), 7.85 (d, 2H)
20		(CDCl ₃) 2.27 (s, 3H), 2.85 (dd, 1H), 3.35 (dd, 1H), 4.2-4.6 (m, 3H), 5.95 (bs, 1H), 7.39 (d, 2H), 7.57 (d, 2H), 8.48 (s, 1H)
21		(CDCl ₃) 4.82 (q, 2H), 7.46 (d, 1H), 7.97 (d, 2H), NH not resolved
23		(CDCl ₃) 0.88 (m, 3H), 1.32 (m, 4H), 1.68 (m, 2H), 3.72 (br t, 2H), 4.63 (s, 2H), 6.87 (d, 1H), 6.99 (d, 1H), 7.38 (d, 2H), 7.63 (d, 2H)
24		(DMSO-d ₆) 4.03 (s, 2H), 4.44 (s, 2H), 7.79 (s, 1H), 7.91 (s, 1H), 10.63 (bs, 1H)
25		(CDCl ₃) 0.82 (t, 3H), 1.21 (m, 2H), 1.39 (m, 2H), 4.04 (t, 2H), 4.31 (s, 2H), 7.26 (d, 1H), 7.37 (t, 1H), 7.60 (dt, 1H), 7.95 (dd, 1H)
26		(CDCl ₃) 3.47 (s, 3H), 4.45 (dq, 2H), 4.55 (dq, 1H), 5.05 (d, 1H), 6.10 (bs, 1H), 7.43 (d, 2H), 7.64 (d, 2H)
27		(DMSO-d ₆) 3.22 (s, 3H), 3.89 (s, 2H), 7.51 (d, 2H), 7.6 (s, 1H), 7.75 (d, 2H)
28		(CDCl ₃) 4.25 (d, 2H), 5.10 (bs, 1H), 7.27 (m, 1H), 7.41 (m, 4H), 7.66 (m, 4H)
29		(CDCl ₃) 7.6 (m, 3H), 7.54 (t, 2H), 7.83 (d, 2H), 8.15 (d, 2H), 8.60 (s, 1H)
30		(CDCl ₃) 4.12 (d, 2H), 4.95 (s, 3H), 7.37 (m, 7H), 7.56 (d, 2H)
31		(CDCl ₃) 3.40 (s, 3H), 4.11 (d, 2H), 5.05 (bs, 1H), 7.43 (m, 3H), 7.64 (m, 2H)
32		(CDCl ₃) 3.84 (d, 2H), 7.43 (m, 3H), 7.71 (m, 2H), 10.41 (bs, 1H)
33		(CDCl ₃) 4.13 (d, 2H), 4.11 (q, 2H), 5.05 (bs, 1H), 7.47 (m, 3H), 7.65 (m, 2H)
34		(CDCl ₃) 2.88 (s, 3H), 4.03 (s, 3H), 4.38 (q, 2H), 7.44 (s, 5H)
35		(CDCl ₃) 3.85 (s, 3H), 4.12 (d, 2H), 4.41 (q, 2H), 5.0 (bs, 1H), 6.94 (d, 2H), 7.59 (d, 2H)

67

36	(CDCl ₃) 0 96 (t, 2H), 1 37 (hextet, 2H), 1 70 (pentet, 2H), 3 76 (t, 2H), 3 84 (s, 3H), 4 05 (d, 2H), 4 95 (bs, 1H), 6 93 (d, 2H), 7 59 (d, 2H)
37	(CDCl ₃) 4 15 (s, 2H), 4 42 (q, 2H), 5 12 (bs, 1H), 7 37 (t, 1H), 7 43 (dd, 1H), 7 53 (dd, 1H), 7 66 (dd, 1H)
38	(CDCl ₃) 0 95(t, 2H), 1 35 (hextet, 2H), 1 45 (d, 3H), 1 70 (pentet, 2H), 3 75 (t, 2H), 3 84 (s, 3H), 4 05 (d, 2H), 4 10 (bq, 1H), 5 00 (bs, 1H), 6 93 (d, 2H), 7 60 (d, 2H)
39	(CDCl ₃) 3 88 (s, 3H), 4 75 (q, 2H), 6 98 (d, 2H), 8 09 (d, 2H), 8 53 (s, 1H)
40	(CDCl ₃) 1 84 (s, 3H), 4 48 (q, 2H), 7 47 (d, 2H), 7 58 (d, 2H)
41	(CDCl ₃) 2 39 (s, 3H), 4 13 (d, 2H), 4 41 (q, 2H), 5 05 (bs, 1H), 7 22 (d, 2H), 7 54 (d, 2H)
42	(CDCl ₃) 2 93 (s, 3H), 4 39 (d, 2H), 4 53 (q, 2H), 7 42 (d, 2H), 7 74 (d, 2H)
43	(CDCl ₃) 4 15 (d, 2H), 4 40 (q, 2H), 5 05 (bs, 1H), 7 46 (t, 1H), 7 54 (d, 2H)
44	(CDCl ₃) 3 54 (s, 2H), 3 89 (d, 2H), 4 32 (q, 2H), 4 40 (bs, 1H), 7 25-7 37 (m, 5H)
45	(CDCl ₃) 1 1-1 4 (m, 5H), 1 6-1 9 (m, 5H), 2 1 (m, 1H), 3 97 (d, 2H), 4 28 (q, 2H), 4 5 (bs, 1H)
46	(CDCl ₃) 3 84 (s, 3H), 4 12 (d, 2H), 4 41 (q, 2H), 5 15 (bs, 1H), 7 01 (ddd, 1H), 7 18 (m, 2H), 7 35 (t, 1H)
47	(CDCl ₃) 2 50 (s, 3H), 4 14 (d, 2H), 4 40(q, 2H), 5 0 (bs, 1H), 7 57 (s, 2H)
48	(CDCl ₃) 0 93 (t, 2H), 1 1-1 4 (m, 6H), 1 55-1 9 (m, 7H), 2 15 (m, 1H), 3 65 (t, 2H), 3 89 (s, 2H), 4 45 (bs, 1H), 7 43 (d, 2H), 8 10 (d, 2H), 8 43 (s, 1H)
49	(CDCl ₃) 0 91 (t, 2H), 1 35 (m, 4H), 1 72 (pentet, 2H), 2 49 (s, 3H), 3 76 (t, 2H), 4 06 (d, 2H), 5 05 (bs, 1H), 7 58 (s, 1H)
50	(CDCl ₃) 0 96 (t, 3H), 1 38 (hextet, 2H), 1 72 (pentet, 2H), 3 78 (t, 2H), 4 07 (d, 2H), 4 95 (bs, 1H), 7 41 (d, 2H), 7 59 (d, 2H)
51	(CDCl ₃) 4 19 (d, 2H), 4 42 (q, 2H), 5 10 (bs, 1H), 7 70 (d, 2H), 7 9 (d, 2H)
52	(CDCl ₃) 4 18 (d, 2H), 4 43 (q, 2H), 6 80 (bs, 1H), 7 36 (m, 1H), 7 76 (dt, 1H), 8 08 (d, 1H), 8 53 (m, 1H)
53	(CDCl ₃) 4 3-4 7 (m, 2H), 5 20 (d, 1H), 5 6 (m, 1H), 7 35 (m, 1H), 7 75 (l, 1H), 7 8 (bs, 1H), 8 11 (d, 1H), 8 55 (d, 1H)

54	(CDCl ₃) 0 91 (t, 3H), 1 35 (m, 4H), 1 73(m, 2H), 3 76 (t, 2H),v4 07 (s, 2H), 5 00 (bs, 1H), 7 41 (d, 2H), 7 56 (d, 2H)
55	(CDCl ₃) 0 89 (t, 2H), 1 32 (m, 4H), 1 73 (pentet, 2H), 1 86 (m, 2H), 3 77 (t, 2H), 4 08 (s, 2H), 5 15 (bs, 1H), 7 40 (d, 2H), 7 60 (d, 2H)
56	(CDCl ₃) 0 87 (t, 2H), 1 2-1 45 (m, 8H), 1 5-1 9 (m, 4H), 3 76 (t, 2H), 4 08 (s, 2H), 4 95 (bs, 1H), 7 40 (d, 2H), 7 60 (d, 2H)
57	(CDCl ₃) 0 87 (t, 2H), 1 2-1 45 (m, 12H), 1 6-1 9 (m, 4H), 3 76 (t, 2H), 4 06 (s, 2H), 5 15 (bs, 1H), 7 39 (d, 2H), 7 61 (d, 2H)
58	(CDCl ₃) 2 39 (s, 3H), 4 23 (d, 2H), 5 10 (bs, 1H), 7 08 (d, 1H), 7 30 (t, 1H), 7 41 (m, 4H), 7 65 (d, 2H)
59	(CDCl ₃) 4 23 (d, 2H), 5 45 (bs, 1H), 7 26 (m, 1H), 7 36 (d, 2H), 7 57 (d, 1H), 7 65 (d, 2H), 7 79 (m, 1H), 8 58 (m, 1H)
60	(CDCl ₃) 4 16 (d, 2H), 4 70 (s, 2H), 5 10 (bs, 1H), 7 43 (d, 2H), 7 62 (d, 2H)
61	(CDCl ₃) 0 14 (s, 9H), 3 39 (s, 2H), 4 08 (s, 2H), 5 16 (br s, 1H), 7 39 (dt, 2H), 7 60 (dt, 2H)
62	(CDCl ₃) 4 09 (d, 2H), 4 98 (s, 2H + NH), 6 76 (d, 1H), 6 89 (d, 1H), 7 41 (dt, 2H), 7 61 (dt, 2H)
63	(CDCl ₃) 3 93 (s, 2H), 4 29 (s, 2H), 4 93 (s, 2H), 6 61 (d, 1H), 6 73 (d, 1H), 6 76 (d, 1H), 6 84 (d, 1H), 7 45 (d, 2H), 7 50 (d, 2H)
64	(DMSO-d ₆) 3 89 (s, 2H), 7 56 (s, 1H), 7 66 (s, 1H), 7 75 (s, 2H), 10 58 (s, 1H)
65	(CDCl ₃) 4 15 (s, 2H), 4 56 (s, 2H), 5 01 (br s, 1H), 5 40 (s, 2H), 7 44 (m, 1H), 7 55 (m, 2H)
66	(CDCl ₃) 3 66-3 95 (m, 4H), 4 32 (d, 1H), 4 57 (dd, 1H), 5 69-6 31 (m, 4H), 7 41 (s, 4H)
67	(CDCl ₃) 4 09 (s, 2H), 4 36 (d, 1H), 4 61 (d, 1H), 5 12 (br s, 1H), 5 98 (dt, 1H, cis isomer), 6 09 (dt, 1H, trans isomer), 6 23 (dd, 1H, cis isomer), 6 31 (dd, 1H, trans isomer), 7 39 (dd, 2H), 7 60 (dd, 2H)
68	(CDCl ₃) 0 95 (t, 3H), 1 35 (hextet, 2H), 1 65 (pentet, 2H),2 72 (s, 3H), 3 72 (t, 2H), 4 05 (d, 2H), 4 95 (bs, 1H)
69	(CDCl ₃) 0 96 (t, 3H), 1 39 (hextet, 2H), 1 71 (pentet, 2H), 3 76 (t, 2H), 4 07 (d, 2H), 5 17 (br s, 1H), 7 21 (q, 1H), 7 39 (m, 1H), 7 58 (dt, 1H)

29

70	(DMSO-d6) 4 01 (s, 2H), 4 41 (q, 2H), 7 59 (s, 2H), 7 76 (s, 1H), NH not resolved
71	(CDCl ₃) 3 78 (s, 3H), 3 85 (s, 2H), 4 07 (s, 2H), 4 38 (q, 2H), 7 37 (d, 1H), 7 46 (t, 2H)
72	(CDCl ₃) 1 92 (s, 3H), 4 48 (q, 2H), 4 50 (s, 2H), 7 51 (m, 3H)
73	(CDCl ₃) 4 12 (s, 2H), 4 38 (q, 2H), 5 07 (br s, 1H), 7 33 (dd, 1H), 7 47 (d, 1H), 7 51 (d, 1H)
74	(CDCl ₃) 0 96 (t, 3H), 1 38 (hextet, 2H), 1 69 (pentet, 2H), 3 74 (t, 2H), 4 04 (s, 2H), 5 09 (br s, 1H), 7 36 (s, 2H), 7 55 (s, 1H)
75	(CDCl ₃) 0 91 (t, 3H), 1 32 (m, 2H), 1 67 (m, 2H), 2 02 (s, 3H), 2 33 (s, 3H), 3 69 (m, 2H), 4 85 (broad s, 0 5 H), 4 94 (s, 1H), 7 17 (d, 2H), 7 23 (d, 2H)
76	(CDCl ₃) 0 92 (t, 3H), 1 35 (dt, 2H), 1 69 (m, 2H), 1 99 (s, 3H), 3 70 (m, 2H), 4 76 (broad s, 0 7 H), 5 26 (s, 1H), 7 21 (m, 4H)
77	(CDCl ₃) 0 91 (t, 3H), 1 35 (dt, 2H), 1 66 (m, 2H), 2 02 (s, 3H), 2 35 (s, 3H), 3 66 (t, 2H), 4 87 (broad s, 0 6 H), 4 91 (s, 1H), 7 14 (m, 1H), 7 15 (s, 2 H), 7 27 (m, 1H)
78	(CDCl ₃) 0 91 (t, 3H), 1 32 (dt, 2H), 1 66 (m, 2H), 2 02 (s, 3H), 3 66 (t, 2H), 4 88 (broad s, 0 7 H), 4 84 (s, 1H), 6 62 (d, 1H), 6 64 (s, 1H), 6 70 (d, 1H), 7 1 (t, 1H)
79	(CDCl ₃) 0 92 (t, 3H), 1 34 (dt, 2H), 1 65 (m, 2H), 2 03 (s, 3H), 3 80 (s, 3H), 3 65 (m, 2H), 4 80 (broad s, 0 5 H), 4 88 (s, 1H), 6 89 (d, 2H), 7 26 (d, 2H)
80	(CDCl ₃) 0 90 (t, 3H), 1 33 (dt, 2H), 1 68 (m, 2H), 2 04 (s, 3H), 3 80 (s, 3H), 3 64 (m, 2H), 4 88 (broad s, 0 7 H), 4 96 (s, 1H), 6 90 (m, 3H), 7 28 (m, 1H)
81	(CDCl ₃) 0 60 (t, 3H), 0 96 (dt, 2H), 1 30 (m, 2H), 1 63 (s, 3H), 3 25 (m, 2H), 4 45 (s, 1H), 5 70 (s, 1H), 6 99 (d, 2H)
82	(CDCl ₃) 0 83 (t, 3H), 1 23 (m, 2H), 1 50 (m, 2H), 1 63 (s, 3H), 2 14 (s, 9H), 3 32 (m, 1H), 3 48 (m, 1H), 5 20 (s, 1H), 5 33 (s, 1H), 6 70 (s, 2H)
83	(CDCl ₃) 0 98 (t, 3H), 1 39 (m, 2H), 1 71 (m, 2H), 3 81 (t, 2H), 4 11 (d, 2H), 5 25 (br s, 1H), 6 90 (t, 1H), 7 01 (dd, 1H), 7 21 (dd, 1H), 7 34 (dt, 1H), 11 75 (br s, 1H)
84	(CDCl ₃) 4 16 (d, 2H), 4 41 (q, 2H), 5 07 (br s, 1H), 7 17 (m, 1H), 7 40 (m, 3H)
85	(CDCl ₃) 0 97 (t, 3H), 1 40 (m, 2H), 1 73 (m, 2H), 3 88 (t, 2H), 3 92 (d, 3H), 4 48 (s, 2H), 7 38 (dd, 1H), 7 52 (d, 1H), 7 68 (d, 1H)

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86	(CDCl ₃) 0 41 (m, 2H), 0 53 (m, 2H), 1 29 (m, 1H), 3 67 (d, 2H), 4 14 (d, 2H), 5 01 (br s, 1H), 7 56 (t, 1H), 7 71 (d, 1H), 7 87 (d, 1H), 7 93 (s, 1H)
87	(CDCl ₃) 2 27 (t, 1H), 2 46 (t, 1H), 3 83 (d, 2H), 4 10 (s, 2H), 4 56 (d, 2H), 7 60 (t, 1H), 7 74 (d, 1H), 7 80 (d, 1H), 7 90 (s, 1H)
88	(CDCl ₃) 2 28 (t, 1H), 4 15 (d, 2H), 4 59 (d, 2H), 5 04 (br, 1H), 7 57 (t, 1H), 7 72 (d, 1H), 7 89 (d, 1H), 7 92 (d, 1H)
89	(CDCl ₃) 2 49 (t, 1H), 3 86 (d, 2H), 4 12 (s, 2H), 4 38 (q, 2H), 7 61 (t, 1H), 7 78 (t, 2H), 7 89 (s, 1H)
90	(CDCl ₃) 4 22 (s, 2H), 4 44 (q, 2H), 5 18 (broad s, 1H), 7 97 (s, 1H), 8 12 (s, 2H)
91	(CDCl ₃) 4 12 (s, 2H), 4 42 (q, 2H), 5 55 (d, 2H), 6 44 (t, 1H), 7 61 (t, 1H), 7 78 (m, 3H)
92	(CDCl ₃) 1 00 (t, 3H), 1 43 (dt, 2H), 1 67 (m, 2H), 2 04 (s, 3H), 3 61 (m, 2H), 4 87 (broad s, 0 5 H), 5 00 (s, 1H), 7 28 (d, 5H)
93	(CDCl ₃) 0 80 (t, 3H), 1 42 (dt, 2H), 1 65 (m, 2H), 3 65 (m, 2H), 4 87 (broad s, 0 8 H), 4 97 (s, 1H), 7 05 (dd, 2H), 7 31 (dd, 2H)
94	(CDCl ₃) 0 91 (t, 3H), 1 35 (dt, 2H), 1 68 (m, 2H), 2 03 (s, 3H), 2 28 (s, 3H), 3 70 (t, 2H), 4 84 (broad s, 0 7 H), 4 94 (s, 1H), 7 00 (m, 1H), 7 16 (m, 2H)
95	(CDCl ₃) 0 89 (t, 3H), 1 36 (s, 9 H), 1 41 (m, 2H), 1 74 (m, 2H), 1 98 (s, 3H), 3 66 (m, 1H), 4 85 (broad s, 0 5 H), 4 94 (s, 1H), 7 28 (d, 2H), 7 38 (d, 2H)
96	(CDCl ₃) 4 14 (s, 2H), 4 41 (q, 2H), 5 56 (br d, 1H), 7 13 (dd, 1H), 7 24 (m, 1H), 7 44 (dddd, 1H), 7 86 (td, 1H)
97	(CDCl ₃) 4 14 (s, 2H), 4 40 (q, 2H), 5 04 (br s, 1H), 7 40 (m, 3H), 7 57 (d, 1H)
98	(CDCl ₃) 4 15 (d, 2H), 4 40 (q, 2H), 5 02 (bs, 1H), 7 24 (m, 1H), 7 37 (m, 1H), 7 56 (m, 1H)
99	(CDCl ₃) 4 16 (d, 2H), 4 40 (q, 2H), 5 03 (br s, 1H), 7 50 (s, 2H), 7 76 (m, 1H)
100	(CDCl ₃) 1 29 (t, 3H), 3 83 (q, 2H), 4 08 (d, 2H), 4 94 (br s, 1H), 7 77 (t, 1H), 7 78 (s, 1H)
101	(CDCl ₃) 0 96 (t, 3H), 1 37 (hexet, 2H), 1 71 (pentet, 2H), 3 77 (t, 1H), 4 01 (s, 2H), 5 24 (br s, 1H), 7 50 (s, 2H), 7 79 (d, 1H)

