

Doctor

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SUPERINTENDENCIA DE INDUSTRIA Y COM

E. _____ S. _____

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



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Solicitud de Patente de Invención titulada: "Compuestos de pirido
pirimidinio para controlar plagas invertebradas"

Solicitante: E.I. Du Pont de Nemours and Company

RESPUESTA AL AUTO NOTIFICADO POR FIJACIÓN EN LISTA**DEL 30 DE JULIO DE 2013, TRÁMITE: 11, EVENTO: 378, ACTUACIÓN: 519, OFICIO No.
13540 (EXAMEN DE FONDO)**

ÁLVARO CORREA ORDÓÑEZ, mayor de edad y vecino de Bogotá D.C., identificado tal como aparece al pie de mi firma, en mi carácter de apoderado de la sociedad en referencia, doy respuesta al auto emanado por ese Despacho dentro del término legal:

1. Respuesta a las observaciones del Examinador**1.1. Excepción a la patentabilidad**

Su Despacho menciona que la reivindicación 13 que menciona las semillas no es patentable de acuerdo al artículo 20 de la Decisión 486 literal c).

Al respecto informamos a su Despacho que la reivindicación 13 ha sido cancelada.

1.2. Reivindicaciones relativas a un uso o a un segundo uso

Su Despacho establece que la reivindicación 12 corresponde a la forma de usar los compuestos de fórmula I, aunque en su preámbulo se reclame como método.

Al respecto informamos a su Despacho que la reivindicación 12 ha sido cancelada.

1.3. Título

Su Despacho menciona que el título no corresponde con el objeto de la solicitud porque el término "*pesticida*" es muy general.

Con el fin de atender a la anterior observación presento el siguiente título como sigue:

"Compuestos de pirido pirimidinio y composiciones para controlar plagas invertebradas"

De esta forma se supera la anterior observación.

1.4. Claridad del capítulo reivindicatorio

Su Despacho considera que la reivindicación 1 no se encuentra debidamente soportada en la descripción, ya que no se evidencia la actividad de todos los compuestos sino que se hace una generalización de manera especulativa. Se objeta además la expresión "*opcionalmente*."

El examinador también afirma que la reivindicación 1 no es concisa puesto que cada uno de los radicales abarca una cantidad excesiva de definiciones.

Con relación a las reivindicaciones 8-10, su Despacho establece que hace referencia a una composición pero no se mencionan los componentes y las proporciones de los mismos. Se menciona además que no se encuentran debidamente sustentada puesto que en las realizaciones preferidas no se menciona la actividad de dichas composiciones con sus respectivas proporciones.

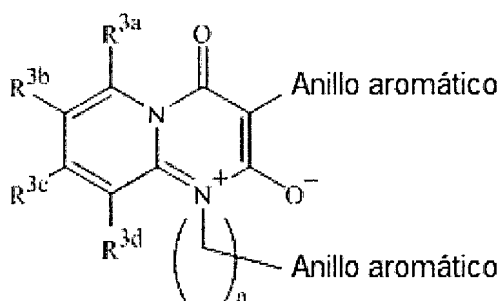
1.4.1. Modificación a una solicitud en trámite

Con el objeto de atender a las observaciones del examinador y de conformidad con el artículo 34 de la Decisión 486 que permite al solicitante en cualquier momento del trámite modificar su solicitud sin que se presente ampliación a la solicitud inicialmente presentada, me permito presentar un pliego reivindicatorio conformado por 8 reivindicaciones.

El examinador podrá notar que mi representada limitó drásticamente el alcance de la invención. Por favor, ver nuevo pliego reivindicatorio.

En la reivindicación 1 modificada, las definiciones de la mayoría de las variables se han limitado drásticamente. Por ejemplo, la variable A se ha limitado a $C(R^{3c})=C(R^{3d})$, el grupo Z se limitó a un enlace directo, y R^1 y R^2 se limitaron a fenilo o a un anillo heteroaromático de 5 o 6 miembros.