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102		(CDCl ₃) 1 31 (t, 3H), 4 15 (d, 2H), 4 25 (q, 2H), 4 52 (s, 2H), 5 17 (br s, 1H), 7 45 (m, 2H), 7 74 (m, 1H)
103		(CDCl ₃) 4 11 (d, 2H), 4 94 (s, 2H), 4 96 (br s, 1H), 7 33 (m, 3H), 7 45 (m, 4H), 7 72 (d, 1H)
104		(CDCl ₃) 0 96 (t, 3H), 1 38 (hextet, 2H), 1 71 (pentet, 2H), 3 77 (t, 2H), 4 08 (d, 2H), 5 00 (br s, 1H), 7 43 (t, 1H), 7 55 (d, 2H)
105		(DMSO-d6) 2 40 (s, 3H), 4 40 (m, 1H), 4 71 (m, 1H), 5 54 (br s, 1H), 7 28 (m, 2H), 7 36 (m, 1H), 7 48 (d, 1H), 8 88 (br s, 1H), 12 10 (s, 1H)
106		(CDCl ₃) 0 96 (t, 3H), 1 40 (hextet, 2H), 1 71 (pentet, 2H), 3 77 (t, 2H), 4 08 (s, 2H), 4 99 (br s, 1H), 7 22 (t, 1H), 7 53 (m, 1H), 7 75 (dd, 1H)
107		(CDCl ₃) 0 95 (t, 3H), 1 75 (hextet, 2H), 3 73 (t, 2H), 4 07 (d, 2H), 5 45 (br s, 1H), 7 42 (t, 1H), 7 58 (d, 2H)
108		(CDCl ₃) 1 20 (t, 3H), 3 56 (q, 2H), 3 75 (t, 2H), 3 99 (t, 2H), 4 10 (s, 2H), 5 01 (br s, 1H), 7 42 (t, 1H), 7 54 (d, 2H)
109		(CDCl ₃) 0 37 (m, 2H), 0 52 (m, 2H), 1 26 (m, 1H), 3 63 (d, 2H), 4 08 (d, 2H), 5 59 (br s, 1H), 7 41 (t, 1H), 7 59 (d, 2H)
110		(CDCl ₃) 0 96 (t, 3H), 1 38 (hextet, 2H), 1 72 (pentet, 2H), 3 77 (t, 2H), 4 07 (d, 2H), 5 14 (br s, 1H), 7 33 (dd, 1H), 7 42 (dt, 1H), 7 53 (dt, 1H), 7 68 (t, 1H)
111		(CDCl ₃) 4 21 (d, 2H), 5 25 (br s, 1H), 7 37 (m, 5H), 7 57 (dd, 1H), 7 64 (dd, 2H), 7 72 (t, 1H)
112		(CDCl ₃) 2 40 (s, 3H), 4 23 (d, 2H), 5 18 (br s, 1H), 7 11 (d, 1H), 7 36 (m, 5H), 7 58 (dt, 1H), 7 71 (t, 1H)
113		(CDCl ₃) 4 48 (q, 2H), 4 49 (s, 2H), 4 56 (br d, 2H), 7 02 (dd, 1H), 7 45 (m, 3H)
114	91%, 262 (M+H)	
115	86%, 300 (M+H)	

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116	71%, 298 (M+Na)	
117	91%, 322 (M+Na)	
118		
119		(CDCl ₃) 0.97 (t, 3H), 1.42 (m, 2H), 1.77 (m, 2H), 3.83 (t, 2H), 4.11 (s, 2H), 5.20 (bs, 1H), 7.54 (m, 2H), 7.85 (m, 4H), 8.04 (s, 1H)
120	80%, 440 (M+Na)	
121	79%, 323 (M+Na)	
122	89%, 257 (GC/MS)	
123		(CDCl ₃) 3.48 (br s, 3H), 4.51 (q, 2H), 4.55 (s, 2H), 7.45 (d, 2H), 7.49 (t, 1H)
124	93%, 248 (M+Na)	
125		(CDCl ₃) 1.31 (t, 3H), 4.11 (s, 2H), 4.24 (c, 2H), 4.50 (s, 2H), 5.50 (bs, 1H), 7.10 (m, 1H), 7.35 (m, 1H), 7.45 (m, 1H)
126		(CDCl ₃) 3.51 (t, 2H), 3.55 (t, 2H), 4.06 (s, 2H), 4.39 (q, 2H), 7.41 (d, 2H), 7.70 (s, 1H)
127		(CDCl ₃) 0.97 (t, 3H), 1.37 (m, 2H), 1.71 (m, 2H), 3.84 (t, 2H), 4.40 (s, 2H), 4.55 (br d, 2H), 7.04 (dd, 1H), 7.43 (t, 1H), 7.46 (d, 2H)
128		(CDCl ₃) 4.11 (d, 2H), 4.39 (d, 2H), 5.06 (br s, 1H), 5.23 (dd, 1H), 5.29 (dd, 1H), 5.95 (m, 1H), 7.42 (t, 1H), 7.55 (d, 2H)
129		(CDCl ₃) 0.96 (t, 3H), 1.36 (m, 2H), 1.71 (m, 2H), 2.34 (s, 3H), 3.84 (t, 2H), 4.40 (s, 2H), 7.42 (t, 1H), 7.48 (d, 2H)

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130		(CDCl ₃) 0 96 (t, 3H), 1 36 (m, 2H), 1 70 (m, 2H), 3 69 (s, 3H), 3 83 (t, 2H), 4 35 (s, 2H), 7 41 (t, 1H), 7 44 (d, 2H)
131		(CDCl ₃) 0 95 (t, 3H), 1 36 (m, 2H), 1 68 (m, 2H), 2 45 (t, 1H), 3 74 (t, 2H), 3 82 (d, 2H), 4 02 (s, 2H), 7 47 (m, 3H)
132		(CDCl ₃) 0 89 (t, 3H), 1 29 (m, 2H), 1 63 (m, 2H), 3 75 (t, 2H), 4 29 (s, 2H), 4 47 (d, 2H), 5 05 (d, 1H), 5 12 (dd, 1H), 5 59 (m, 1H), 7 32 (t, 1H), 7 37 (d, 2H)
133		(CDCl ₃) 0 96 (t, 3H), 1 36 (m, 2H), 1 71 (m, 2H), 2 53 (t, 1H), 3 83 (t, 2H), 4 38 (s, 2H), 4 65 (d, 2H), 7 41 (t, 1H), 7 46 (d, 2H)
134		(CDCl ₃) 1 78 (s, 3H), 4 47 (s, 2H), 4 49 (q, 2H), 4 63 (d, 1H), 4 65 (d, 1H), 7 45 (t, 1H), 7 48 (d, 2H)
135		(CDCl ₃) 0 97 (t, 3H), 1 39 (m, 2H), 1 72 (m, 2H), 1 78 (s, 3H), 3 85 (t, 2H), 4 38 (s, 2H), 4 63 (d, 2H), 7 42 (t, 1H), 7 48 (d, 2H)
136		(CDCl ₃) 0 97 (t, 3H), 1 37 (m, 2H), 1 71 (m, 2H), 3 84 (t, 2H), 4 40 (s, 2H), 4 54 (br d, 2H), 7 03 (dd, 1H), 7 39 (dd, 1H), 7 49 (d, 1H), 7 71 (d, 1H)
137		(CDCl ₃) 4 50 (q, 2H), 4 54 (s, 2H), 5 65 (dd, 1H), 5 85 (dd, 1H), 6 38 (dd, 1H), 7 47 (m, 3H)
138		(CDCl ₃) 0 97 (t, 3H), 1 37 (m, 2H), 1 71 (m, 2H), 3 85 (t, 2H), 4 46 (s, 2H), 5 63 (dd, 1H), 5 87 (dd, 1H), 6 38 (dd, 1H), 7 44 (m, 1H), 7 48 (m, 2H)
139		(CDCl ₃) 4 04 (s, 2H), 4 92 (s, 2H), 5 30 (bs, 1H), 7 10-7 60 (m, 8H)
140		(CDCl ₃) 1 29 (t, 3H), 4 09 (s, 2H), 4 22 (c, 2H), 4 50 (s, 2H), 5 50 (bs, 1H), 6 47 (bs, 1H), 6 80 (bs, 1H), 7 45 (s, 1H)
141	93%, 309 (M+H)	
142	100%, 379 (M+H)	
143	100%, 308 (M+H)	

144	100%, 342 (M+H)	
145	100%, 316 (M+H)	
146	100%, 334 (M+H)	
147	100%, 304 (M+H)	
148	100%, 236 (M+H)	
149	100%, 276 (M+H)	
150	100%, 286 (M+H)	
151	89%, 290 (M+H)	
152	100%, 248 (M+H)	
153	100%, 326 (M+H)	
154	100%, 272 (M+H)	
155	100%, 330 (M+H)	
156	98%, 282 (M+H)	

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157	100%, 317 (M+H)	
158	86%, 444 (M+H)	
159	100%, 327 (M+H)	
160	93%, 301 (M+H)	
161	100%, 330 (M+H)	
162		(DMSO-d6) 0 97 (t, 3H), 1 36 (m, 2H), 1 68 (m, 2H), 3 70 (t, 2H), 3 99 (s, 2H), 7 45 (m, 1H&NH), 7 97 (m, 4H)
163		(DMSO-d6) 4 10 (s, 2H), 4 52 (q, 2H), 7 46 (m, 1H&NH), 7 98 (m, 4H)
164		(CDCl3) 0 96 (t, 3H), 1 76 (m, 2H), 3 74 (t, 2H), 4 08 (d, 2H), 4 92 (br s, 1H), 7 49 (s, 2H), 7 77 (s, 1H)
165	83%, 276 (M+H)	
166	85%, 350 (M+H)	
167		(CDCl3) 4 22 (s, 2H), 4 43 (c, 2H), 5 25 (bs, 1H), 7 64 (dxd, 1H), 8 06 (d, 1H), 8 32 (d, 1H), 8 49 (s, 1H)
168		(CDCl3) 0 95 (t, 3H), 1 36 (m, 2H), 1 68 (m, 2H), 2 44 (t, 1H), 3 74 (t, 2H), 3 83 (d, 2H), 4 02 (s, 2H), 7 43 (dd, 1H), 7 53 (d, 1H), 7 68 (d, 1H)
169		(CDCl3) 2 49 (t, 1H), 3 86 (d, 2H), 4 09 (s, 2H), 4 37 (q, 2H), 7 49 (m, 3H)
170		(CDCl3) 0 97 (t, 3H), 1 38 (m, 2H), 1 72 (m, 2H), 1 78 (s, 3H), 3 84 (l, 2H), 4 37 (s, 2H), 4 63 (d, 2H), 7 44 (dd, 1H), 7 49 (d, 1H), 7 70 (d, 1H)

171		(CDCl ₃) 0.96 (t, 3H), 1.37 (m, 2H), 1.71 (m, 2H), 2.48 (l, 1H), 3.83 (l, 2H), 4.38 (s, 2H), 4.64 (d, 2H), 7.41 (dd, 1H), 7.48 (d, 1H), 7.67 (d, 1H)
172		(CDCl ₃) 0.96 (t, 3H), 1.38 (m, 2H), 1.71 (m, 2H), 3.83 (t, 2H), 4.36 (s, 2H), 4.54 (d, 2H), 5.11 (d, 1H), 5.18 (d, 1H), 5.67 (m, 1H), 7.39 (dd, 1H), 7.47 (d, 1H), 7.66 (d, 1H)
173		(CDCl ₃) 0.98 (t, 3H), 1.39 (m, 2H), 1.75 (m, 2H), 3.88 (t, 2H), 4.46 (s, 2H), 6.90 (d, 2H), 7.19 (dd, 1H), 7.31 (dd, 2H), 7.50 (s, 2H), 7.79 (s, 1H)
174		(DMSO-d ₆) 3.85 (d, 2H), 7.50 (br s, 1H), 7.70 (d, 2H), 7.94 (t, 1H), 10.51 (br s, 1H)
175		(CDCl ₃) 0.97 (t, 3H), 1.40 (m, 2H), 1.72 (m, 2H), 3.79 (t, 2H), 4.11 (d, 2H), 5.02 (br s, 1H), 7.55 (t, 1H), 7.74 (dt, 1H), 7.89 (dt, 1H), 8.00 (t, 1H)
176		(CDCl ₃) 3.83 (s, 2H), 4.27 (d, 2H), 6.72 (br s, 1H), 7.60 (t, 1H), 7.81 (d, 1H), 8.05 (d, 1H), 8.12 (t, 1H)
177		(CDCl ₃) 0.96 (t, 3H), 1.37 (m, 2H), 1.70 (dd, 3H), 1.71 (m, 2H), 3.84 (t, 2H), 4.42 (s, 2H), 5.60 (d, 1H), 6.94 (dq, 1H), 7.39 (dd, 1H), 7.49 (d, 1H), 7.73 (d, 1H)
178		(CDCl ₃) 0.98 (t, 3H), 1.40 (m, 2H), 1.76 (m, 2H), 3.90 (t, 2H), 4.89 (s, 2H), 6.77 (d, 2H), 7.23 (d, 1H), 7.32 (t, 2H), 7.52 (s, 2H), 7.79 (s, 1H)
179		(CDCl ₃) 0.96 (t, 3H), 1.37 (m, 2H), 1.75 (m, 2H), 3.47 (br t, 2H), 3.83 (t, 2H), 4.31 (t, 2H), 4.37 (s, 2H), 7.41 (dd, 1H), 7.49 (d, 1H), 7.69 (d, 1H)
180		(CDCl ₃) 0.95 (t, 3H), 1.17 (t, 3H), 1.36 (m, 2H), 1.68 (m, 2H), 2.24 (qt, 2H), 3.73 (t, 2H), 3.78 (t, 2H), 4.00 (s, 2H), 7.42 (dd, 1H), 7.52 (d, 1H), 7.72 (d, 1H)
181		(CDCl ₃) 0.69 (m, 2H), 0.96 (m, 1H), 0.97 (t, 3H), 1.06 (m, 2H), 1.39 (m, 2H), 1.74 (m, 2H), 3.86 (t, 2H), 4.42 (s, 2H), 7.51 (m, 2H), 7.79 (d, 1H)
182		(CDCl ₃) 0.95 (t, 3H), 1.35 (m, 2H), 1.67 (m, 2H), 3.73 (t, 2H), 3.88 (s, 2H), 4.28 (s, 2H), 7.12 (d, 2H), 7.35 (m, 4H), 7.49 (d, 1H), 7.65 (d, 1H)
183		(CDCl ₃) 0.94 (t, 3H), 1.36 (m, 2H), 1.68 (m, 2H), 1.87 (t, 3H), 3.73 (t, 2H), 3.76 (q, 2H), 4.01 (s, 2H), 7.42 (dd, 1H), 7.52 (d, 1H), 7.70 (d, 1H)
184	91%, 311 (M+H)	

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185	85%, 267 (M+H)	
186	90%, 342 (M+H)	
187	90%, 312 (M+H)	
188	90%, 365 (M+H)	
189	92%, 308 (M+H)	
190	90% 335 (M+H)	
191		(CDCl ₃) 0 96 (t, 3H), 1 36 (m, 2H), 1 72 (m, 2H), 3 86 (t, 2H), 4 92 (s, 2H), 5 16 (d, 1H), 5 23 (dd, 1H), 5 72 (m, 1H), 7 39 (dd, 1H), 7 47 (d, 1H), 7 70 (d, 1H)
192		(CDCl ₃) 0 96 (t, 3H), 1 37 (m, 2H), 1 72 (m, 2H), 2 21 (t, 1H), 3 87 (t, 2H), 3 94 (d, 2H), 4 93 (s, 2H), 7 40 (dd, 1H), 7 48 (d, 1H), 7 71 (d, 1H)
193		(CDCl ₃) 3 45 (s, 3H), 4 39 (m, 1H), 4 57 (m, 1H), 5 10 (d, 1H), 6 56 (br, 1H), 7 47 (t, 1H), 7 61 (d, 2H)
194		(CDCl ₃) 0 99 (t, 3H), 1 40 (m, 2H), 1 75 (m, 2H), 3 88 (t, 2H), 4 47 (s, 2H), 6 90 (d, 2H), 7 22 (dd, 1H), 7 33 (dd, 2H), 7 42 (t, 1H), 7 56 (d, 2H)
195		(CDCl ₃) 0 95 (t, 3H), 1 39 (m, 2H), 1 72 (m, 2H), 3 77 (t, 2H), 3 91 (s, 3H), 4 02 (d, 2H), 6 21 (br s, 1H), 6 96 (d, 1H), 7 03 (dt, 1H), 7 39 (ddd, 1H), 7 89 (dd, 1H)
196		(CDCl ₃) 2 22 (quintet, 2H), 3 62 (t, 2H), 3 94 (t, 2H), 4 09 (d, 2H), 5 03 (br s, 1H), 7 50 (d, 2H), 7 77 (t, 1H)
197		(CDCl ₃) 0 91 (t, 3H), 1 36 (m, 4H), 1 73 (m, 2H), 3 75 (t, 2H), 4 08 (d, 2H), 4 94 (br s, 1H), 7 49 (s, 2H), 7 77 (s, 1H)
198		(CDCl ₃) 1 31 (t, 3H), 4 16 (s, 2H), 4 24 (q, 2H), 6 90 (1H, br s), 7 29-7 49 (m, 4H)

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199	(CDCl ₃) 0 94 (t, 3H), 1 34 (m, 2H), 1 65 (m, 2H), 3 71 (t, 2H), 3 80 (s, 3H), 3 85 (s, 2H), 4 21 (s, 2H), 6 86 (d, 2H), 7 03 (d, 2H), 7 37 (dd, 1H), 7 50 (d, 1H), 7 64 (d, 1H)
200	(CDCl ₃) 0 95 (t, 3H), 1 35 (m, 2H), 1 67 (m, 2H), 3 76 (m, 2H), 3 77 (s, 6H), 3 89 (s, 2H), 4 20 (s, 2H), 6 25 (d, 2H), 6 38 (t, 1H), 7 37 (dd, 1H), 7 50 (d, 1H), 7 63 (d, 1H)
201	(CDCl ₃) 0 95 (t, 3H), 1 36 (m, 2H), 1 54 (m, 2H), 1 67 (m, 3H), 1 86 (m, 1H), 1 97 (m, 2H), 2 53 (m, 1H), 3 09 (d, 2H), 3 73 (t, 2H), 3 89 (s, 2H), 7 31 (dd, 1H), 7 52 (d, 1H), 7 57 (d, 1H)
202	(CDCl ₃) 0 93 (t, 3H), 1 34 (dt, 2H), 1 67 (quintet, 2H), 1 71 (t, 1H), 4 58 (m, 1H), 5 29 (d, 1H), 5 34 (m, 1H), 5 86 (s, 1H), 5 97 (m, 1H), 7 48 (d, 1H), 7 62 (dd, 1H), 7 86 (d, 1H)
203	(CDCl ₃) 0 92 (t, 3H), 1 34 (m, 2H), 1 70 (quintet, 2H), 1 79 (s, 3H), 3 70 (m, 1H), 3 77 (m, 1H), 4 50 (d, 1H), 4 97 (s, 2H), 5 74 (s, 1H), 7 46 (d, 1H), 7 56 (dd, 1H), 7 82 (d, 1H)
204	(CDCl ₃) 0 93 (t, 3H), 1 37 (dt, 2H), 1 58 (quintet, 2H), 2 21 (t, 2H), 4 00 (s, 2H), 4 95 (broad s, 1H), 7 33 (d, 2H), 7 56 (d, 2H)
205	(CDCl ₃) 2 49 (t, 2H), 2 92 (t, 2H), 3 85 (s, 2H), 4 24 (m, 3H), 7 26 (m, 5H)
206	(Methanol-d ₄) 1 00 (t, 2H), 1 43 (t, 3H), 1 43 (m, 2H), 1 75 (quintet, 2H), 3 79 (t, 2H), 4 03 (s, 2H), 4 41 (q, 2H), 7 83 (m, 6H), 8 13 (d, 2H)
207	(CDCl ₃) 0 96 (t, 3H), 1 38 (dt, 2H), 1 68 (quintet, 2H), 3 77 (t, 2H), 4 06 (s, 2H), 5 12 (broad s, 1H), 7 16 (t, 1H), 7 58 (m, 1H), 7 89 (dd, 1H)
208	(Methanol-d ₄) 4 22 (s, 2H), 4 59 (q, 2H), 7 45 (t, 1H), 7 90 (m, 1H), 8 16 (dd, 1H)
209	(CDCl ₃) 1 13 (t, 3H), 1 18 (t, 3H), 2 22 (m, 4H), 3 80 (t, 2H), 4 04 (s, 2H), 4 50 (t, 2H), 7 46 (dd, 1H), 7 52 (d, 1H), 7 75 (d, 1H)
210	(DMSO-d ₆) 1 04 (t, 3H), 2 18 (q, 2H), 3 94 (br s, 2H), 4 40 (s, 2H), 7 74 (s, 2H), 7 98 (s, 1H), NH not resolved
211	(CDCl ₃) 0 93 (t, 3H), 1 34 (m, 2H), 1 68 (m, 2H), 3 73 (t, 2H), 4 01 (d, 2H), 6 02 (br s, 1H), 7 26 (t, 1H), 7 53 (dt, 1H), 7 62 (d, 1H), 7 85 (t, 1H)
212	(CDCl ₃) 4 08 (d, 2H), 4 38 (q, 2H), 5 62 (br s, 1H), 7 28 (t, 1H), 7 58 (dd, 2H), 7 80 (t, 1H)
213	(CDCl ₃) 0 94 (t, 3H), 1 37 (m, 2H), 1 70 (m, 2H), 3 75 (t, 2H), 3 82 (d, 2H), 5 12 (s, 2H), 6 17 (br s, 1H), 7 03 (dt, 2H), 7 36 (m, 6H), 7 87 (dd, 1H)

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214	(CDCl ₃) 1 06 (t, 3H), 3 65, (s, 3H), 4 2 (m, 3H), 4 77 (dq, 1H), 5 74 (s, 1H), 7 38 (d, 2H), 7 45 (t, 1H)
215	(Acetone-d6) 2 76 (t, 1H), 3 10 (t, 1H), 4 11 (d, 2H), 4 11 (s, 2H), 4 52 (d, 2H), 7 68 (dd, 1H), 7 76 (d, 1H), 7 86 (d, 1H)
216	(Acetone-d6) 2 79 (t, 1H), 4 10 (s, 2H), 4 58 (d, 2H), 7 09 (broad s, 1H), 7 73 (d, 1H), 7 84 (dd, 1H), 8 06 (d, 1H)
217	(CDCl ₃) 2 28 (t, 1H), 2 48 (t, 1H), 3 85 (d, 2H), 4 07 (s, 2H), 4 53 (d, 2H), 7 24 (t, 1H), 7 56 (m, 1H), 7 84 (dd, 1H)
218	(Acetone-d6) 3 15 (t, 1H), 4 21 (s, 2H), 4 68 (d, 2H), 7 16 (broad s, 1H), 7 55 (t, 1H), 8 04 (m, 1H), 8 26 (dd, 1H)
219	(CDCl ₃) -0 01 (m, 2H), 0 27 (m, 2H), 0 41 (m, 2H), 0 45 (m, 2H), 0 79, (m, 1H), 1 17 (m 1H), 2 85 (d, 2H), 3 53 (d, 2H), 3 98 (s, 2H), 7 09 (t, 1H), 7 35 (m, 1H), 7 62 (dd, 1H)
220	(CDCl ₃) 0 35 (m, 2H), 0 50 (m, 2H), 1 23 (m 1H), 3 57 (d, 2H), 4 00 (s, 2H), 6 19 (s, 1H), 7 10 (t, 1H), 7 64 (m, 1H), 7 93 m 1H)
221	(CDCl ₃) 0 93 (t, 3H), 1 33 (m, 2H), 1 68 (m, 2H), 3 72 (l, 2H), 3 98 (s, 2H), 6 46 (s, 1H), 7 11 (dt, 1H), 7 35 (dd, 1H), 7 49 (t, 2H)
222	(CDCl ₃) 0 08 (m, 2H), 0 38 (m, 2H), 0 52 (m, 4H), 0 88 (m, 1H), 1 26 (m 1H), 2 95 (d, 2H), 3 63 (d, 2H), 4 08 (s, 2H), 7 20 (m, 3H), 7 40 (m, 1H)
223	(CDCl ₃) 0 37 (m, 2H), 0 51 (m, 2H), 1 26 (m, 1H), 3 63 (d, 2H), 4 05 (d 2H), 5 68 (br s, 1H), 7 13 (ddt, 1H), 7 38 (dd, 1H), 7 45 (m, 2H)
224	(CDCl ₃) 0 08 (m, 2H), 0 37 (m, 2H), 0 53 (m, 4H), 0 87 (m, 1H), 1 26 (m, 1H), 2 93 (d, 2H), 3 62 (d, 2H), 4 08 (d, 2H), 7 31 (dd, 1H), 7 41 (dd, 1H), 7 57 (dd, 1H), 7 63 (d, 1H)
225	(CDCl ₃) 2 28 (t, 1H), 4 12 (s, 2H), 4 57 (d, 2H), 5 20 (br s, 1H), 7 16 (ddt, 1H), 7 42 (m, 3H)
226	(CDCl ₃) 2 27 (t, 1H), 2 47 (t, 1H), 3 84 (d, 2H), 4 08 (s, 2H), 4 53 (d, 2H), 7 31 (dd, 1H), 7 53 (d, 1H), 7 60 (dd, 1H), 7 74 (d, 1H)
227	(CDCl ₃) 2 28 (t, 1H), 4 12 (s, 2H), 4 57 (d, 2H), 5 14 (br s, 1H), 7 31 (d, 1H), 7 59 (ddd, 2H), 7 85 (d, 1H)

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228	(DMSO-d6) 1 50 (s, 9H), 4 75 (s, 2H), 7 09 (d, 1H), 7 52 (d, 1H), 7 54 (d, 2H), 7 87 (d, 2H)
229	(CDCl3) 0 95 (br t, 3H), 1 37 (m, 2H), 1 69 (m, 2H), 3 76 (br, 2H), 4 65 (s, 2H), 6 90 (d, 1H), 7 02 (d, 1H), 7 40 (d, 2H), 7 66 (d, 2H)
230	(Acetone-d6) 1 03 (t, 6H), 1 40 (m, 4H), 1 70 (m, 4H), 3 74 (t, 1H), 3 95 (s, 4H), 7 88 (s, 4H)
231	(CDCl3) 0 97 (t, 6H), 1 40 (m, 4H), 1 74 (quintet, 4H), 3 80 (t, 4H), 4 09 (s, 4H), 5 27 (s, 2H), 7 64 (d, 4H), 7 75 (d, 4H)
232	(CDCl3) 0 95 (t, 6H), 1 37 (dq, 4H), 1 71 (quintet, 4H), 3 76 (t, 4H), 4 05 (s, 4H), 5 52 (s, 2H), 7 48 (t, 2H), 7 76 (dd, 4H), 7 96 (s, 2H)
233	(CDCl3) 4 76 (q, 2H), 7 45 (d, 2H), 8 09 (d, 2H), 8 55 (s, 1H)
234	(CDCl3) 0 92 (t, 3H), 1 38 (m, 4H), 1 9 (pentet, 2H), 4 15 (t, 3H), 7 43 (d, 2H), 8 09 (d, 2H), 8 45 (s, 1H)
235	(CDCl3) 1 48 (t, 3H), 4 22 (q, 2H), 7 43 (d, 2H), 8 10 (d, 2H), 8 45 (s, 1H)
236	(CDCl3) 4 77 (d, 2H), 5 34, 5 38 (2ds, 2H), 6 0 (m, 1H), 7 43 (d, 2H), 8 10 (d, 2H), 8 48 (s, 1H)
237	(methanol-d4) 1 02 (t, 3H), 2 1 (qt, 2H), 2 46 (s, 3H), 4 7 (under solvent peak), 7 37 (d, 2H), 8 35 (d, 2H)
238	(CDCl3) 3 83 (s, 3H), 7 43 (d, 2H), 8 10 (d, 2H), 8 46 (s, 1H)
239	(CDCl3) 2 65 (s, 3H), 4 75 (q, 2H), 7 43 (d, 2H), 8 10 (d, 2H)
240	(CDCl3) 5 30 (s, 2H), 7 34-7 52 (m, 7H), 8 08, (d, 2H), 8 46 (s, 1H)
241	(CDCl3) 1 72 (s, 9H), 7 40 (d, 2H), 8 05 (d, 2H), 8 32 (s, 1H)
242	(CDCl3) 3 83 (s, 3H), 7 47 (m, 3H), 8 15 (m, 2H), 8 48 (s, 1H)
243	(DMSO-d6) 7 5 (m, 3H), 8 05 (m, 2H), 8 55 (s, 1H)
244	(CDCl3) 0 91 (t, 2H), 1 32 (hexet, 2H), 1 75 (pentet, 2H), 3 79 (s, 3H), 4 05 (t, 2H), 6 90 (d, 2H), 8 02 (d, 2H), 8 35 (s, 1H)
245	(CDCl3) 4 77 (q, 2H), 7 35-7 5 (m, 2H), 8 04 (d, 1H), 8 14 (t, 1H), 8 57 (s, 1H)
246	(CDCl3) 5 28 (q, 2H), 7 46 (t, 1H), 7 49 (dt, 1H), 8 09 (dt, 1H), 8 18 (t, 1H), 8 86 (s, 1H)
247	(CDCl3) 2 42 (s, 3H), 4 75 (q, 2H), 7 27 (d, 2H), 8 02 (d, 2H), 8 54 (s, 1H)
248	(CDCl3) 4 77 (q, 2H), 7 47 (t, 1H), 8 03 (d, 2H), 8 56 (s, 1H)

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249	(CDCl ₃) 4 04 (s, 2H), 4 66 (q, 2H), 7 25-7 37 (m, 5H), 8 39 (s, 1H)
250	(methanol-d ₄) 1 27 (t, 3H), 4 22 (q, 2H), 7 47 (d, 2H), 7 76 (d, 2H)
251	(CDCl ₃) 1 1-1 55 (m, 5H), 1 65-2 0 (m, 5H), 2 69 (tt, 1H), 4 64 (q, 2H), 8 42 (s, 1H)
252	(CDCl ₃) 3 88 (s, 3H), 4 77 (q, 2H), 7 03 (ddd, 1H), 7 39 (t, 1H), 7 68 (t, 1H), 7 75 (d, 1H)
253	(CDCl ₃) 2 53 (s, 3H), 4 77 (q, 2H), 8 05 (s, 2H), 8 54 (s, 1H)
254	(CDCl ₃) 0 92 (t, 2H), 1 30 (m, 2H), 1 42 (d, 3H), 1 85 (m, 1H), 1 90 (m, 1H), 5 10 (m, 1H), 7 43 (d, 2H), 8 10 (d, 2H), 8 43 (s, 1H)
255	(CDCl ₃) 0 96 (t, 3H), 1 15-1 6 (m, 6H), 1 65-2 0 (m, 8H), 4 04 (t, 2H), 8 32 (s, 1H)
256	(CDCl ₃) 1 30 (m, 1H), 1 45 (m, 2H), 1 7-2 0 (m, 7H), 4 8 (lt, 2H), 7 43 (d, 2H), 8 10 (d, 2H), 8 43 (s, 1H)
257	(CDCl ₃) 0 93 (t, 2H), 1 39 (m, 4H), 1 85 (pentet, 2H), 2 52 (s, 3H), 4 13 (t, 2H), 8 06 (s, 2H), 8 43 (s, 1H)
258	(CDCl ₃) 0 99 (t, 3H), 1 4 (m, 2H), 1 85 (pentet, 2H), 4 15 (t, 2H), 7 45 (d, 2H), 8 08 (d, 2H), 8 44 (s, 1H)
259	(CDCl ₃) 0 88 (t, 3H), 1 23-1 4 (m, 10 H), 1 85 (pentet, 2H), 4 15 (t, 2H), 7 43 (d, 2H), 8 08 (d, 2H), 8 44 (s, 1H)
260	(CDCl ₃) 0 88 (t, 3H), 1 23-1 4 (m, 14 H), 1 85 (pentet, 2H), 4 15 (t, 2H), 7 43 (d, 2H), 8 09 (d, 2H), 8 44 (s, 1H)
261	(CDCl ₃) 7 45 (m, 3H), 7 77 (d, 1H), 7 95 (m, 1H), 8 15 (d, 2H), 8 63 (s, 1H), 8 79 (m, 1H)
262	(CDCl ₃) 0 89 (t, 3H), 1 35 (m, 6H), 1 85 (pentet, 2H), 4 15 (t, 2H), 7 44 (d, 2H), 8 09 (d, 2H), 8 44 (s, 1H)
263	(CDCl ₃) 4 78 (q, 2H), 7 23 (m, 2H), 7 48 (dddd, 1H), 7 90 (td, 1H), 8 57 (s, 1H)
264	(CDCl ₃) 4 97 (s, 2H), 7 39 (d, 2H), 8 03 (d, 2H), 8 49 (s, 1H)
265	(CDCl ₃) 0 18 (s, 9H), 3 85 (s, 2H), 7 44 (d, 2H), 8 07 (d, 2H), 8 42 (s, 1H)
266	(CDCl ₃) 5 34 (s, 2H), 6 79 (d, 1H), 7 02 (d, 1H), 7 44 (d, 2H), 8 09 (d, 2H), 8 47 (s, 1H)
267	(CDCl ₃) 4 77 (q, 2H), 7 40 (td, 1H), 7 41 (td, 1H), 7 52 (dd, 1H), 7 69 (dd, 1H), 8 56 (s, 1H)

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268		(CDCl ₃) 0 97 (t, 3H), 1 37 (hextet, 2H), 1 80 (pentet, 2H), 2 76 (s, 3H), 4 14 (t, 2H), 8 38 (s, 1H)
269		(CDCl ₃) 0 98 (t, 3H), 1 42 (hextet, 2H), 1 87 (pentet, 2H), 4 17 (t, 2H) 7 36 (dd, 1H), 7 44 (d, 1H), 7 71 (d, 1H), 8 46 (s, 1H)
270		(CDCl ₃) 0 99 (t, 3H), 1 43 (hextet, 2H), 1 86 (pentet, 2H), 4 17 (t, 2H), 7 54 (d, 1H), 7 99 (dd, 1H), 8 25 (s, 1H), 8 44 (s, 1H)
271		(CDCl ₃) 1 00 (t, 3H), 1 43 (m, 2H), 1 86 (m, 2H), 4 17 (t, 2H), 7 42 (t, 1H), 8 03 (d, 2H), 8 44 (s, 1H)
272		(CDCl ₃) 0 50 (m, 2H), 0 62 (m, 2H), 1 43 (m, 1H), 4 02 (d, 2H), 7 54 (d, 1H), 7 99 (dd, 1H), 8 25 (d, 1H), 8 46 (s, 1H)
273	37% 266 (M+Na) ⁺ 40% 268 (M+Na)	
274		(CDCl ₃) 1 45 (t, 3H), 4 11 (q, 2H), 6 98 (d, 2H), 7 48 (d, 2H), 7 86 (d, 2H), 8 12 (d, 2H), 8 57 (s, 1H)
275		(CDCl ₃) 1 31 (t, 3H), 2 42 (s, 3H), 4 28 (q, 2H), 4 89 (s, 2H), 7 3 (m, 2H), 7 9 (m, 2H), 8 53 (s, 1H)
276		(CDCl ₃) 3 01 (t, 2H), 4 49 (t, 2H), 7 75 (d, 2H), 7 80 (d, 2H), 8 29 (d, 2H) 8 34 (d, 2H), 8 56 (s, 1H)
277		(CDCl ₃) 0 99 (t, 3H), 1 44 (hextet, 2H), 1 87 (pentet, 2H), 4 17 (t, 2H), 7 4 (m, 2H), 8 05 (d, 1H), 8 15 (s, 1H), 8 45 (s, 1H)
278		(CDCl ₃) 2 47 (s, 3H), 7 29 (m, 1H), 7 41 (m, 3H), 7 55 (m, 2H), 8 10 (m, 1H), 8 20 (bs, 1H), 8 60 (s, 1H)
279		(CDCl ₃) 0 92 (t, 3H), 1 25 (m, 2H), 1 36 (m, 4H), 1 83 (pentet, 2H), 7 01 (d, 1H), 7 50 (d, 1H), 7 58 (d, 1H), 7 68 (d, 1H), 7 89 (d, 1H), 8 24 (d, 1H), 8 62 (s, 1H)

280	(CDCl ₃) 0 99, 1 01 (2t, 6H), 1 53, (m, 2H), 1 80 (pentet, 2H), 1 91 (hextet, 2H), 4 03 (t, 2H), 4 11 (t, 2H), 6 97 (d, 2H), 8 07 (d, 2H), 8 43, (s,1H)
281	(CDCl ₃) 1 08 (t, 3H), 1 84 (hextet, 2H), 3 99 (t, 2H), 4 74 (q, 2H), 6 98 (d, 2H), 8 06 (d, 2H), 8 53, (s,1H)
282	(CDCl ₃) 3 82 (s, 3H), 7 08 (m, 4H), 7 13 (t, 3H), 7 37 (t, 1H), 8 2 (d, 1H), 8 46, (s,1H)
283	(CDCl ₃) 0 97 (t, 3H), 1 43 (m, 2H), 1 85 (m, 2H), 3 86 (s, 3H), 4 15 (t, 2H), 7 03 (m, 2H), 7 43 (dt, 1H), 7 58 (dd, 1H), 8 44 (s, 1H)
284	(CDCl ₃) 0 97 (t, 3H), 1 43 (dt, 2H), 1 86 (quintet, 2H), 2 42 (s, 3H), 2 52 (s, 3H), 4 14 (t, 2H), 7 27 (d, 2H), 8 48 (d, 2H)
285	(CDCl ₃) 0 97 (t, 3H), 1 43 (dt, 2H), 1 83 (quintet, 2H), 2 43 (s, 3H), 2 53 (s, 3H), 4 13 (t, 2H), 7 36 (m, 2H), 8 30 (m, 2H)
286	(CDCl ₃) 0 97 (t, 3H), 1 43 (dt, 2H), 1 80 (quintet, 2H), 2 50 (s, 3H), 3 88 (s, 3H), 4 13 (t, 2H), 6 97 (d, 2H), 8 63 (d, 2H)
287	(CDCl ₃) 0 99 (t, 3H), 1 43 (m, 2H), 1 85 (m, 2H), 4 15 (t, 2H), 6 97 (m, 2H), 7 36 (dt, 1H), 8 14 (dd, 1H), 8 45 (s, 1H), 10 37 (s, 1H)
288	(CDCl ₃) 1 00 (t, 3H), 1 43 (dq, 2H), 1 88 (quintet, 2H), 4 21 (t, 2H), 7 94 (s, 1H), 8 42 (s, 1H), 8 54 (s, 2H)
289	(CDCl ₃) 1 00 (t, 3H), 1 44 (dt, 2H), 1 86 (quintet, 2H), 4 16 (t, 2H), 7 18 (t, 1H), 8 07 (m, 1H), 8 34 (dd, 1H), 8 43 (s, 1H)
290	(CDCl ₃) 4 77 (q, 2 H), 7 21 (t, 1H), 8 10 (m, 1H), 8 35 (dd, 1H), 8 55 (s, 1H)
291	(DMSO-d6) 2 32 (s, 3H), 4 68 (q, 2H), 7 27 (d, 2H), 7 36 (d, 2H), NH not resolved
292	(CDCl ₃) 3 88 (s, 3H), 4 35 (s, 2H), 4 45 (br q, 2H), 7 45 (s, 3H)

*Compound 273 was prepared and tested as a 1 : 1 mixture with its unoxidized (dihydro) form

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MISSING AT THE TIME OF FILING