Se enfatiza que el alcance de la reivindicación 1 se ha limitado a los compuestos de la estructura que se muestra a continuación:



Reivindicación 1
modificada Fórmula I

Se hace notar a su Despacho que estas limitaciones permiten que se simplifique la condición que se presenta al final de la reivindicación 1.

También se hace notar que el grupo R^{3d} no puede ser hidrógeno, y de esta forma se requiere que un sustituyente este presente en la posición R^{3d} . Por lo tanto,

la nueva reivindicación 1 esta debidamente sustentada por los cientos de compuestos preparados y listados en las tablas índice de la solicitud en estudio.

De hecho, el examinador podrá verificar que mi representada limitó el alcance a tal grado que algunos de los compuestos preparados y ensayados no están ahora dentro del alcance de la reivindicación 1 modificada.

Con relación al término "opcionalmente", informamos a su Despacho que dicha expresión se cambió por "sustituido o no sustituido", de esta forma se supera esta objeción. Por ejemplo, un grupo alquilo opcionalmente sustituido con halógeno ahora estaría definido como un grupo alquilo sustituido o no sustituido con halógeno, lo que claramente indica tanto un grupo alquilo como un grupo haloalquilo.

Con relación a las reivindicaciones 8-10, dichas reivindicaciones se combinaron en la reivindicación 7 modificada, y la reivindicación 7 se limitó a las mezclas de los compuestos de Formula 1 y otros compuestos específicamente nombrados biológicamente activos.

1.5 Argumentos en favor de la novedad y del nivel inventivo

1.5.1. Novedad

La novedad de una solicitud está legalmente definida en el Artículo 16 de la Decisión 486 así: *“una invención se considerará nueva, cuando no está comprendida en el estado de la técnica. El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso de la prioridad reconocida...”*

El examinador establece que el documento D1 (CO10-095278) afecta la novedad de la solicitud en estudio. Al respecto mi representada respetuosamente menciona que el examinador aparentemente no vio la condición que aparece al final de la reivindicación 1.

De acuerdo a las modificaciones efectuadas a la reivindicación 1,

ahora la condición se lee de la siguiente forma:

"siempre que cuando A es $C(R^{3c})=C(R^{3d})$, R^{3c} es H o F, y R^{3d} es F, CF_2H o CF_3 , entonces, al menos uno de R^{3a} o R^{3b} es distinto de H."

Esta condición remueve toda posibilidad de solapamiento con D1, ya que básicamente esto afirma que cuando R^{3c} y R^{3d} tienen las mismas definiciones a sus variables correspondientes de D1, entonces R^{3a} y R^{3b} no pueden ser H. En el documento D1, las posiciones R^{3a} y R^{3b} deben ser H. Por lo tanto, no puede haber solapamiento entre el documento D1 y el capítulo reivindicatorio de la solicitud en estudio.

En virtud del artículo 16 de la Decisión 486, de las modificaciones hechas al pliego reivindicatorio y de los argumentos arriba citados, se concluye que el documento D1 no afecta la novedad de las reivindicaciones 1 a 8 de la solicitud en estudio.

1.5.2 Nivel inventivo

El nivel inventivo de una solicitud se encuentra definido en el Artículo 18 de la Decisión 486 y se establece cuando *"si para una persona del oficio normalmente versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica."*

Teniendo en cuenta las modificaciones efectuadas al pliego reivindicatorio de la presente invención, es claro que los documentos D2, D3 y D4 no afectan el nivel inventivo de la presente solicitud. Para sustentar lo anteriormente expuesto, me permito presentar los siguientes argumentos:

En primer lugar, informamos a su Despacho que el reporte Internacional del examen preliminar de patentabilidad de la solicitud internacional PCT/US2010/044274, de la cual se desprende esta solicitud fase nacional, reconoció tanto la novedad como el nivel inventivo del capítulo reivindicatorio tal como fue presentado originalmente.