The compounds of the present invention have fungitoxic activity, particularly against phytopathogenic fungi. They are active against fungi of a number of classes including Deuteromycetes (Fungi Imperfecti), Basidiomycetes, Phycomycetes and Ascomycetes. More particularly, the method of this invention provides for activity against organisms including, but not limited to, *Pycularia oryzae*, *Erysiphe graminis*, *Puccinia recondita*, *Colletotrichum lagenarium*, *Helminthosporium* species, *Alternaria solani*, *Septoria nodorum*, *Sclerotinia* species, *Sphaerotheca fuliginea*, *Plasmopara viticola*, *Pseudoperonospora cubensis*, *Cercospora* species, *Uncinula necator* and *Podosphaera leucotricha*. More particularly, rice diseases are controlled by the method of the invention. Examples of such rice diseases are seedborne diseases, soilborne diseases, and seedling box and field diseases such as those caused by *Pycularia oryzae* and *Rhizoctonia* species. Additional diseases include powdery mildew incited by *Sphaerotheca fuliginea* (e.g., cucurbit powdery mildew), *Uncinula necator* (e.g., grape powdery mildew), and *Podosphaera leucotricha* (e.g., apple powdery mildew). Cereal diseases are controlled such as those caused by *Erysiphe graminis*, *Puccinia recondita*, *Septoria nodorum* and *Helminthosporium* species. Tomato and potato diseases are controlled such as those caused by *Alternaria solani*. The compounds of the invention can be applied as fungicidal sprays by methods commonly employed, such as conventional high-gallonage hydraulic sprays, low-gallonage sprays, air-blast, aerial sprays and dusts. Such use conveniently permits treatment of fungal infestations in crops such as vegetables, fruits, ornamentals, seeds, turf, cereal and vines among other plants. The dilution and rate of application will depend upon the type of equipment employed, the method and frequency of application desired and diseases to be controlled, but the effective amount is usually from about 0.01 kilogram (kg) to about 20 kg, of active ingredient (a.i.) per

hectare (ha) As a foliar fungicide, a compound of the present invention is usually applied to growing plants at a rate of about 0.1 to about 5 and preferably from about 0.125 to about 0.5 kg per hectare

As a seed protectant, the amount of toxicant coated on the seed is usually at a dosage rate of about 10 to about 250 grams (g) and preferably from about 20 to about 60 g per 50 kilograms of seed As a soil fungicide, the chemical can be incorporated in the soil or applied to the surface usually at a rate of 0.5 to about 20 kg and preferably about 1 to about 5 kg per hectare

The compounds of the present invention are useful for the control of fungi and can be utilized at various loci such as the seed, the water surface, the soil or the foliage For such purposes, these compounds can be used in the technical or pure form as prepared, as solutions or as formulations The compounds are usually taken up in a carrier or are formulated so as to render them suitable for subsequent use as fungicides For example, these chemical agents can be formulated as wettable powders, dry powders, emulsifiable concentrates, dusts, granular formulations, aerosols, or flowable emulsion concentrates In such formulations, the compounds are extended with a liquid or solid carrier and when desired suitable surfactants are incorporated

It is usually desirable, particularly in the case of foliar spray formulations, to include adjuvants, such as wetting agents, spreading agents, dispersing agents, stickers, adhesive and the like in accordance with agricultural practices Such adjuvants commonly used in the art can be found in McCutcheon's Emulsifiers and Detergents, McCutcheon's Emulsifiers and Detergents and McCutcheon's Functional Materials all

published annually by McCutcheon Division of MC Publishing Company (New Jersey)

In general, the compounds utilized in this invention can be dissolved in appropriate solvents such as acetone, methanol, ethanol, dimethylformamide or dimethyl sulfoxide and such solutions extended with water. The concentrations of the solution can vary from 1% to 90% with a preferred range being 5 to 50%.

For the preparation of emulsifiable concentrates, the compounds of the invention can be dissolved in suitable organic solvents or a mixture of solvents, together with an emulsifying agent which permits dispersion of the fungicide in water. The concentration of the active ingredient in emulsifiable concentrates is usually 10% to 90% and in flowable emulsion concentrates, this can be as high as 75%.

Wettable powders suitable for spraying can be prepared by admixing the compound with finely divided solid, such as inorganic silicates and carbonates, and silicas and incorporating wetting agents, sticking agents, and/or dispersing agents in such mixtures. The concentration of active ingredients in such formulations is usually in the range of 20% to 98%, preferably 40% to 75%. A typical wettable powder is made by blending 50 parts of a compound of this invention, 45 parts of a synthetic precipitated hydrated silicon dioxide sold under the trademark Hi-Sil[®] and 5 parts of sodium lignosulfonate (Marasperse[®] N-22). In another preparation of a Kaolin type, (Borden) clay is used in place of the Hi-Sil in the above wettable powder and in another such preparation 25% of the Hi-Sil is replaced with a synthetic sodium silicoaluminate sold under the trademark Zeolox[®] 7.

Dusts are prepared by mixing the compounds of the invention with finely divided inert solids which can be organic or inorganic in nature. Materials useful for this purpose include botanical flours, silicas, silicates and carbonates. One convenient method for preparing a dust is to dilute a wettable powder with a finely divided carrier. Dust concentrates containing 20% to 80% of the active ingredient are commonly made and are subsequently diluted to 1% to 10% use concentration.

The compounds of the present invention may be utilized in combination with other fungicides such as ferbam, ziram, maneb, mancozeb, zineb, propineb, metham, thiram, the complex of zineb and polyethylene thiuram disulfide, dazomet and mixtures of these with copper salts, dinocap, binapacryl, 2-*sec*-butyl-4,6-dinitrophenyl isopropyl carbonate, captan, folpet, glyodin, anilazine, ditalimfos, 5-amino-1-[bis(dimethylamino)-phosphinyl]-3-phenyl-1,2,4-triazole, etradiazole, dithianon, thioquinox, benomyl, thiabendazole, 4-(2-chlorophenylhydrazono)-3-methyl-5-isoxazolone, vinclozolin, iprodione, procymidone, tradimenol, triadimefon, blitertanol, prochloraz, fenanmol, bis-(*p*-chlorophenyl)-3-pyridinemethanol, bis-(*p*-chlorophenyl)-5-pyrimidinemethanol, tranimol, flutnafol, flusilazole, propiconazole, ectaconazole, myclobutanil, fenbuconazole, hexaconazole, cyproconazole, tebuconazole, epoxiconazole, diniconazole, fluoroimide, pyridine-2-thiol-1-oxide, 8-hydroxyquinoline sulfate and metal salts thereof, 2,3-dihydro-5-carboxanilido-6-methyl-1,4-oxathiin-4,4-dioxide, 2,3-dihydro-5-carboxanilido-6-methyl-1,4-oxathiin, *cis*-N-[(1,1,2,2-tetrachloroethyl)thiol]-4-cyclohexene-1,2-dicarboximide, cycloheximide, dehydroacetic acid, captafol, ethirimol, quinomethionate, D,L-methyl-N-(2,6-dimethylphenyl)-N-(2'-methoxyacetyl)alanine methyl ester, D,L-methyl-N-(2,6-dimethylphenyl)-N-chloroacetyl-D,L-2-amino-butyrolactone, D,L-N-(2,6-dimethylphenyl)-N-(phenylacetyl)alanine methyl

ester, 5-methyl-5-vinyl-3-(3,5-dichlorophenyl)-2,4-dioxo-1,3-oxazolidine, 3-(3,5-dichlorophenyl)-5-methyl-5-(methoxymethyl)-1,3-oxazolidi-2,4-dione, 3-(3,5-dichlorophenyl)-1-isopropylcarbamoylhydantoin, 2-cyano-[N-(ethylaminocarbonyl)-2-methoximino]acetamide, fenpropimorph, fenpropidine, 2,6-dimethyl-N-tridecylmorpholine, dodemorph, triforine, chlorothalonil, dichlone, chloroneb, tncamba, TCPN, dichloran, 2-chloro-1-nitropropane, polychloronitrobenzenes such as pentachloronitrobenzene (PCNB), tetrafluorodichloroacetone, griseofulvin, kasugamycin, polyoxin, validamycin, streptomycin, copper hydroxide, cuprous oxide, basic cupric chloride, basic copper carbonate, copper terephthalate, copper naphthenate, Bordeaux mixture, dodine, *p*-dimethylaminobenzenesodium sulfonate, methyl isothiocyanate, 1-thiocyano-2,4-dinitrobenzene, 1-phenylthio-semicarbazide, calcium cyanamide, lime sulfur, thiophanate-methyl, flutolanil, edifenphos, isoprothiolane, probenazole, iprobenfos, tricyclazole, pyroquilon, dimethomorph, cymoxanil, thifluzamide, furalaxyl, ofurace, benalaxyl, oxadixyl, propamocarb, cyprofuram, fenpiclonil, fludioxonil, pynmethanil, cyprodinil, triticonazole, fluquinconazole, metconazole, spiroxamine, carpropamid, azoxystrobin, kresoxim-methyl, metominostrobin, trifloxystrobin and zoxamide

Fungicidal Testing Protocols and Test Data

Examples of diseases against which the compounds of the invention are useful include rice diseases such as rice blast, rice sheath blight and helmenthosporium leaf spot, cereal diseases such as wheat powdery mildew, wheat leaf rust, and septoria, tomato and potato early blight, peanut early leaf spot, grape and cucumber powdery mildew, apple scab, apple powder mildew, brown rot of fruits, cucumber anthracnose and bean powdery mildew

Fungicide screening for control of Rice Blast
and Cucumber Powdery Mildew

Plant Propagation

Plants used in the fungicide testing program were grown in 2-1/4-inch (5.7-cm) square pots containing RediEarth propagation substrate. The plants were raised under greenhouse conditions. The rice plants were 12-days-old and cucumbers were 13-days-old at the time of spraying with chemical treatments.

Sample Preparation

The sample of the experimental chemical was weighed and dissolved in an acetone-methanol-water solution (A/M/W at 1:1:2 ratio by volume).

Spraying Procedure

After sprayer calibration, the test solutions were poured into the fungicide sprayer. The fungicide sprayer contains three spray nozzles, located approximately 10 cm above and to the sides of the plants. The spray produced by the nozzles results in uniform coverage of both the upper and lower parts of the plant leaves. After spraying, the treated plants were placed in a drying chamber for 4 hours, prior to sorting.

Cucumber Powdery Mildew

Cucumber Powdery Mildew (CPM), caused by the fungus *Sphaerotheca fuliginea*, was maintained on large cucumber plants. For inoculum preparation, five to eight leaves depending on size, completely covered with powdery mildew spores, were collected. The leaves were placed in a glass jar and covered with 500 ml of water, containing 5 drops of Tween-80. The material was filtered through two layers of cheesecloth to remove leaf fragments. The spore count was adjusted to 2×10^5 spores per ml.

Cucumber plants, cv "Bush Champion," were used for this test. The plants were thinned to one per pot after the cotyledons were fully developed. Two days before the test, the small leaves and meristem region were removed, leaving only the cotyledons and one large true leaf.

The protectant tests required that the cucumber plants be inoculated 1 day after spraying with the chemical treatment. The plants were inoculated with a hand-held spray bottle with the suspension of fungal spores. The leaves were lightly misted on the upper surface from two different spray directions. Disease development occurred in the greenhouse.

After seven days, the plants were evaluated for percent of disease control. The results are reported as percent control, 100 is total disease control, 0 is no disease control.

Rice Blast

Rice Blast (RB), caused by the fungus *Pynularia oryzae*, was maintained on potato dextrose agar (PDA) plates under fluorescent lamps at room temperature. Six different isolates of the fungus were used to prepare the inoculum. Approximately 5 plates of each isolate were used to prepare 250 ml of inoculum. The plates were flooded with water and scraped gently with a rubber spatula. The spore suspension was filtered through one layer of cheese cloth to remove mycelial fragments and agar pieces. The spore count was adjusted to achieve a concentration of 5×10^6 spores per ml.

Rice plants cv "M-201," were used for this test. The protectant tests required that the rice plants be inoculated 1 day after spraying with the chemical treatment. The curative tests in the primary screen required that the plants be inoculated 1 day after spraying with the treatment. The plants were inoculated with fungal spores using a DeVilbiss atomizer, using a spray pressure of 30 psi (200 kPa). The inoculated plants were quickly placed in a mist chamber with 100% relative humidity (RH) at 20°C for one day and two nights, approximately 40 hours. The plants were moved to the greenhouse for disease development.

Six days after inoculation, the treatment comparisons were made. The results are reported as percent control, 100 is total disease control, 0 is no disease control.

Table 4. Protectant Fungicide Data at 300 g/ha for Rice Blast (RB) and Cucumber Powdery Mildew (CPM) in the greenhouse, given in percent control. NT means not tested.

#	RB	CPM		#	RB	CPM		#	RB	CPM
1	99	80		100	99	80		192	99	75
2	95	85		101	100	80		193	80	0
3	80	0		102	85	50		194	80	0
4	99	50		103	90	0		195	99	50
5	75	50		104	99	80		196	99	0
6	90	50		105	85	75		197	99	75
7	95	75		106	100	95		198	80	0
8	99	90		107	99	95		199	90	0
9	100	80		108	90	85		200	85	0
10	90	0		109	100	95		201	85	0

11	75	0		110	99	90		202	90	0
12	95	0		111	85	90		203	85	0
13	95	0		112	85	80		204	75	85
14	100	85		113	99	75		206	85	80
15	75	50		114	75	0		207	100	85
16	90	75		115	100	50		208	95	50
17	99	80		116	85	0		209	75	0
18	95	75		117	90	0		210	100	25
19	100	75		118	90	0		211	100	85
20	50	75		119	99	0		212	98	85
21	0	50		120	80	0		213	85	50
23	0	50		121	80	0		214	50	85
24	0	50		122	75	75		215	85	0
25	75	0		123	95	50		216	98	80
26	100	95		124	75	0		217	85	0
27	80	99		125	50	50		218	98	80
28	85	85		126	50	0		219	50	75
29	90	90		127	95	50		220	100	80
30	85	75		128	90	0		221	85	80
31	50	0		129	50	75		222	0	50
32	75	50		130	50	0		223	95	80
33	80	75		131	80	75		224	75	50
35	50	50		132	85	50		225	80	0
36	99	50		133	80	0		226	50	0
37	95	75		134	80	50		227	90	75
38	0	50		135	90	50		229	0	50
39	99	85		136	100	80		230	75	0

40	90	0		137	85	0		231	85	0
41	100	50		138	99	0		232	100	99
42	99	50		139	99	50		233	100	80
43	99	80		140	0	50		234	100	80
44	85	0		141	85	50		235	90	80
45	75	0		142	80	0		236	99	90
46	80	0		143	98	50		237	0	95
47	100	80		144	85	0		238	50	90
48	50	0		145	90	0		240	95	75
49	95	75		146	95	85		241	50	0
50	100	80		147	98	0		243	75	0
51	90	0		148	80	80		244	100	50
52	50	0		149	95	75		245	99	0
53	75	0		150	100	50		246	100	0
54	99	85		151	90	0		247	100	80
55	90	50		152	85	0		248	100	80
56	80	80		153	100	0		249	85	0
57	50	0		154	0	75		250	90	50
58	85	50		155	90	85		251	75	0
59	50	0		156	85	0		252	85	0
60	75	0		157	98	0		253	100	50
61	85	50		158	85	0		254	95	0
62	85	0		159	85	0		255	50	0
64	50	0		160	75	0		256	95	NT
65	95	50		161	80	0		257	95	50
66	50	0		162	95	50		258	100	75
67	99	80		163	90	0		259	90	75

68	0	50		164	100	95		260	75	0
69	95	80		165	80	0		261	50	0
70	80	80		166	75	0		262	85	80
71	75	50		167	85	0		263	80	85
72	75	50		168	95	50		264	50	0
73	85	75		169	50	0		265	85	90
74	99	0		170	90	75		266	90	50
75	0	85		171	80	50		267	80	85
76	0	25		172	98	0		268	0	75
77	0	50		173	50	0		269	99	0
78	0	25		174	75	0		270	100	95
79	75	50		175	95	0		271	99	50
80	0	50		176	50	50		272	100	80
82	0	25		177	95	50		273 ^a	100	0
83	80	0		178	75	0		274	85	0
84	80	85		179	75	0		275	85	0
85	100	50		180	95	90		276	85	0
86	99	80		181	50	0		277	95	0
87	90	0		182	85	0		278	85	0
88	100	50		183	95	0		280	50	0
89	75	0		184	85	75		281	85	95
92	0	50		185	80	75		282	75	75
93	0	75		186	85	0		283	90	50
94	0	75		187	80	0		287	80	0
95	25	75		188	80	0		288	0	75
96	50	75		189	80	75		289	100	50
97	0	85		190	80	0		290	100	50

98	85	75		191	95	50		291	80	0
99	100	80						292	99	75
								293	100	50
								294	100	80
								295	99	50
								296	98	75

^aCompound 273 was prepared and tested as a 1:1 mixture with its unoxidized (dihydro) form

For insecticidal use, the compositions and compounds of this invention can be applied directly to the locus to be protected, as for example, the area around or upon economic plants infected with insects or to plants on which infestation is to be prevented. Examples of injurious insects belong to the orders Lepidoptera, Coleoptera, Diptera, Thysanoptera, Hymenoptera, Heteroptera, Homoptera, Orthoptera, and Acarina. The compounds and compositions may be used either as contact or systemic pesticides. The compounds of the invention are applied to the insect's habitat at a rate of 0.0005 to 10 kilograms per hectare, preferably 0.05 to 5 and most preferably from 0.1 to 1 kilogram per hectare.

In the practice of the method of the invention, the active compound may be applied to the soil or foliage where it is absorbed by the plant, translocated to other plant parts and ultimately ingested by the pest or insects by means of ingestion of the plant part(s). This means of application is referred to as "systemic" application. Alternatively, the active compound may be applied to the soil and contacted therein with the insects and other pests to be controlled. This means of application is referred to as "soil" application. In another alternative, the active

compound may be foliarly applied to the plants to be freed from insects and other pests which feed on the foliage

The active compounds of the present invention may be employed alone or in the form of mixtures with one another and/or with such solid and/or liquid dispersible carrier vehicles and/or with other known compatible active agents, especially plant protection agents, such as other insecticides, arthropodicides, nematocides, fungicides, bactericides, rodenticides, herbicides, fertilizers, growth-regulating agents, synergists

In the compositions of the invention, the active compound is present in an amount substantially between about 0.0001-99% by weight. For compositions suitable for storage or transportation, the amount of active ingredient is preferably between about 0.5-90% by weight, and more preferably between about 1-75% by weight of the mixture. Compositions suitable for direct application or field application generally contain the active compound in an amount substantially between about 0.0001-95%, preferably between about 0.0005-90% by weight, and more preferably between about 0.001-75% by weight of the mixture. The composition can also be stated as a ratio of the compound to the carrier. In the present invention the weight ratio of these materials (active compound/carrier) can vary from 99:1 to 1:4 and more preferably from 10:1 to 1:3.

In general, the compounds of this invention can be dissolved in certain solvents such as acetone, methanol, ethanol, dimethylformamide, pyridine or dimethyl sulfoxide and such solutions can be diluted with water. The concentrations of the solution can vary from about 1% to about 90% with a preferred range being from about 5% to about 50%.

For the preparation of emulsifiable concentrates, the compound can be dissolved in suitable organic solvents, or a mixture of solvents, together with an emulsifying agent to enhance dispersion of the compound in water. The concentration of the active ingredient in emulsifiable concentrates is usually from about 10% to about 90%, and in flowable emulsion concentrates, can be as high as about 75%.

The active compounds can be applied as insecticide sprays by methods commonly employed, such as conventional high-gallonage hydraulic sprays, low gallonage sprays, ultra-low-volume sprays, airblast spray, aerial sprays, and dusts.

The present invention also contemplates methods of killing, combatting or controlling pests which comprises contacting pests with a combative or toxic amount (i.e. a pesticidally effective amount) of at least one active compound of the invention alone or together with a carrier vehicle (composition or formulation) as noted above. The term "contacting" as employed in the specification and claims means applying to at least one of (a) such pests and (b) the corresponding habitat thereof (i.e., the locus to be protected, for example, to a growing crop or to an area where a crop is to be grown) the active compound of this invention alone or as a constituent of a composition or formulation.

In addition to the aforementioned ingredients the preparations according to the invention may also contain other substances commonly used in preparations of this kind. For example, a lubricant, such as calcium stearate or magnesium stearate, may be added to a wettable powder or to a mixture to be granulated. Furthermore there may, for example, be added "adhesives" such as polyvinylalcohol-cellulose derivatives or other



colloidal materials, such as casein, to improve the adherence of the pesticide to the surface to be protected

Insecticidal Testing Protocol and Test Data

Numerous compounds of this invention were tested for insecticidal activity. This testing was carried out using two different protocols.

Protocol 1

Test Solution Preparation

A test solution containing 1250 parts per million (ppm) was prepared by dissolving the test compound in 15 milliliters of solvent (acetone:methanol, 1:1) and then adding 65 milliliters of a second solvent (acetone:water, 1:1) to give an acetone:water:methanol system of 50:40:10.

Sprayer

The enclosed spraying chamber consisted of a single spray nozzle mounted on a boom moving at a fixed speed and distance over stationary targets. The vertical distance from the nozzle tip to the targets was adjusted to give rates varying from 150 g/ha to 600 g/ha.

3. Test Species

Tests were conducted with the following pests:

Foliar Species

<u>SYMBOL</u>	<u>COMMON NAME</u>	<u>LATIN NAME</u>
AW	Southern Armyworm	Spodoptera endania
BB	Mexican Bean Beetle	Epilachna varivestis
MTA	Two-Spotted Spider Mite	Tetranychus urticae

Southern Armyworm

Individual fully expanded primary lima bean (*Phaseolus limensis*) leaves were placed bottom side up on moistened pieces of filter paper in Petri dishes. The leaves were sprayed with the test solutions and allowed to dry. The dishes were infested with 5 third instar larvae of the southern armyworm, covered with the lids, and held at 27°C. Armyworm control was rated by visual inspection after 48 hours. A rating of 100 indicated that all larvae were dead. A rating of 0 indicated no dead larvae and normal feeding. Intermediate control was indicated by intermediate ratings.

Mexican Bean Beetle

Individual fully expanded primary lima bean (*Phaseolus limensis*) leaves were placed bottom side up on moistened pieces of filter paper in Petri dishes. The leaves were sprayed with the test solutions and allowed to dry. The dishes were infested with 5 third instar larvae of the Mexican bean beetle, covered with the lids, and held at 27°C. Bean beetle control was rated by visual inspection after 48 hours. A rating of 100 indicated that all larvae were dead. A rating of 0 indicated no dead larvae and normal feeding. Intermediate control was indicated by intermediate ratings.

C Two Spotted Spider Mite

A pad of moistened cotton was placed in a Petri dish. A 1 - inch square section cut from a fully expanded primary lima bean (*Phaseolus limensis*) leaf was positioned bottom side up on the moist cotton. The leaf square was infested with approximately 50 adult female mites. The dishes were sprayed with the test solutions and held at 27°C for mortality.

determination 1-day post-treatment The percentage of mites killed were rated from 100% (all dead) to 0% (all alive)

Protocol 2

Candidate compounds are solubilized in a solvent mix (either acetone/methanol/water or DMSO/water) The compounds are screened against *Aedes aegypti* (yellowfever mosquito, YFM) or *Caenorhabditis elegans* nematode (CE)

For screening *A. aegypti*, wells are filled with 1 mL of diet (500 ppm of a 1:1 liver powder/yeast in DI water) The appropriate volume of test material is added to the wells to provide a final concentration of 3 ppm Approximately 10-15 three (3) day old mosquito larvae are used for infesting the test wells Mosquito larva trays are stored in an 27°C room and mortality readings taken 3 days after infesting A compound is declared active if all organisms within the test well are dead at reading time

For screening *C. elegans*, wells are filled with 1 mL of *E. coli* diet (cell density = 4% transmittance at 535 nM) The appropriate volume of test material is added to the wells to provide a final concentration of either 15 or 20 ppm Approximately 10-15 four (4) day old nematodes are used for infesting the test wells Test plates are stored at 21°C and mortality readings taken 6 days after infesting A compound is declared active if all organisms within the test well are dead at reading time

Table 5 Insecticide data for compounds of the invention

Cmpd Number	Protocol 1				Protocol 2	
	DOSE	AW	BB	MTA	CE	YFM
					Insect Active	Insect Active
4	300	75	0	0	NT	NT
5	300	NT	75	0	NT	NT
5	600	50	NT	NT	NT	NT
6	300	0	100	0	NT	NT
7	300	0	100	100	NT	NT
8	300	0	0	100	NT	NT
9	NT	NT	NT	NT	Y	Y
16	150	NT	NT	69	Y	Y
18	150	NT	NT	100	Y	N
19	150	0	100	90	NT	NT
26	300	0	50	0	NT	NT
27	300	0	75	0	NT	NT
29	300	0	0	90	NT	NT
33	300	0	100	75	NT	NT
34	300	0	75	0	NT	NT
37	300	100	75	75	NT	NT
40	300	0	50	90	NT	NT
41	300	0	50	0	NT	NT
43	150	50	0	0	NT	NT
44	150	75	0	0	NT	NT
48	150	0	0	75	NT	NT
50	150	0	0	75	N	N
52	150	0	0	100	NT	Y
60	NT	NT	NT	NT	Y	N
61	NT	NT	NT	NT	Y	N
63	150	NT	NT	0	Y	Y
65	NT	NT	NT	NT	Y	N
67	NT	NT	NT	NT	Y	N
69	150	NT	NT	68	Y	N
70	150	NT	NT	71	N	N
81	NT	NT	NT	NT	N	Y
86	NT	NT	NT	NT	N	Y
91	NT	NT	NT	NT	N	Y
99	NT	NT	NT	NT	Y	N
100	150	NT	NT	25	Y	N

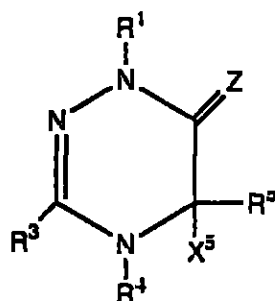
101	150	NT	NT	0		Y	N
103	150	NT	NT	23		Y	Y
109	150	NT	NT	90		Y	N
110	150	NT	NT	100		Y	Y
112	150	NT	NT	0		Y	N
123	150	NT	NT	0		Y	N
127	150	NT	NT	95		N	N
128	NT	NT	NT	NT		Y	N
133	150	NT	NT	0		N	Y
134	300	NT	NT	NT		N	Y
135	150	NT	NT	43		N	N
137	NT	NT	NT	NT		Y	Y
162	NT	NT	NT	NT		Y	N
163	150	NT	NT	100		N	N
164	NT	NT	NT	NT		Y	Y
171	NT	NT	NT	NT		N	Y
175	NT	NT	NT	NT		Y	N
178	NT	NT	NT	NT		Y	N
179	NT	NT	NT	NT		Y	N
180	NT	NT	NT	NT		Y	N
183	NT	NT	NT	NT		Y	N
203	NT	NT	NT	NT		N	Y
205	NT	NT	NT	NT		N	Y
209	NT	NT	NT	NT		N	Y
210	NT	NT	NT	NT		N	Y
223	NT	NT	NT	NT		Y	NT
233	300	50	75	0		NT	NT
234	300	0	0	100		NT	NT
235	300	0	100	100		NT	NT
236	300	0	100	100		NT	NT
238	300	0	75	100		NT	NT
239	300	0	75	0		NT	NT
240	300	50	75	100		NT	NT
241	300	0	0	100		NT	NT
242	300	0	90	100		NT	NT
245	300	100	100	100		NT	NT
247	300	0	90	0		NT	NT
248	150	0	0	100		NT	NT
249	150	100	0	90		NT	NT
251	150	0	50	75		NT	NT

252	150	0	100	50		NT	NT
253	150	0	0	100		NT	NT
254	150	0	100	100		Y	N
255	150	0	90	100		N	N
256	150	0	0	90		N	N
258	NT	NT	NT	NT		Y	N
259	150	NT	NT	0		Y	N
260	150	NT	NT	0		Y	N
262	150	NT	NT	0		Y	Y
264	NT	NT	NT	NT		Y	N
265	150	NT	NT	0		Y	Y
266	150	NT	NT	0		Y	Y
270	150	NT	NT	0		Y	N
271	150	NT	NT	93		Y	Y
277	NT	NT	NT	NT		Y	Y
278	NT	NT	NT	NT		Y	N
284	NT	NT	NT	NT		Y	Y
285	NT	NT	NT	NT		N	Y
286	NT	NT	NT	NT		N	Y
288	NT	NT	NT	NT		N	Y

Y = yes (active), N = no (inactive), NT = not tested

We claim

1 A compound of the formula



wherein

R^1 is alkyl, haloalkyl, cyanoalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkylalkynyl, alkoxyalkyl, alkylthioalkyl, cycloalkyl, cycloalkylalkyl, trialkylsilylalkyl where the three alkyl groups may be the same or different, alkoxycarbonyl, alkylcarbonyl, alkoxycarbonylalkyl, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of alkyl, halo, nitro, alkoxy, alkylthio, haloalkyl, haloalkylthio and haloalkoxy, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, pyndyl or pyndyl substituted with from one to two substituents independently selected from the group consisting of alkyl and halo, furyl, thienyl, thenyl or furyl, thienyl or thenyl substituted with halo or alkyl on the furyl or thienyl ring, benzothienyl, benzofuranyl or benzothienyl or benzofuranyl substituted with halo, alkyl or haloalkyl,

R^3 is alkyl, cycloalkyl, cycloalkylalkyl, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, aryl selected from phenyl, naphthyl, and phenyl and naphthyl substituted with from one to five substituents independently selected from the group consisting of halo, alkyl, haloalkyl, haloalkoxy, alkylthio, haloalkylthio, alkylsulfinyl, alkylsulfonyl, nitro, cyano, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or phenyl and naphthyl substituted with a heteroaryl group selected from furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, pyridyl, pyridaziny, pyrimidinyl, pyraziny, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl, and furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, pyridyl, pyridaziny, pyrimidinyl, pyraziny, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, nitro and cyano, phenyl, phenoxy, and phenyl and phenoxy substituted with one or two substituents independently selected from the group consisting of halo, alkyl, alkoxy, haloalkyl, haloalkoxy, alkylthio, nitro and cyano, heteroaryl selected from furyl, thienyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, pyridyl, pyridaziny, pyrimidinyl, pyraziny, pyrazolyl, 1,2,3-thiadiazol-4-yl, thiazolyl, triazolyl, triaziny, isoxazolyl and oxazolyl, and

furyl, thienyl, pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, 1,2,3-thiadiazol-4-yl and oxazolyl substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, haloalkylthio, nitro and cyano,

R^4 is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, cycloalkyl, cycloalkylalkyl, cycloalkylcarbonyl, alkylsulfonyl, alkylthio, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, cyano, alkenyl, alkenylsulfonyl, haloalkenyl, alkenylcarbonyl, alkynyl, haloalkynyl, alkoxycarbonyl, haloalkoxycarbonyl, alkoxycarbonylalkyl, alkoxycarbonylthio, (alkylthio)carbonyl, alkyl(thiocarbonyl), alkylthiothiocarbonyl, alkenyloxy-carbonyl, alkenylthiothiocarbonyl, alkynyloxy-carbonyl, alkynylthiothiocarbonyl, alkoxyoxalyl, alkylcarbonyloxy-alkoxycarbonyl, aralkyl, arylcarbonyl, arylsulfonyl, arylsulfonylalkenyl, aryloxy-carbonyl, aryloxythiocarbonyl, arylthiothiocarbonyl or aralkyl, arylcarbonyl, arylsulfonyl, arylsulfonylalkenyl, aryloxy-carbonyl, aryloxythiocarbonyl, arylthiothiocarbonyl substituted on an aromatic ring with from one to two substituents independently selected from halo and alkyl, or thenyl or thenyl substituted on the thienyl ring with from one to two substituents independently selected from halo and alkyl,

R⁵ is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, formyl, alkoxy, alkoxycarbonyl, alkoxycarbonyloxy, alkylcarbonyloxy, alkoxycarbonylthio, alkylcarbonylthio, alkylthio, hydroxy, mercapto, alkenyl, alkynyl, cyano, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, aryl, aralkyl, aryloxy, arylthio, arylcarbonylthio or aryl, aralkyl, aryloxy, arylthio, arylcarbonylthio substituted on the aryl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl, haloalkoxy, amino, alkylamino and dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or

R⁴ can form a fused ring to the **R³** substituent when the **R³** substituent is aryl or heteroaryl wherein **R⁴** is selected from -CH(R)-, -O-, -S-, -N(R)-, -C(=O)-, -O(C=O)-, -C(=O)O-, -CH₂CH₂-, -CH=CH-, -N(R)CH₂-, -C(R)=N-, -N=C(R)-, -CH(R)O-, -OCH(R)-, -CH(R)S- and -SCH(R)-, or

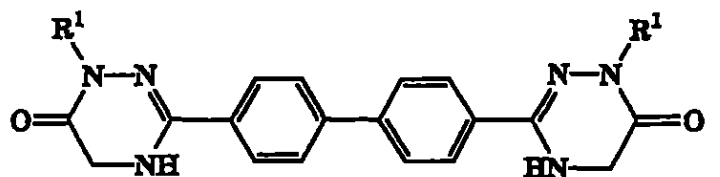
R³ and **R⁴** taken together can form a substituted pyridazinyl ring,

R⁵ and **X⁵** taken together can form a carbonyl, or

X⁵ is a hydrogen atom or taken together with **R⁴** forms a nitrogen-carbon bond,

Z is an oxygen atom, a sulfur atom or NR,

R is H or alkyl, or a compound of the formula



or the agronomically acceptable salts, isomers, tautomers, enantiomers and mixtures thereof, provided that

when R^1 is an aralkyl or a heteroaralkyl, R^4 is not cyano, alkylsulfonyl, arylsulfonyl or polyhaloalkyl,

when R^1 is acetyl and R^3 is 2-pyridyl, R^5 and X^5 taken together can not form a carbonyl, and

when R^3 is phenyl, methyl or cyclohexyl, R^1 is not phenyl, methyl, nitrophenyl, ethoxycarbonyl, benzyl or benzyloxymethyl

2 The compound of claim 1 wherein

R^1 is (C₁-C₁₂)alkyl, halo(C₁-C₁₂)alkyl, (C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkynyl, halo(C₂-C₈)alkynyl, cyclo(C₃-C₇)alkyl(C₂-C₈)alkynyl, (C₁-C₄)alkoxy(C₁-C₄)alkyl, cyclo(C₃-C₇)alkyl, cyclo(C₃-C₇)alkyl(C₁-C₈)alkyl, tri(C₁-C₈)alkylsilyl(C₁-C₄)alkyl where the three alkyl groups may be the same or different, (C₁-C₈)alkoxycarbonyl, (C₁-C₈)alkylcarbonyl, (C₁-C₈)alkoxycarbonyl(C₁-C₄)alkyl, phenyl or phenyl substituted

with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phen(C₁-C₄)alkyl or phen(C₁-C₄)alkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, furyl, thienyl, benzothienyl or benzofuranyl,

R³ is (C₁-C₁₂)alkyl, benzyl, phenethyl or benzyl or phenethyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, halo(C₁-C₄)alkoxy, (C₁-C₄)alkylthio, halo(C₁-C₄)alkylthio, (C₁-C₄)alkylsulfinyl, (C₁-C₄)alkylsulfonyl, nitro, cyano, di(C₁-C₄)alkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, or quinoliny, isoquinoliny, benzofuranyl or benzothienyl substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

- R⁴** is a hydrogen atom, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, -(C₁-C₄)alkylcarbonyl, (C₁-C₄)alkylcarbonyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkyl, cyclo(C₃-C₈)alkyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkylcarbonyl, (C₁-C₄)alkylsulfonyl, (C₂-C₈)alkenyl, (C₂-C₈)alkenylsulfonyl, phenylsulfonyl(C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkenylcarbonyl, (C₂-C₈)alkynyl, (C₁-C₄)alkoxycarbonyl, halo(C₁-C₄)alkoxycarbonyl, (C₁-C₄)alkoxycarbonyl(C₁-C₄)alkyl, (C₁-C₄)alkylcarbonyloxymethoxycarbonyl, (C₁-C₄)alkoxycarbonylthio, ((C₁-C₄)alkylthio)carbonyl, (C₁-C₄)alkylthiothiocarbonyl, (C₂-C₈)alkenyloxycarbonyl, (C₂-C₈)alkenylthiothiocarbonyl, (C₂-C₈)alkynyloxycarbonyl, (C₂-C₈)alkynylthiothiocarbonyl, (C₁-C₄)alkoxyoxalyl, (C₁-C₄)alkylcarbonyloxy(C₁-C₄)alkoxycarbonyl, phen(C₁-C₄)alkyl, benzoyl, phenoxycarbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl or phen(C₁-C₄)alkyl, benzoyl, phenoxycarbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl substituted on the phenyl ring with from one to two substituents independently selected from halo and (C₁-C₄)alkyl, or thenyl or thenyl substituted on the thienyl ring with from one to two substituents independently selected from halo and (C₁-C₄)alkyl.
- R⁵** is a hydrogen atom, (C₁-C₄)alkoxy, (C₁-C₄)alkylthio, hydroxy, mercapto, cyano, phenyl or phenyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy.
- Z** is an oxygen atom or a sulfur atom, and

X^5 is a hydrogen atom or taken together with R^4 forms a nitrogen-carbon bond

3 The compound of claim 2 wherein

R^1 is (C₁-C₁₀)alkyl, halo(C₁-C₄)alkyl, (C₂-C₈)alkenyl, (C₂-C₈)alkynyl, cyclo(C₃-C₈)alkyl(C₁-C₂)alkyl, tri(C₁-C₄)-alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R^3 is phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₂)alkyl and halo(C₁-C₂)alkoxy,

R^4 is a hydrogen atom, (C₁-C₄)alkylsulfonyl, (C₁-C₄)alkoxy-carbonylthio, (C₂-C₄)alkenyloxycarbonyl, (C₂-C₈)alkynyl, (C₂-C₄)alkynyloxycarbonyl or (C₁-C₄)alkoxyoxalyl, and

R^5 is a hydrogen atom, (C₁-C₄)alkoxy or (C₁-C₄)alkylthio

4 The compound of claim 3 wherein

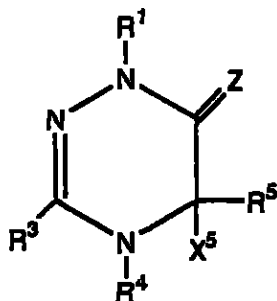
R^1 is (C₁-C₁₀)alkyl, halo(C₁-C₁₀)alkyl, (C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkynyl, cyclo(C₃-C₈)alkyl(C₁-C₂)alkyl, tri(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

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R^3 is dihalosubstitutedphenyl, di(C_1 - C_4)alkylsubstitutedphenyl, di(halo(C_1 - C_2)alkyl)substitutedphenyl, monohalomono(C_1 - C_4)alkylsubstitutedphenyl or monohalomono(halo(C_1 - C_4)alkyl)substitutedphenyl,

R^4 and R^5 are hydrogen

- 5 A fungicidal composition comprising a fungicidally effective amount of a compound of the formula



wherein

R^1 is a hydrogen atom, alkyl, haloalkyl, cyanoalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkylalkynyl, alkoxyalkyl, alkylthioalkyl, cycloalkyl, cycloalkylalkyl, trialkylsilylalkyl where the three alkyl groups may be the same or different, alkoxycarbonyl, alkylcarbonyl, alkoxycarbonylalkyl, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of alkyl, halo, nitro, alkoxy, alkylthio, haloalkyl, haloalkylthio and haloalkoxy, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently

selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, pyridyl or pyridyl substituted with from one to two substituents independently selected from the group consisting of alkyl and halo, furyl, thienyl, thenyl or furyl, thienyl or thenyl substituted with halo or alkyl on the furyl or thienyl ring, benzothienyl, benzofuranyl or benzothienyl or benzofuranyl substituted with halo, alkyl or haloalkyl,