Por lo tanto, el pliego reivindicatorio que ahora se presenta, que es mucho más limitado que el originalmente presentado, claramente es inventivo con relación

a los documentos D2, D3 y D4, tomándolos solos o combinados. A continuación se presenta un breve resumen de las diferencias entre los compuestos de la presente invención de Fórmula 1 y aquellos revelados en los documentos D2-D4:

(a) La limitación del grupo A en el pliego reivindicatorio modificado asegura que el núcleo del grupo pirido pirimidinio no se parezca al núcleo de las estructuras del compuesto 3 en el documento D2, los compuestos 2-4 del documento D3, o el compuesto de la Fórmula I en el documento D4;

(b) La limitación que requiere la sustitución en R^{3d} aleja mucho más a los compuestos de la presente invención de los compuestos revelados en los documentos D2-D4;

(c) El grupo R^1 ahora debe ser un anillo aromático, el cual no se revela en el documento D2; además, los compuestos del documento D4 requiere que todos tengan un grupo de enlace de amida en la presente posición de R^1 position; y

(d) R^2 debe contener ahora un anillo aromático -- este elemento estructural no se revela en los documentos D2-D4;

Por lo tanto, al comparar los presentes compuestos de la Fórmula 1 de la solicitud en estudio con los compuestos revelados en los documentos D2-D4, es claro que se muestra diferencias significantes prácticamente en cada parte de la molécula.

El examinador podrá notar que se ha agregado una nueva reivindicación 8 en el nuevo capítulo reivindicatorio. Esta reivindicación está totalmente sustentada en la memoria descriptiva originalmente presentada. Por favor, ver páginas 103-104 de la descripción originalmente presentada. Es decir, estas estructuras que se muestran en la nueva reivindicación 8 corresponden a los 38 compuestos tal como aparecen numerados en las páginas 103 y 104 de la descripción de la presente solicitud. Así mismo, sus estructuras se muestran en las tablas índice de la descripción de la presente solicitud.

Por lo anteriormente expuesto, se considera que el nuevo pliego reivindicatorio cumple con los requisitos de patentabilidad establecidos en la Decisión 486.

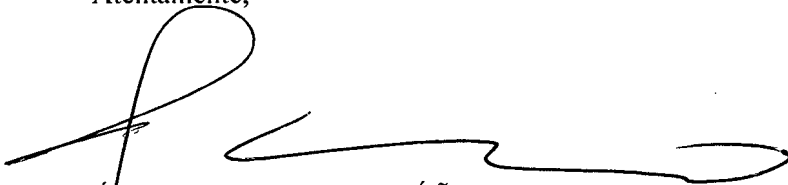
En este orden de ideas, tenemos que la invención propuesta por el solicitante si cumple con los requisitos de patentabilidad y de esta manera es susceptible de ostentar el título de patente de invención.

2. Solicitudes concedidas en otros países para esta misma invención.

A manera informativa, pongo en conocimiento del Examinador que la Oficina de Patentes Europea ya otorgó el capítulo reivindicatorio de la solicitud de patente Europea No. 10 740 817.1-1462 mucho más amplio que el que ahora se presenta en la solicitud de patente Colombiana. Aún cuando entiendo que estas decisiones de ninguna manera obligan al Despacho para decidir de igual forma, considero que por tratarse de una pregunta fáctica la determinación de la existencia de novedad, nivel inventivo y aplicación industrial, las decisiones de otras oficinas de patentes constituyen un antecedente persuasivo en la materia.

En virtud de lo anterior, solicito que se acepten las razones expuestas en el presente documento y en consecuencia, se otorgue el privilegio de patente de invención para el invento que se tramita en este expediente.