R^3 is alkyl, cycloalkyl, cycloalkylalkyl, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, aryl selected from phenyl, naphthyl, and phenyl and naphthyl substituted with from one to five substituents independently selected from the group consisting of halo, alkyl, haloalkyl, haloalkoxy, alkylthio, haloalkylthio, alkylsulfinyl, alkylsulfonyl, nitro, cyano, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or phenyl and naphthyl substituted with a heteroaryl group selected from furyl, thienyl, quinolyl, isoquinolyl, benzofuranyl, benzothienyl, pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl, and furyl, thienyl, quinolyl, isoquinolyl, benzofuranyl, benzothienyl, pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, 1,2,3-thiadiazol-4-yl, 3-(4,5-dihydro-1,2,4-triazin-6-one)yl and oxazol-5-yl substituted with one or two substituents

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independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, nitro and cyano, phenyl, phenoxy, and phenyl and phenoxy substituted with one or two substituents independently selected from the group consisting of halo, alkyl, alkoxy, haloalkyl, haloalkoxy, alkylthio, nitro and cyano, heteroaryl selected from furyl, thienyl, quinoliny, isoquinoliny, benzoruranyl, benzothienyl, pyndyl, pyndaziny, pynmidiny, pyraziny, pyrazoly, 1,2,3-thiadiazol-4-yl, thiazoly, triazoly, triaziny, isoxazoly and oxazoly, and furyl, thienyl, pyndyl, pyndaziny, pynmidiny, pyraziny, 1,2,3-thiadiazol-4-yl and oxazoly substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, haloalkylthio, nitro and cyano,

R^4 is a hydrogen atom, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, cycloalkyl, cycloalkylalkyl, cycloalkylcarbonyl, alkylsulfonyl, alkoxy, alkylthio, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, cyano, alkenyl, alkenylsulfonyl, haloalkenyl, alkenylcarbonyl, alkynyl, haloalkynyl, alkoxycarbonyl, haloalkoxycarbonyl, alkoxycarbonylalkyl, alkoxycarbonylthio, (alkylthio)carbonyl, alkyl(thiocarbonyl), alkylthiothiocarbonyl, alkenyloxy-carbonyl, alkenylthiothiocarbonyl, alkynyloxy-carbonyl, alkynylthiothiocarbonyl, alkoxyoxaly, alkylcarbonyloxy-alkoxycarbonyl, aralkyl, arylcarbonyl, arylsulfonyl, arylsulfonylalkenyl, aryloxy-carbonyl, aryloxythiocarbonyl,

arylthiothiocarbonyl or aralkyl, arylcarbonyl, arylsulfonyl, arylsulfonylalkenyl, aryloxy carbonyl, aryloxythiocarbonyl, arylthiothiocarbonyl substituted on an aromatic ring with from one to two substituents independently selected from halo and alkyl,

R^5 is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, alkylcarbonylalkyl, formyl, alkoxy, alkoxycarbonyl, alkoxycarbonyloxy, alkylcarbonyloxy, alkoxycarbonylthio, alkylcarbonylthio, alkylthio, hydroxy, mercapto, alkenyl, alkynyl, cyano, amino, alkylamino, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy, arylcarbonylthio, or aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy, arylcarbonylthio substituted on the aryl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl, haloalkoxy, amino, alkylamino and dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, or

R^4 can form a fused ring to the R^3 substituent when the R^3 substituent is aryl or heteroaryl wherein R^4 is selected from -CH(R)-, -O-, -S-, -N(R)-, -C(=O)-, -O(C=O)-, -C(=O)O-, -CH₂CH₂-, -CH=CH-, -N(R)CH₂-, -C(R)=N-, -N=C(R)-, -CH(R)O-, -OCH(R)-, -CH(R)S- and -SCH(R)-, or

C₄)alkylsulfonyl, (C₂-C₈)alkenyl, (C₂-C₈)alkenylsulfonyl, phenylsulfonyl(C₂-C₈)alkenyl, halo(C₂-C₈)alkenyl, (C₂-C₈)alkenylcarbonyl, (C₂-C₈)alkynyl, (C₁-C₄)alkoxycarbonyl, halo(C₁-C₄)alkoxycarbonyl, (C₁-C₄)alkoxycarbonyl(C₁-C₄)alkyl, (C₁-C₄)alkylcarbonyloxymethoxycarbonyl, (C₁-C₄)alkoxycarbonylthio, ((C₁-C₄)alkylthio)carbonyl, (C₁-C₄)alkylthiothiocarbonyl, (C₂-C₈)alkenylloxycarbonyl, (C₂-C₈)alkenylthiothiocarbonyl, (C₂-C₈)alkynylloxycarbonyl, (C₂-C₈)alkynylthiothiocarbonyl, (C₁-C₄)alkoxyoxalyl, (C₁-C₄)alkylcarbonyloxy(C₁-C₄)alkoxycarbonyl, phen(C₁-C₄)alkyl, benzoyl, phenoxycarbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl or phen(C₁-C₄)alkyl, benzoyl, phenoxycarbonyl, phenoxythiocarbonyl, phenylthiothiocarbonyl substituted on the phenyl ring with from one to two substituents independently selected from halo and (C₁-C₄)alkyl,

R⁵ is a hydrogen atom, (C₁-C₄)alkoxy, (C₁-C₄)alkylthio, hydroxy, mercapto, cyano, phenyl or phenyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy,

Z is an oxygen atom or a sulfur atom, and

X⁵ is a hydrogen atom or taken together with R⁴ forms a nitrogen-carbon bond

7 The fungicidal composition of claim 6 wherein

R¹ is (C₁-C₁₀)alkyl, halo(C₁-C₄)alkyl, (C₂-C₆)alkenyl, (C₂-C₆)alkynyl, cyclo(C₃-C₆)alkyl(C₁-C₂)alkyl, tr(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R³ is phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₂)alkyl and halo(C₁-C₂)alkoxy,

R⁴ is a hydrogen atom, (C₁-C₄)alkylsulfonyl, (C₁-C₄)alkoxycarbonylthio, (C₂-C₄)alkenyloxy carbonyl, (C₂-C₆)alkynyl, (C₂-C₄)alkynyloxy carbonyl or (C₁-C₄)alkoxyoxalyl, and

R⁵ is a hydrogen atom, (C₁-C₄)alkoxy or (C₁-C₄)alkylthio

8 The fungicidal composition of claim 7 wherein

R¹ is (C₁-C₁₀)alkyl, halo(C₁-C₁₀)alkyl, (C₂-C₆)alkenyl, halo(C₂-C₆)alkenyl, (C₂-C₆)alkynyl, cyclo(C₃-C₆)alkyl(C₁-C₂)alkyl, tr(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R³ is dihalosubstitutedphenyl, di(C₁-C₄)alkylsubstitutedphenyl, di(halo(C₁-C₂)alkyl)substitutedphenyl, monohalomono(C₁-C₄)alkylsubstitutedphenyl or monohalomono(halo(C₁-C₄)alkyl)substitutedphenyl,

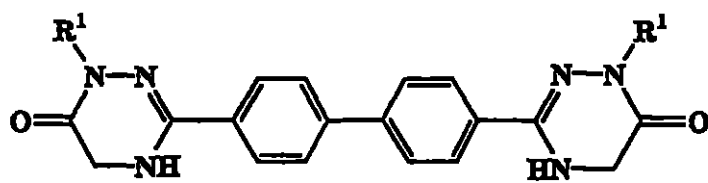
R^3 and R^4 taken together can form a substituted pyridazinyl ring,

R^5 and X^5 taken together can form a carbonyl, or

X^5 is a hydrogen atom or taken together with R^5 forms a nitrogen-carbon bond,

Z is an oxygen atom, a sulfur atom or NR ,

R is H or alkyl, or a compound of the formula



or the agronomically acceptable salts, isomers, tautomers, enantiomers and mixtures thereof, and an agronomically acceptable carrier

6 The fungicidal composition of claim 5 wherein

R^1 is (C_1-C_{12}) alkyl, halo (C_1-C_4) alkyl, (C_2-C_8) alkenyl, halo (C_2-C_8) alkenyl, (C_2-C_8) alkynyl, halo (C_2-C_8) alkynyl, cyclo (C_3-C_7) alkyl (C_2-C_8) alkynyl, (C_1-C_4) alkoxy (C_1-C_4) alkyl, cyclo (C_3-C_7) alkyl, cyclo (C_3-C_7) alkyl (C_1-C_8) alkyl, tri (C_1-C_8) alkylsilyl (C_1-C_4) alkyl where the three alkyl groups may be the same or different, (C_1-C_8) alkoxycarbonyl, (C_1-C_8) alkylcarbonyl, (C_1-C_8) alkoxycarbonyl (C_1-C_4) alkyl, phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of (C_1-C_4) alkyl, halo, $(C_1-$

C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phen(C₁-C₄)alkyl or phen(C₁-C₄)alkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, furyl, thienyl, benzothienyl or benzofuranyl,

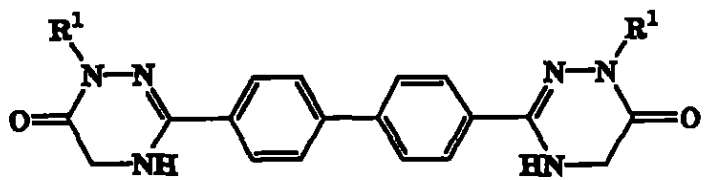
R³ is (C₁-C₁₂)alkyl, benzyl, phenethyl or benzyl or phenethyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, halo(C₁-C₄)alkoxy, (C₁-C₄)alkylthio, halo(C₁-C₄)alkylthio, (C₁-C₄)alkylsulfinyl, (C₁-C₄)alkylsulfonyl, nitro, cyano, di(C₁-C₄)alkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, quinoliny, isoquinoliny, benzofuranyl, benzothienyl, or quinoliny, isoquinoliny, benzofuranyl or benzothienyl substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

R⁴ is a hydrogen atom, halo(C₁-C₄)alkyl, (C₁-C₄)alkylcarbonyl, (C₁-C₄)alkylcarbonyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkyl, cyclo(C₃-C₈)alkyl(C₁-C₄)alkyl, cyclo(C₃-C₈)alkylcarbonyl, (C₁-

carbonyloxy, alkoxycarbonylthio, alkylcarbonylthio, alkylthio, mercapto, alkenyl, alkynyl, cyano, dialkylamino, aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy, arylcarbonylthio or aryl, aralkyl, aryloxy, arylthio, arylcarbonyloxy or arylcarbonylthio substituted on the aryl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy,

X^6 is a hydrogen atom or taken together with R^4 forms a nitrogen-carbon bond,

Z is an oxygen atom, or a compound of the formula



or the agronomically acceptable salts, isomers, tautomers, enantiomers and mixtures thereof and an agronomically acceptable carrier, provided that when R^1 is an aralkyl or a heteroaralkyl, R^1 is not cyano, alkylsulfonyl, arylsulfonyl or polyhaloalkyl

10 The insecticidal composition of claim 9 wherein

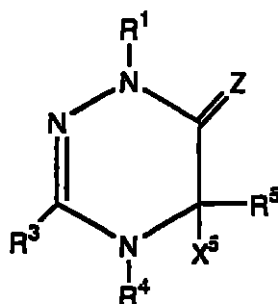
R^1 is a hydrogen atom, (C_1-C_{12}) alkyl, halo (C_1-C_4) alkyl, (C_2-C_8) alkenyl, halo (C_2-C_8) alkenyl, (C_2-C_8) alkynyl, halo (C_2-C_8) alkynyl, cyclo (C_3-C_7) alkyl (C_2-C_8) alkynyl, cyclo (C_3-C_7) alkyl, cyclo (C_3-C_7) alkyl (C_1-C_8) alkyl, tri (C_1-C_8) alkylsilyl $(C_1-$

C₄)alkyl where the three alkyl groups may be the same or different, (C₁-C₆)alkylcarbonyl, phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phen(C₁-C₄)alkyl or phen(C₁-C₄)alkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, furyl, thienyl, benzothienyl or benzofuranyl,

R³ is (C₁-C₁₂)alkyl, benzyl, phenethyl or benzyl or phenethyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy, phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₄)alkyl, halo(C₁-C₄)alkoxy, (C₁-C₄)alkylsulfinyl, (C₁-C₄)alkylsulfonyl, nitro, cyano, di(C₁-C₄)alkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, benzofuranyl, benzothienyl or benzofuranyl or benzothienyl substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

R^4 and R^5 are hydrogen

- 9 An insecticidal composition comprising a insecticidally effective amount of a compound of the formula



wherein

R^1 is a hydrogen atom, alkyl, haloalkyl, cyanoalkyl, alkenyl, haloalkenyl, alkynyl, haloalkynyl, cycloalkylalkynyl, alkylthioalkyl, cycloalkyl, cycloalkylalkyl, trialkylsilylalkyl where the three alkyl groups may be the same or different, alkylcarbonyl, phenyl, naphthyl, or phenyl or naphthyl substituted with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, furyl, thienyl, thenyl or furyl, thienyl or thenyl substituted with halo on the furyl or thienyl ring, benzothienyl or benzofuranyl,

R^3 is alkyl, cycloalkyl, cycloalkylalkyl, phenalkyl or phenalkyl substituted on the phenyl ring with from one to three

substituents independently selected from the group consisting of alkyl, halo, alkoxy, haloalkyl and haloalkoxy, aryl selected from phenyl and phenyl substituted with from one to five substituents independently selected from the group consisting of halo, alkyl, haloalkyl, haloalkoxy, alkylsulfinyl, alkylsulfonyl, nitro, cyano, dialkylamino wherein the alkyl groups may be the same or different or together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring, heteroaryl selected from furyl, quinoliny, isoquinoliny, benzofuranyl, benzothienyl and pyndyl, and benzofuranyl, benzothienyl and pyndyl substituted with one or two substituents independently selected from halo, alkyl, alkoxy, haloalkoxy, haloalkyl, alkylthio, nitro and cyano,

R^4 is a hydrogen atom, alkyl, alkylcarbonyl, alkoxy, alkylthio, alkylamino, cyano, alkenyl, alkynyl, haloalkynyl, haloalkoxycarbonyl, alkoxycarbonylthio, alkenyloxycarbonyl, alkynyloxycarbonyl, alkoxyoxalyl, alkylcarbonyl, alkylcarbonyloxyalkoxycarbonyl, arylcarbonyl, arylsulfonyl, aryloxythiocarbonyl, or arylcarbonyl, arylsulfonyl, aryloxythiocarbonyl substituted on the aryl ring with from one to two substituents independently selected from halo and alkyl, or thenyl or thenyl substituted on the thienyl ring with from one to two substituents independently selected from halo and alkyl,

R^5 is a hydrogen atom, alkyl, haloalkyl, alkylcarbonyl, formyl, alkoxy, alkoxycarbonyl, alkoxycarbonyloxy, alkyl-

R^4 is a hydrogen atom, (C₁-C₄)alkylcarbonyl, (C₁-C₄)alkylsulfonyl, (C₂-C₈)alkynyl, halo(C₂-C₈)alkynyl, halo(C₁-C₄)alkoxycarbonyl, (C₁-C₄)alkylcarbonyloxymethoxycarbonyl, (C₁-C₄)alkoxycarbonylthio, (C₂-C₈)alkenyloxycarbonyl, (C₂-C₈)alkynyloxycarbonyl or (C₁-C₄)alkoxyoxalyl, and

R^5 is a hydrogen atom, (C₁-C₄)alkylthio, (C₁-C₄)alkoxy, cyano, phenyl or phenyl substituted on the phenyl ring with from one to three substituents independently selected from the group consisting of (C₁-C₄)alkyl, halo, (C₁-C₄)alkoxy, halo(C₁-C₄)alkyl and halo(C₁-C₄)alkoxy

11 The insecticidal composition of claim 10 wherein

R^1 is (C₁-C₁₀)alkyl, halo(C₁-C₁₀)alkyl, (C₂-C₈)alkynyl, cyclo(C₃-C₈)alkyl(C₁-C₂)alkyl, tr(C₁-C₄)alkylsilyl(C₁-C₂)alkyl where the three alkyl groups may be the same or different,

R^3 is phenyl or phenyl substituted with from one to three substituents independently selected from the group consisting of halo, (C₁-C₄)alkyl, halo(C₁-C₂)alkyl and halo(C₁-C₂)alkoxy, or benzothienyl substituted with one or two substituents independently selected from halo, (C₁-C₄)alkyl, (C₁-C₄)alkoxy, halo(C₁-C₄)alkoxy, halo(C₁-C₄)alkyl, (C₁-C₄)alkylthio, nitro and cyano,

R^4 is a hydrogen atom, (C₁-C₄)alkylsulfonyl, (C₁-C₄)alkoxycarbonylthio, (C₂-C₄)alkenyloxycarbonyl, (C₂-C₄)alkynyloxycarbonyl or (C₁-C₄)alkoxyoxalyl, and

R^5 is a hydrogen atom, (C₁-C₄)alkoxy or (C₁-C₄)alkylthio

- 12 A method of controlling a fungus comprising applying a fungicidally effective amount of a composition of claim 5, 6, 7 or 8 to the fungus, to the locus of the fungus or to the growth medium of said fungus
- 13 A method of controlling an insect comprising applying an insecticidally effective amount of a composition of claim 9, 10 or 11 to the insect, to the locus of the insect or to the growth medium of said insect

Certificate of Express Mailing (37 CFR 1.10)	
<u>EL910146203US</u> Express Mail Mailing Number	<u>October 26 2001</u> Date of Deposit
I hereby certify that this application is being deposited with the United States Postal Service Express Mail Post Office to Addressee service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents Washington D C 20231	
<u>Michele Lyons</u> (Typed or printed name of person mailing application)	<u></u> (Signature of person mailing application)

PCT INTERNATIONAL APPLICATION COVER LETTER

Regarding the International Application of

Docket or Reference Number DAS Case No RHA01070

Applicant(s) Dow AgroSciences LLC
Martha Jean Kelly, et al
Entitled SUBSTITUTED 4,5-DIHYDRO-1,2,4-TRIAZIN-6-ONES, 1,2,4-TRIAZIN-6-ONES, AND THEIR USE AS FUNGICIDES AND INSECTICIDES

Corresponding to the following application(s)

<u>Serial No</u>	<u>Filing Date</u>	<u>Country</u>
60/243,803	27 October 2000	US

To the United States Receiving Office (RO/US)

Accompanying this cover letter is the above-identified International Application including a completed Request Form PCT/RO/101 and Fee Sheet Please process the application according to the provisions of the Patent Cooperation Treaty

Respectfully submitted,


Carl D Corvin
Agent for the Applicant(s)
Reg No 34,569

Date October 26, 2001

ENTERED IN MAIL
1/30/02 3:41 PM

PCT

REQUEST

The undersigned requests that the present
International application be processed
according to the Patent Cooperation Treaty

For Receiving Office use only

International Application No

International Filing Date

Name of Receiving Office and PCT International Application

Applicant's or agent's file reference

RHA01070

Box No. I TITLE OF INVENTION

SUBSTITUTED 4,5-DIHYDRO-1,2,4-TRIAZIN-6-ONES, 1,2,4-TRIAZIN-6-ONES, AND THEIR USE AS
FUNGICIDES AND INSECTICIDES

Box No. II APPLICANT

☐ This person is also inventor

Name and address

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, Indiana 46268
UNITED STATES OF AMERICA

Telephone No
(317) 337-5115

Facsimile No
(317) 337-4847

Telexprinter No

Applicant's Registration No. with the Office
34,569

State (that is country) of nationality

US

State (that is country) of residence

US

This person is applicant for
the purposes of

☐ all designated
States☐ all designated States except
the United States of America☐ the United States
of America only☐ the States indicated in
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address

KELLY, Martha Jean
1475 Little Creek Lane
Collegeville, Pennsylvania 19426
UNITED STATES OF AMERICA

This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box
is marked do not fill in below)

Applicant's Registration No. with the Office

State (that is country) of nationality

US

State (that is country) of residence

US

This person is applicant for
the purposes of

☐ all designated
States☐ all designated States except
the United States of America☒ the United States
of America only☐ the States indicated in
the Supplemental Box☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf
of the applicant(s) before the competent International Authorities as:

☒ agent☐ common representative

Name and address:

CORVIN, Carl Dean
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, Indiana 46268
UNITED STATES OF AMERICA

Telephone No
(317) 337-5115

Facsimile No
(317) 337-4847

Telexprinter No

Agent's Registration No. with the Office
34,569

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the
space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S) <i>If none of the following sub boxes is used this sheet is not to be included in the request</i>			
Name and address. EVANS, Karen Anderson 701 Marlbrook Lane Lansdale, Pennsylvania 19446 UNITED STATES OF AMERICA		This person is ☐ applicant only ☒ applicant and inventor ☐ inventor only (If this check-box is marked do not fill in below.) Applicant's Registration No. with the Office	
State (that is, country) of nationality US		State (that is, country) of residence US	
This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box			
Name and address GALLAGHER, James Joseph 530 Meadowbrook Avenue Ambler, Pennsylvania 19002 UNITED STATES OF AMERICA		This person is ☐ applicant only ☒ applicant and inventor ☐ inventor only (If this check-box is marked do not fill in below.) Applicant's Registration No. with the Office	
State (that is, country) of nationality US		State (that is, country) of residence US	
This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box			
Name and address MULVIHILL, Mark Joseph 2801 Navajo Path Ambler, Pennsylvania 19002 UNITED STATES OF AMERICA		This person is ☐ applicant only ☒ applicant and inventor ☐ inventor only (If this check-box is marked do not fill in below.) Applicant's Registration No. with the Office	
State (that is, country) of nationality US		State (that is, country) of residence US	
This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box			
Name and address.		This person is. ☐ applicant only ☐ applicant and inventor ☐ inventor only (If this check-box is marked do not fill in below.) Applicant's Registration No. with the Office	
State (that is, country) of nationality		State (that is, country) of residence	
This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box			

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No. V DESIGNATION OF STATES

The following designations are hereby made under Rule 4 9(a)

Regional Patent

- ☒ AP ARIPO Patent GH Ghana GM Gambia KE Kenya LS Lesotho MW Malawi MZ Mozambique SD Sudan SL Sierra Leone SZ Swaziland TZ United Republic of Tanzania UG Uganda ZW Zimbabwe and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent AM Armenia AZ Azerbaijan BY Belarus KG Kyrgyzstan KZ Kazakhstan MD Republic of Moldova RU Russian Federation TJ Tajikistan TM Turkmenistan and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent AT Austria BE Belgium CH and LI Switzerland and Liechtenstein CY Cyprus DE Germany DK Denmark ES Spain FI Finland FR France GB United Kingdom GR Greece IE Ireland IT Italy LU Luxembourg MC Monaco NL Netherlands PT Portugal SE Sweden TR Turkey and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent BF Burkina Faso BJ Benin CF Central African Republic CG Congo CI Côte d'Ivoire CM Cameroon GA Gabon GN Guinea GW Guinea Bissau ML Mali MR Mauritania NE Niger SN Senegal TD Chad TG Togo and any other State which is a member State of OAPI and a Contracting State of the PCT if other and of protection or treatment desired specify on line _____

National Patent /if other kind of protection or treatment desired specify on line/

- | | | |
|---|--|--|
| ☒ AE United Arab Emirates | ☒ GE Georgia | ☒ MW Malawi |
| ☒ AG Antigua and Barbuda | ☒ GH Ghana | ☒ MX Mexico |
| ☒ AL Albania | ☒ GM Gambia | ☒ MZ Mozambique |
| ☒ AM Armenia | ☒ HR Croatia | ☒ NO Norway |
| ☒ AT Austria | ☒ HU Hungary | ☒ NZ New Zealand |
| ☒ AU Australia | ☒ ID Indonesia | ☒ PL Poland |
| ☒ AZ Azerbaijan | ☒ IL Israel | ☒ PT Portugal |
| ☒ BA Bosnia and Herzegovina | ☒ IN India | ☒ RO Romania |
| ☒ BB Barbados | ☒ IS Iceland | ☒ RU Russian Federation |
| ☒ BG Bulgaria | ☒ JP Japan | ☐ SD Sudan |
| ☒ BR Brazil | ☒ KE Kenya | ☒ SE Sweden |
| ☒ BY Belarus | ☒ KG Kyrgyzstan | ☒ SG Singapore |
| ☒ BZ Belize | ☐ KP Democratic People's Republic of Korea | ☒ SI Slovenia |
| ☒ CA Canada | ☒ KR Republic of Korea | ☒ SK Slovakia |
| ☒ CH and LI Switzerland and Liechtenstein | ☒ KZ Kazakhstan | ☒ SL Sierra Leone |
| ☒ CY China | ☒ LC Saint Lucia | ☒ TJ Tajikistan |
| ☒ CO Colombia | ☒ LK Sri Lanka | ☒ TM Turkmenistan |
| ☒ CR Costa Rica | ☒ LR Liberia | ☒ TR Turkey |
| ☐ CU Cuba | ☒ LS Lesotho | ☒ TT Trinidad and Tobago |
| ☒ CZ Czech Republic | ☒ LT Lithuania | ☒ TZ United Republic of Tanzania |
| ☒ DE Germany | ☒ LU Luxembourg | ☒ UA Ukraine |
| ☒ DK Denmark | ☒ LV Latvia | ☒ UG Uganda |
| ☒ DM Dominica | ☒ MA Morocco | ☒ US United States of America |
| ☒ DZ Algeria | ☒ MD Republic of Moldova | ☒ UZ Uzbekistan |
| ☒ EE Estonia | ☒ MG Madagascar | ☒ VN Viet Nam |
| ☒ ES Spain | ☒ MK The former Yugoslav Republic of Macedonia | ☒ YU Yugoslavia |
| ☒ FI Finland | ☒ MN Mongolia | ☒ ZA South Africa |
| ☒ GB United Kingdom | | ☒ ZW Zimbabwe |
| ☒ GD Grenada | | |

Check boxes below reserved for designating States which have become party to the PCT after issuance of this sheet

- | | | |
|--------------------------------|--------------------------------|--------------------------------|
| ☐ _____ | ☐ _____ | ☐ _____ |
| ☐ _____ | ☐ _____ | ☐ _____ |

Precautionary Designation Statement In addition to the designations made above the applicant also makes under Rule 4 9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No VI PRIORITY CLAIM				
The priority of the following earlier application(s) is hereby claimed				
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is		
		national application country	regional application regional Office	international application receiving Office
Item (1) 27 October 200 27 10 00	60/243,803	US		
Item (2)				
Item (3)				
Item (4)				
Item (5)				

☐ Further priority claims are indicated in the Supplemental Box

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as

☐ all items ☒ item (1) ☐ item (2) ☐ item (3) ☐ item (4) ☐ item (5) ☐ other see Supplemental Box

Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen, the two-letter code may be used)

ISA / US

Request to use results of earlier search, reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year) Number Country (or regional Office)

Box No VIII DECLARATIONS

The following declarations are contained in Boxes Nos. VIII(i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration)

☐ Box No VIII (i)	Declaration as to the identity of the inventor	
☐ Box No VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date to apply for and be granted a patent	
☐ Box No VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date to claim the priority of the earlier application	
☒ Box No VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)	1
☐ Box No VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	

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Box No. VIII (iv) DECLARATION INVENTORSHIP (only for the purposes of the designation of the United States of America)

The declaration must conform to the standardized wording provided for in Section 214 see Notes to Boxes Nos VIII VIII(i) to (v) (in general) and the specific Notes to Box No. VIII(iv) If this Box is not used, this sheet should not be included in the request

**Declaration of Inventorship (Rules 4 17(iv) and 51 bis.1(a)(iv))
for the purposes of the designation of the United States of America**

I hereby declare that I believe I am the original first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application)

This declaration is directed to international application No. PCT/_____ (if furnishing declaration pursuant to Rule 26ter)

I hereby declare that my residence mailing address and citizenship are as stated next to my name

I hereby state that I have reviewed and understand the contents of the above-identified international application including the claims of said application I have identified in the request of said application in compliance with PCT Rule 4 10 any claim to foreign priority and I have identified below under the heading Prior Applications, by application number country or Member of the World Trade Organization day month and year of filing any application for a patent or inventor's certificate filed in a country other than the United States of America including any PCT international application designating at least one country other than the United States of America having a filing date before that of the application on which foreign priority is claimed

Prior Applications

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 CFR § 1.56 including but not limited to continuation in part applications material information which became available between the filing date of the prior application and the PCT international filing date of the continuation in-part application

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

Name Martha Jean Kelly

Residence Collegeville, Pennsylvania
(city and either U.S. state if applicable or country)

Mailing Address 1475 Little Creek Lane

Citizenship United States of America

Inventor's Signature _____

Date _____

(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application The signature must be that of the inventor not that of the agent international application)

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the

Name Karen Anderson Evans

Residence Lansdale, Pennsylvania
(city and either U.S. state if applicable or country)

Mailing Address 701 Marlbrook Lane

Citizenship United States of America

Inventor's Signature _____

Date _____

(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application The signature must be that of the inventor not that of the agent)

(of signature which is not contained in the request or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

☒ This declaration is continued on the following sheet, "Continuation of Box No. VIII(iv)"

Continuation of Box No VIII (i) to (v) DECLARATION

If the space is insufficient in any of Boxes Nos. VIII(i) to (v) to furnish all the information including in the case where more than two inventors are to be named in Box No VIII(iv) in such case write "Continuation of Box No. VIII" (indicate the item number of the Box) and furnish the information in the same manner as required for the purposes of the Box in which the space was insufficient. If additional space is needed in respect of two or more declarations, a separate continuation box must be used for each such declaration. If this Box is not used this sheet should not be included in the request.

Name James Joseph Gallagher

Residence Ambler, Pennsylvania
(city and either U.S. state if applicable or country)

Mailing Address 530 Meadowbrook Avenue

Citizenship United States of America

Inventor's Signature _____

Date _____

(if not contained in the request or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor not that of the agent)
(international application)

(of signature which is not contained in the request or of the declaration that is corrected or added under Rule 26ter after the filing of the

Name Mark Joseph Mulvihill

Residence Ambler, Pennsylvania
(city and either U.S. state if applicable or country)

Mailing Address 2801 Navaio Path

Citizenship United States of America

Inventor's Signature _____

Date _____

(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor not that of the agent)

(of signature which is not contained in the request or of the declaration that is corrected or added under Rule 26ter after the filing of the
international application)

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Box No IX CHECK LIST LANGUAGE OF FILING																																		
This international application contains (a) the following number of sheets in paper form request (including declaration sheets) 7 description (excluding sequence listing part) 104 claims 22 abstract 1 drawings 0 Suo-total number of sheets 134 sequence listing part of description (actual number of sheets if filed in paper form, whether or not also filed in computer readable form see (b) below) 0 Total number of sheets 134 (b) sequence listing part of description filed in computer readable form (i) ☐ only (under Section 801(a)(i)) (ii) ☐ in addition to being filed in paper form (under Section 801(a)(ii)) Type and number of carriers (diskette CD-ROM CD-R or other) on which the sequence listing part is contained (additional copies to be indicated under item 9(ii) in right column) —	This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item) <table style="width: 100%;"> <tr> <td style="width: 5%;">1</td> <td style="width: 85%;">☒ fee calculation sheet</td> <td style="width: 10%; text-align: right;">1</td> </tr> <tr> <td>2</td> <td>☐ original separate power of attorney</td> <td></td> </tr> <tr> <td>3</td> <td>☐ original general power of attorney</td> <td></td> </tr> <tr> <td>4</td> <td>☒ copy of general power of attorney reference number if any —</td> <td style="text-align: right;">1</td> </tr> <tr> <td>5</td> <td>☐ statement explaining lack of signature</td> <td></td> </tr> <tr> <td>6</td> <td>☐ priority document(s) identified in Box No VI as item(s) —</td> <td></td> </tr> <tr> <td>7</td> <td>☐ translation of international application into (language) —</td> <td></td> </tr> <tr> <td>8</td> <td>☐ separate indications concerning deposited microorganism or other biological material</td> <td></td> </tr> <tr> <td>9</td> <td>☐ sequence listing in computer readable form (indicate also type and number of carriers (diskette CD ROM CD-R or other))</td> <td></td> </tr> <tr> <td colspan="3"> (i) ☐ copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) (ii) ☐ (only where check box (b)(i) or (b)(ii) is marked in left column) additional copies including where applicable the copy for the purposes of international search under Rule 13ter (iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column </td> </tr> <tr> <td>10</td> <td>☒ other (specify): Cover Letter to USRO, return postcard</td> <td style="text-align: right;">2</td> </tr> </table>	1	☒ fee calculation sheet	1	2	☐ original separate power of attorney		3	☐ original general power of attorney		4	☒ copy of general power of attorney reference number if any —	1	5	☐ statement explaining lack of signature		6	☐ priority document(s) identified in Box No VI as item(s) —		7	☐ translation of international application into (language) —		8	☐ separate indications concerning deposited microorganism or other biological material		9	☐ sequence listing in computer readable form (indicate also type and number of carriers (diskette CD ROM CD-R or other))		(i) ☐ copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) (ii) ☐ (only where check box (b)(i) or (b)(ii) is marked in left column) additional copies including where applicable the copy for the purposes of international search under Rule 13ter (iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column			10	☒ other (specify): Cover Letter to USRO, return postcard	2
1	☒ fee calculation sheet	1																																
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4	☒ copy of general power of attorney reference number if any —	1																																
5	☐ statement explaining lack of signature																																	
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10	☒ other (specify): Cover Letter to USRO, return postcard	2																																
Figure of the drawings which should accompany the abstract	Language of filing of the international application: English																																	
Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE																																		
Dow AgroSciences LLC By <u>Carl D Corvin</u> Carl D Corvin																																		

For receiving Office use only		
1 Date of actual receipt of the purported international application		2. Drawings ☐ received ☐ not received
3 Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application		
4 Date of timely receipt of the required corrections under PCT Article 11(2)		
5 International Searching Authority (If two or more are competent) ISA/	6 ☐ Transmittal of search copy delayed until search fee is paid	

For International Bureau use only
Date of receipt of the record copy by the International Bureau

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PCT

INTERNATIONAL SEARCH REPORT

1PC 1 Article 18 and Rules 43 and 44)

Applicant RHW/070	FOR FURTHER ACTION	- Notification of International Search - Report on PCT ISA (if available) (if applicable) - Fee
International application PCT/91/01	International filing date (day month year) 25 October 1991 (26 10 1991)	Earliest Priority Date (day month year) 27 October 1990 (27 10 1990)
Applicant DOW AG/086		

This information is not to be distributed outside the Agency and is exempted from automatic declassification according to E.O. 13526, 1.4. This information is exempted from automatic declassification according to E.O. 13526, 1.4.

[illegible]

It is also recommended by a copy of each prior air document and its contents.

1. Basis of the Report
- a. With regard to the language the international search was carried out on the basis of the international application in the language in which it was filed unless otherwise indicated under this item
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23 (b))
- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application the international search was carried out on the basis of the sequence listing
- ☐ contained in the international application in written form
- ☐ filed together with the international application in computer readable form
- ☐ furnished subsequently to this Authority in written form
- ☐ furnished subsequently to this Authority in computer readable form
- ☐ the claimant that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished
- ☐ the claimant that the information recorded in computer readable form is identical to the written sequence listing has been furnished
2. ☐ Certain claims were found unsearchable (See Box I)
3. ☐ Unity of invention is lacking (See Box II)
4. With regard to the title
- ☒ the text is approved as submitted by the applicant
- ☐ the text has been established by this Authority to read as follows
5. With regard to the abstract
- ☒ the text is approved as submitted by the applicant
- ☐ the text has been established according to Rule 38 2(b) by this Authority as it appears in Box III. The applicant may within one month from the date of mailing of this international search report submit comments to this Authority
6. The figure or the drawings to be published with the abstract is Figure No. _____
- ☐ as suggested by the applicant
- ☐ because the applicant failed to suggest a figure
- ☐ because this figure better characterizes the invention
- ☐ None of the figures

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ISA/110

A CLASSIFICATION OF SUBJECT MATTER
IPC Class. (Int. Cl.)
USC Class.
According to International Patent Classification (IPC) and International Classification and IPC

B FIELDS SEARCHED

Minimum documentation searched (classification) followed by classification symbol
US 1-23-182-8-10

Documentation searched other than minimum documentation to the extent that such documents are included in fields searched

Electronic database consulted during the international search (name of database and the practicable search term used)
CAS, LNC

C DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication where appropriate of the relevant pages	Relevant to claim No.
X	WO 01/0741 (EISA CO. LTD.) 7 August 2001 see pages 35 and 46	1 and 2
X	DE 2 9 40 11 (ASTA MEDICA AG) 26 May 1999 see Table 2 and	1

☐ Further documents are listed in the continuation of Box C ☐ See patent family annex

Special categories of cited documents	
A Document defining the general state of the art which is not considered to be of particular relevance	T Other documents published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
E Earlier application or patent published on or after the international filing date	X Document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
L Document which may throw doubts on novelty (claims) or which is cited in a caption the publication date of another citation or other special reason (as specified)	Y Document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
O Document referring to an oral disclosure, use, exhibition or other means	Z Document member of the same patent family
P Document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 07 October 2002 (07.10.2002)	Date of mailing of the international search report 13 NOV 2002
Name and mailing address of the ISA/US (Inventor or Patent and Trademark Box 147 Washington, DC 20531 Facsimile No. (703) 45 3230	Authorized officer Brenda L. Coleman Telephone No. 703 408-1235

PATENT COOPERATION TREATY

RECEIVED

MAY 23 2002

From the RECEIVING OFFICE

To
CARL DEAN CORVIN
DOW AGROSCIENCES LLC
9330 ZIONSVILLE ROAD
INDIANAPOLIS INDIANA 46268

PCT

Due 6/24/02

INVITATION TO CORRECT DEFECTS IN
THE INTERNATIONAL APPLICATION

(PCT Articles 34(1) and 14(1) and Rule 26)

Date of mailing
(day, month/year)

20 May 2002

Applicant's or agent's file reference

RHA01070

REPLY DUE

within 1 months / days
from the above date of mailing

International application No

PCT/US01/50363

International filing date
(day, month/year)

26 Oct 2001

Applicant

DOW AGROSCIENCES LLC

1 The applicant is hereby invited within the time limit indicated above, to correct the defects in the international application as filed, the defects specified on the attached



Annex A



Annex B1 (text matter of the international application as filed)



Annex C1 (drawings of the international application as filed)

2 The applicant is hereby invited within the time limit indicated above, to correct the defects in the translation of the international application furnished under Rule 12.3 the defects specified on the attached



Annex A



Annex B2 (text matter of the translation of the international application)



Annex C2 (drawings of the translation of the international application)

Additional observations (if necessary)

HOW TO CORRECT THE DEFECTS*

Correction must be submitted by filing a replacement sheet embodying the correction and a letter accompanying the replacement sheet, which shall draw attention to the difference between the replaced sheet and the replacement sheet. A correction may be stated in a letter only if it is of such a nature that it can be transferred from the letter to the record copy without adversely affecting the clarity and direct reproducibility of the sheet onto which the correction is to be transferred (Rule 26.4(a)).