Atentamente,

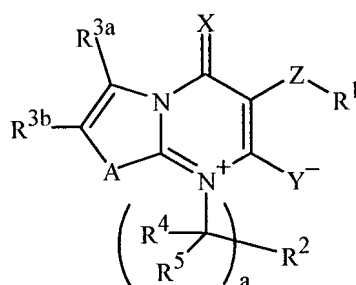


ÁLVARO CORREA ORDÓÑEZ
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- Anexos:
- Capítulo reivindicatorio modificado conformado por 8 reivindicaciones
 - Copia de la comunicación de otorgamiento del 18 de julio de 2013 de la Oficina de patentes Europea.
 - Capítulo reivindicatorio otorgado en Europa.

REIVINDICACIONES MODIFICADAS SOLICITUD DE PATENTE NO. 12.019.536

1. Un compuesto de la Fórmula 1, un N-óxido, o sal de este,



1

en donde

X es O;

Y es O;

A es $C(R^{3c})=C(R^{3d})$, siempre que la porción $C(R^{3c})=C(R^{3d})$ se oriente de manera que el átomo de carbono unido a R^{3d} se conecte directamente con el anillo de pirimidinio de la Fórmula 1;

Z es un enlace directo;

R^1 es fenilo o un anillo heteroaromático de 5 o 6 miembros, cada uno sustituido o no sustituido con hasta 3 sustituyentes independientemente seleccionados de R^{14} ;

R^2 es un anillo heteroaromático de 5 o 6 miembros, cada anillo sustituido o no sustituido con hasta 5

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sustituyentes seleccionados independientemente de R^{15} ;

R^{3a} , R^{3b} , R^{3c} son independientemente H o halógeno;

R^{3d} es halógeno, alquilo C_{1-8} , alcoxi C_{1-8} , haloalquilo C_{1-8} o haloalcoxi C_{1-8} ;

cada R^4 y R^5 es H;

cada R^{14} es independientemente halógeno, ciano, $C(=O)OR^{18}$, $C(=O)NR^{21}R^{19}$, $C(=NOR^{21})R^{22}$ o Z^1Q^t ; o alquilo C_{1-8} , alcoxi C_{1-8} o alquiltio C_{1-8} , cada uno sustituido o no sustituido con al menos un sustituyente independientemente seleccionado de halógeno;

cada Z^1 es independientemente un enlace directo o O;

cada Q^t es independientemente fenilo, piridinilo o pirimidinilo, cada uno sustituido o no sustituido con hasta 5 sustituyentes seleccionados independientemente del grupo que consiste de halógeno, ciano, alquilo C_{1-4} , haloalquilo C_{1-4} , alcoxi C_{1-4} y haloalcoxi C_{1-4} ;

cada R^{15} es independientemente halógeno o ciano; o alquilo C_{1-8} o alcoxi C_{1-8} , cada uno sustituido o no sustituido con al menos un sustituyente seleccionado independientemente de halógeno;

cada R^{17} es independientemente halógeno, ciano, alcoxi C_{1-4} o haloalcoxi C_{1-4} ;

cada R^{18} y R^{19} es independientemente Q^t , o alquilo C_1-C_6 ,
 alquenilo C_2-C_6 , alquinilo C_2-C_6 , cicloalquilo C_3-C_8 ,
 alquilocicloalquilo C_4-C_8 o cicloalquilalquilo C_4-C_8 ,
 cada uno sustituido o no sustituido con al menos un
 sustituyente seleccionado independientemente de R^{17} ;
 cada R^{21} es independientemente Q^t o H; o alquilo C_1-C_6 ,
 alquenilo C_2-C_6 , alquinilo C_2-C_6 , cicloalquilo C_3-C_8 ,
 alquilocicloalquilo C_4-C_8 o cicloalquilalquilo C_4-C_8 ,
 cada uno sustituido o no sustituido con al menos un
 sustituyente seleccionado independientemente de R^{17} ;
 cada R^{22} es independientemente Q^t o H; o alquilo C_1-C_6 ,
 alquenilo C_2-C_6 , alquinilo C_2-C_6 , cicloalquilo C_3-C_8 ,
 alquilocicloalquilo C_4-C_8 o cicloalquilalquilo C_4-C_8 ,
 cada uno sustituido o no sustituido con al menos un
 sustituyente seleccionado independientemente de R^{17} ;
 y
 a es 1, 2 ó 3;
 siempre que cuando A es $C(R^{3c})=C(R^{3d})$, R^{3c} es H o F,
 y R^{3d} es F, CF_2H o CF_3 , entonces, al menos uno de R^{3a}
 o R^{3b} es distinto de H.