ATTENTION

Failure to correct the defects will result in the international application being considered withdrawn by this receiving Office (see Rule 26.5 for further details)

A copy of this invitation and any attachments has been sent to the International Bureau



and the International Searching Authority

Name and mailing address of the receiving Office

Assistant Commissioner for Patent, Box PCT
Washington, D.C. 20231 Attn: RO/US

Authorized officer

Latrice Russell

Facsimile No. 703-305-3230

Telephone No. 703 306-6829

Form PCT/RO/106 (July 1998)

ENTERED ON DOCKET/
REVIEWED

Date 6/6/02 By Am

The receiving Office has found the following defects in the international application as filed

1. As to signature of the international application (Rules 4.13 and 10.4) the request
- a. ☐ is not signed
 - b. ☐ is not signed by all applicants
 - c. ☐ is not accompanied by the statement referred to in the check list in Box No. VIII of the request explaining the lack of the signature of an applicant for the designation of the United States of America.
 - d. ☒ is signed by what appears to be an agent or common representative but
 - ☐ the international application is not accompanied by a power of attorney appointing him
 - ☒ the power of attorney accompanying the international application was not signed by all the applicants.
 - e. ☐ other (specify)

All applicants must sign, including inventors if they are also applicants (e.g. where the United States of America is designated)

2. As to indications concerning the applicant the request (Rules 4.4 and 4.5)

- a. ☐ does not properly indicate the applicant's name (specify)
- b. ☐ does not indicate the applicant's address.
- c. ☐ does not properly indicate the applicant's address (specify)
- d. ☐ does not indicate the applicant's nationality
- e. ☐ does not indicate the applicant's residence
- f. ☐ other (specify)

3. As to the language of certain elements of the international application other than the description and claims (Rules 12.1(c) and 26.3tertiol and (c))

- a. ☐ the request is not in a language which is both a language accepted by this receiving Office and a language of publication which is (are)
- b. ☐ the text matter of the drawings is not in the language in which the international application is to be published, which is
- c. ☐ the abstract is not in the language in which the international application is to be published, which is

4. The title of the invention

- a. ☐ is not indicated in Box No. I of the request (Rule 4.1(a))
- b. ☐ is not indicated at the top of the first sheet of the description (Rule 5.1(a)).
- c. ☐ as appearing in Box No. I of the request is not identical with the title heading the description (Rule 5.1(a))

5. As in the abstract (Rule 8)

- ☐ the international application does not contain an abstract

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IN THE UNITED STATES RECEIVING OFFICE

Applicant (s) Dow AgroSciences LLC
Martha J Kelly et al

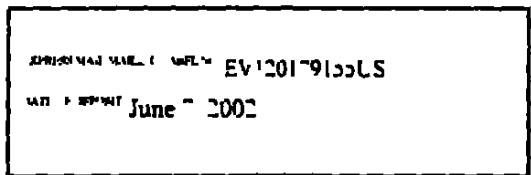
International Application No PCT/LS01/50363

Filed October 26 2001

For SUBSTITUTED 4-5-DIHYDRO-1,2,4-TRIAZIN-6-ONES 1,2,4-TRIAZIN-6-ONES AND THEIR USE AS FUNGICIDES AND INSECTICIDES

DAS REFERENCE RHA01070

Authorized Officer Latrice Russell



Dear Sir/Madam

RESPONSE

In response to the Invitation to Correct Defects in the International Application mailed on May 20, 2002, attached hereto is a copy of the Appointment of Agent and Declaration of Inventorship which was omitted upon filing. In response to the Communication in Cases for Which No Other Form is Applicable mailed on May 20, 2002, page 84 is not missing, the page number was skipped unintentionally due to the table on previous pages 65-83.

Respectfully submitted,

A handwritten signature in black ink that reads "Carl D. Corvin".

Carl D. Corvin
Registration No. 34,569
Phone (317) 337-5115

June 7, 2002
9330 Zionsville Road
Indianapolis, Indiana 46268
CDC/ml

6/10/02 AB

RHA01070

Box No. VIII (iv) DECLARATION INVENTORSHIP (only for the purposes of the designation of the United States of America)

The declaration must conform to the standardized wording provided for in Section 214, see Notes to Boxes Nos. VIII VIII(i) to (v) (in general) and the specific Notes to Box No. VIII(iv). If this Box is not used, this sheet should not be included in the request.

Declaration of Inventorship (Rules 4.17(iv) and 51 bis.1(a)(iv))
for the purposes of the designation of the United States of America

I hereby declare that I believe I am the original first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application)

This declaration is directed to international application No. PCT/_____ (if furnishing declaration pursuant to Rule 28ter)

I hereby declare that my residence, mailing address and citizenship are as stated next to my name

I hereby declare that I have reviewed and understand the contents of the above-identified international application including the claims of said application. I have identified in the request of said application in compliance with PCT Rule 4.0 any claim to foreign priority and have identified below under the heading "Prior Applications" by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America including any PCT international application designating at least one country other than the United States of America having a filing date before that of the application on which foreign priority is claimed.

Prior Applications

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 CFR § 1.56 including continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name Martha Jean Kelly

Residence Collegeville, Pennsylvania
(city and either U.S. state, if applicable, or country)

Mailing Address 1475 Little Creek Lane

Citizenship United States of America

Inventor's Signature: Martha Jean Kelly
(If not contained in the request, or if declaration is corrected or added under Rule 28ter after the filing of the international application. The signature must be that of the inventor, not that of the agent.)
international application)

Date: 12/5/01

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 28ter after the filing of the international application)

Name Karen Anderson Evans

Residence Lansdale, Pennsylvania
(city and either U.S. state, if applicable, or country)

Mailing Address 701 Marlbrook Lane

Citizenship United States of America

Inventor's Signature: Karen Anderson Evans
(If not contained in the request, or if declaration is corrected or added under Rule 28ter after the filing of the international application. The signature must be that of the inventor, not that of the agent.)
international application)

Date: 1/8/02

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 28ter after the filing of the international application)

☒ This declaration is continued on the following sheet, "Continuation of Box No. VIII(iv)"

Corresponds to: Form PCT RO/101, declaration sheet (iv) (March 2001)

Continuation of Box No. VIII (i) to (v) DECLARATION

If the space is insufficient in any of Boxes Nos. VIII(i) to (v) to furnish all the information including in the case where more than two inventors are to be named in Box No. VIII(iv) in such case write "Continuation of Box No. VIII" (indicate the item number of the Box) and furnish the information in the same manner as required for the purposes of the Box in which the space was insufficient. If additional space is needed in respect of two or more declarations, a separate continuation box must be used for each such declaration. If this Box is not used, this sheet should not be included in the request.

Name James Joseph GallacnerResidence Ampler, Pennsylvania
(city and either U S state if applicable or country)Mailing Address 530 Meadowbrook AvenueCitizenship United States of AmericaInventor's Signature James J. Gallacner

(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor not that of the agent international application)

Date December 29, 2001

(of signature which is not contained in the request or of the declaration that is corrected or added under Rule 26ter after the filing of the

Name Mark Joseph MulvihillResidence Yorktown Heights, New York
(city and either U S state if applicable or country)Mailing Address 30378 Faircrest DriveCitizenship United States of AmericaInventor's Signature Mark Joseph Mulvihill

(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor not that of the agent international application)

Date 10/24/2001

(of signature which is not contained in the request or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

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PCT/US
POWER OF ATTORNEYPATENT COOPERATION TREATY
Appointment of Agent

The undersigned applicant(s) hereby appoints as individual agents

Attorney/Agent	Reg No	Attorney/Agent	Reg No.	Attorney/Agent	Reg No.
BORUCKI Andrea T	33 651	LUDWIG Kenneth B	42 814	SCHUETT Kenyon L	44 324
CORVIN Carl D	34 569	MACIAK Ronald S	35,282	STUART Donald R	28 479
LOERTSCHER Kenneth L	29 558	MIXAN Craig E	32 709		

all of Dow AgroSciences LLC or its affiliated companies for which Dow AgroSciences LLC has control to act on his (her their) behalf before the competent International Authorities in connection with this international application concerning

SUBSTITUTED 4 5-DIHYDRO-1 2 4-TRIAZIN-6-ONES, 1,2,4-TRIAZIN-6-ONES, AND THEIR USE AS FUNGICIDES AND INSECTICIDES

International Patent Application No PCT/US

Agent's File Reference PHA01070

filed with the United States Receiving Office

Signed at <u>Center Square, PA</u> This <u>5</u> day of <u>December</u> , 20 <u>01</u> Effective as of October 26, 2001 By <u>Martha Jean Kelly</u> Martha Jean Kelly
Signed at <u>Lansdale, PA</u> This <u>8</u> day of <u>January</u> , 20 <u>02</u> Effective as of October 26, 2001 By <u>Karen Anderson Evans</u> Karen Anderson Evans
Signed at <u>Concord, MA 01742</u> This <u>29</u> day of <u>December</u> , 20 <u>01</u> Effective as of October 26, 2001 By <u>James J. Gallagher</u> James Joseph Gallagher
Signed at <u>Tarrytown, New York 10591</u> This <u>29</u> day of <u>October</u> , 20 <u>01</u> Effective as of October 26, 2001 By <u>Mark Joseph Mulvihill</u> Mark Joseph Mulvihill

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

INVITATION TO CORRECT
DECLARATION(S) MADE IN THE REQUEST
UNDER PCT RULE 4.17

(PCT Rules 4.17 and 26ter 2(a))

To

CORVIN, Carl, Dean
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis IN 46268
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year)	28 June 2002 (28 06 02)
Applicant's or agent's file reference RHA01070	REPLY DUE See below
International application No PCT/US01/50363	International filing date (day/month/year) 26 October 2001 (26 10 01)
Applicant DOW AGROSCIENCES LLC	

- 1 The applicant is hereby invited to submit to the International Bureau a corrected declaration within the time limit indicated below and as explained in the Annex. The applicant's attention is drawn to the fact that the declaration has not been examined for compliance with national law requirements of the designated State(s) for which that declaration is made.

When? Within 16 months from the priority date provided that any corrected declaration which is received by the International Bureau after the expiration of that time limit shall be considered to have been received on the last day of that time limit if it reaches it before the technical preparations for international publication have been completed (Rule 26ter 1).

How? By submitting a replacement sheet containing a corrected declaration accompanied by a letter explaining the correction (see Section 216). See Sections 211 to 215 for the applicable standardized wording.

Where? Directly to the International Bureau at the address indicated below.
If the corrected declaration is submitted to the receiving Office, that Office shall mark the date of receipt on it and transmit it promptly to the International Bureau. The declaration shall be considered to have been submitted to the International Bureau on the date marked (see Section 317).

- 2 Failure to correct the declaration within the time limit will result in copies of the declaration, as originally filed, being communicated by the International Bureau to the designated Offices concerned according to Rule 47.1(a)ter.

Any declaration received after the expiration of the time limit under Rule 26ter 1 will have to be submitted by the applicant directly to the designated Offices concerned. It is only in the case of a signed declaration of inventorship for the purposes of the designation of the United States of America (Rule 4.17(iv)) that the original declaration will be returned to the applicant (see Section 419(d)).

- 3 In respect of national phase processing, the applicant's attention is drawn to Rule 51bis 2 which provides that the designated Office shall not, unless it may reasonably doubt the veracity of the declaration concerned, require any document or evidence relating to the subject matter of any declaration complying with Rule 4.17(i) to (iv) which is contained in the request or submitted to the International Bureau or directly to the designated Office. Note however that Rule 51bis 2 may not apply in respect of certain States. For further information, see Notes to the request form, Box No. VIII.

- 4 A copy of this invitation is being sent to the receiving Office.

The International Bureau of WIPO 34 chemin des Colombettes 1211 Geneva 20 Switzerland	Authorized officer Fiona DOHERTY (Fax 338 87 40)
Facsimile No (41 22) 740 14 35	Telephone No (41 22) 338 83 38

Form PCT/IB/370 (March 2001)

The International Bureau has found the following defect(s) in the declaration(s) listed below.

- 1 ☐ declaration as to the identity of the inventor (Rules 4 17(i) and 51bis 1(a)(i) and Section 211) in respect of
- a (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)
- b (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)
- 2 ☐ declaration as to the applicant's entitlement as at the international filing date to apply for or be granted a patent (Rules 4 17(ii) and 51bis 1(a)(ii) and Section 212) in respect of
- a (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)
- b (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)
- 3 ☐ declaration as to the applicant's entitlement as at the international filing date to claim priority of the earlier application (Rules 4 17(iii) and 51bis 1(a)(iii) and Section 213) in respect of
- a (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)
- b (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)
- 4 ☒ declaration of inventorship (only for the purposes of the designation of the United States of America) (Rules 4 17(iv) and 51bis 1(a)(iv) and Section 214) in respect of
- a (name(s) included in the declaration) KELLY Martha Jean EVANS Karen Anderson, GALLAGHER, James, Joseph MULVIHILL Mark, Joseph
- ☐ is not in the prescribed wording
- ☒ is not signed by all inventors named in the declaration
- ☐ other (specify)
- b (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ is not signed by all inventors named in the declaration
- ☐ other (specify) ..
- 5 ☐ declaration as to non prejudicial disclosures or exceptions to lack of novelty (Rules 4 17(v) and 51bis 1(a)(v) and Section 215) in respect of
- a (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)
- b (name(s) included in the declaration)
- ☐ is not in the prescribed wording
- ☐ other (specify)

IPEA/ US

CHAPTER II

PCT
DEMAND

under Article 31 of the Patent Cooperation Treaty

The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated)

For International Preliminary Examining Authority use only

Identification of IPEA		Date of receipt of DEMAND
Box No I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference RHA01070
International application No PCT/US01/50363	International filing date 27 October 2000 (27 10 00)	(Earliest) Priority date 27 October 2000 (27 10 00)
Title or invention See 1 in Addendum		
Box No II APPLICANT(S)		
Name and address DOW AGROSCIENCES LLC 9330 Zionsville Road Indianapolis, Indiana 46268-1054 United States of America		Telephone No. 317-337 5115 Facsimile No 317-337-4847 Teleprinter No Applicant's Registration No. with the Office
State (that is, country) of nationality US	State (that is, country) of residence US	
Name and address KELLY, Martha J 1475 Little Creek Lane Collegeville, Pennsylvania 19426 United States of America		
State (that is, country) of nationality US	State (that is, country) of residence US	
Name and address EVANS, Karen A 701 Marlbrook Lane Lansdale, Pennsylvania 19446 United States of America		
State (that is, country) of nationality US	State (that is, country) of residence US	
☒ Further applicants are indicated on a continuation sheet.		

Corresponds to: Form PCT/IPEA401 (first sheet) (January 2002)

See Notes to the demand form

ENTERED ON DOCKET/
REVIEWED
Date 5/17/02 SV PM

International application No
PCT/US01/50363

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet should not be included in the demand

Name and address

GALLAGHER, James J
530 Meadowbrook Avenue
Ambler Pennsylvania 19002
United States of America

State (that is country) of nationality

US

State (that is country) of residence

US

Name and address

MULVIHILL, Mark J
3037B Ferncrest Drive
Yorktown Heights, New York 10598
United States of America

State (that is country) of nationality

US

State (that is country) of residence

US

Name and address

State (that is country) of nationality

State (that is country) of residence

Name and address

State (that is country) of nationality

State (that is country) of residence

Name and address

State (that is country) of nationality

State (that is country) of residence

☐ Further applicants are indicated on a continuation sheet.

International application No PCT/US01/50363	
Box No III AGENT OR COMMON REPRESENTATIVE OR ADDRESS FOR CORRESPONDENCE	
The following person is ☒ agent ☐ common representative and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination ☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked ☐ is hereby appointed specifically for the procedure before the International Preliminary Examining Authority in addition to the agent(s)/common representative appointed earlier	
Name and address CORVIN, Carl D Dow AgroSciences LLC 9330 Zionsville Road Indianapolis, Indiana 46268 United States of America	Telephone No 317-337 5115 Facsimile No 317-337-4847 Teleprinter No Agent's Registration No with the Office 34,569
☐ Address for Correspondence Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent	
Box No IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION	
Statement concerning amendments 1 The applicant wishes the international preliminary examination to start on the basis of ☒ the international application as originally filed the description ☒ as originally filed ☐ as amended under Article 34 the claims ☒ as originally filed ☐ as amended under Article 19 (together with any accompanying statement) ☐ as amended under Article 34 the drawings ☐ as originally filed ☐ as amended under Article 34 2 ☐ The applicant wishes any amendment to the claims under Article 18 to be considered as reversed 3 ☒ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 89 1(d)). (This check-box may be marked only where the time limit under Article 19 has not yet expired.) Where no check-box is marked international preliminary examination will start on the basis of the international application as originally filed or where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report as so amended	
Language for the purposes of international preliminary examination English ☒ which is the language in which the international application was filed ☒ which is the language of a translation furnished for the purposes of international search ☒ which is the language of publication of the international application ☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination	
Box No V ELECTION OF STATES	
The applicant hereby elects all eligible States (that is, all States which have been designated and which are bound by Chapter II of the PCT) excluding the following States which the applicant wishes not to elect	

International application No
PCT/US01/50363

Box No VI CHECK LIST

The demand is accompanied by the following elements in the language referred to in Box No IV for the purposes of international preliminary examination

- | | | |
|---|---|--------|
| 1 | translation of international application | sheets |
| 2 | amendments under Article 34 | sheets |
| 3 | copy (or where required translation) of amendments under Article 19 | sheets |
| 4 | copy (or where required translation) of statement under Article 19 | sheets |
| 5 | letter | sheets |
| 6 | other (specify) | sheets |

For International Preliminary
Examining Authority use only

received	not received
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- | | |
|--------------------------|--------------------------|
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |

The demand is also accompanied by the item(s) marked below

- | | |
|--|---|
| 1 ☒ fee calculation sheet | 5 ☐ statement explaining lack of signature |
| 2 ☐ original separate power of attorney | 6 ☐ sequence listing in computer readable form |
| 3 ☐ original general power of attorney | 7 ☐ other (specify) |
| 4 ☐ copy of general power of attorney reference number if any | |

Box No VII SIGNATURE OF APPLICANT AGENT OR COMMON REPRESENTATIVE

DOW AGROSCIENCES LLC, ET AL

By Carl D Corvin
Carl D Corvin

Signed on 09 May 2002

For International Preliminary Examining Authority use only

1 Date of actual receipt of DEMAND

2 Adjusted date of receipt of demand due to CORRECTIONS under Rule 60 1(b)

- | | |
|---|--|
| 3 ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5 below does not apply | ☐ The applicant has been informed accordingly |
| 4 ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80 5. | |
| 5 ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date the delay in arrival is EXCUSED pursuant to Rule 82 | |

For International Bureau use only

Demand received from IPEA on.

104

SUPERINDUSTRIA Y COMERCIO
Radicación : 03035666 00000000
Fecha (AMB) 2003-04-29 17:36:30
Trámite 011 PCT-PATENT 379 FASE NACI 411 PRESENTAC
Dependencia: 2029 DIVISION DE NUEVAS CREACIONES

Folios 104

NIT 800176089-2

RECIBO OFICIAL DE CAJA : 03 - 26,224
FECHA : ABRIL 14 DE 2003

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No PAGO	FECHA PGO	Vr PAGO
CAVELIER ABOGADOS	CONSIGNACION	BANCO POPULAR	050-00110-6	11726188	14/04/2003	34,071,480 00

***** CONCEPTO *****

CANT	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	30005-01-01 SOLICITUDES	1 TRAMITES DE SOL DE PATENTE DE IN	400,000 00
		TOTAL	\$ 400,000 00

SON: CUATROCIENTOS MIL PESOS

RESPONSABLE 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No _____

Q66 10975-841-005-3

60195

REQUISITOS NECESARIOS PARA PRESENTACION Y AGILIZACION DEL TRAMITE

	USUARIO	RADICADOR
PATENTE DE INVENCION ✓	()	()
- Indicación de que se solicita la concesión de una patente	()	()
- Datos de identificación del solicitante o de la persona que se presenta la solicitud	()	()
- Descripción de la invención.	()	()
- Dibujos de ser estos pertinentes	()	()
- Comprobante de Pago de las tasas establecidas	()	()

COMPLETA () INCOMPLETA ()

DISEÑO INDUSTRIAL ()

- Indicación de que se solicita el registro de Diseño Industrial	()	()
- Datos de identificación del solicitante o de la persona que presenta la solicitud	()	()
- Representación gráfica y fotográfica del Diseño Industrial o muestra del Material que incorpora el diseño	()	()
- Comprobante de pago de las tasas establecidas	()	()

COMPLETA () INCOMPLETA ()

ESQUEMA DE TRAZADO ()

- Indicación de que solicita el registro de un Esquema de trazado	()	()
- Datos de identificación del solicitante o de la persona que presenta La solicitud	()	()
- Representación gráfica del esquema de trazado	()	()
- Comprobante de pago de las tasas establecidas	()	()

COMPLETA () INCOMPLETA ()

Firma Responsable

ANDREA POSE

Fecha