2. Un compuesto de la reivindicación 1, en donde
 R^{21} es alquilo C_1-C_4 ;
 R^{22} es alquilo C_1-C_4 ; y
 a es 1.

3. Un compuesto de la reivindicación 2, en donde R^2 es piridinilo, pirimidinilo, oxazolilo o tiazolilo, cada uno sustituido o no sustituido con hasta 3 sustituyentes seleccionados independientemente de del grupo que consiste de halógeno y alquilo de C_1-C_4 .
4. Un compuesto de la reivindicación 3, en donde R^1 es fenilo o piridinilo, cada uno sustituido o no sustituido con hasta 3 sustituyentes seleccionados independientemente de R^{14} .
5. Un compuesto de la reivindicación 4, en donde R^{3a} , R^{3b} y R^{3c} son H; y R^{3d} es halógeno, alquilo C_1-C_4 o alcoxi C_1-C_4 .
6. Un compuesto de la reivindicación 1, que se selecciona del grupo que consiste en:

sal interna de 9-bromo-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometoxi)fenil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 9-bromo-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometil)fenil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 9-bromo-3-(3-bromofenil)-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 9-bromo-1-[(2-cloro-5-tiazolil)metil]-3-[3-cloro-5-(trifluorometil)fenilo]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 9-bromo-3-[3-cloro-2-fluoro-5-(trifluorometil)fenil]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 9-cloro-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometoxi)fenil]-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-3-[3-(trifluorometoxi)fenil]-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-3-[3-(trifluorometil)fenil]-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2-fluorofenil)-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 9-bromo-1-[(2-cloro-5-tiazolil)metil]-3-[3-cloro-5-(trifluorometoxi)fenil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[3-cloro-5-(trifluorometoxi)fenil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2,6-difluorofenil)-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-3-[3-[(trifluorometil)tio]fenil]-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-(2-fluorofenil)-2-hidroxi-9-metil-4-oxo-1-(5-pirimidinilmetil)-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-3-fenil-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[2-fluoro-5-(trifluorometil)fenil]-2-hidroxi-9-metil-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(4-fluorofenil)-2-hidroxi-9-metil-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metoxi-4-oxo-3-[3-(trifluorometoxi)fenil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[2-fluoro-5-(trifluorometil)fenil]-2-hidroxi-9-metoxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-[2-metoxi-5-(trifluorometoxi)fenil]-9-metil-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-(2-metoxifenil)-9-metil-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-[3-cloro-2-fluoro-5-(trifluorometil)fenil]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-3-[4-[(trifluorometil)tio]fenil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2,4-difluorofenil)-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 3-(3-cloro-2-fluorofenil)-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-(3-metoxifenil)-9-metil-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 7-bromo-1-[(2-cloro-5-tiazolil)metil]-3-[2-fluoro-3-(trifluorometil)fenil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-(3-yodofenil)-9-metil-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 2-hidroxi-9-metil-1-[(2-metil-5-tiazolil)metil]-4-oxo-3-[3-(trifluorometoxi)fenil]-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 2-hidroxi-9-metil-1-[(2-metil-5-tiazolil)metil]-4-oxo-3-[3-(trifluorometil)fenil]-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 3-(2-fluorofenil)-2-hidroxi-9-metil-1-[(2-metil-5-tiazolil)metil]-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 3-[3-bromo-5-(trifluorometil)fenil]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 3-[3-bromo-5-(trifluorometoxi)fenilo]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[3-cloro-5-(trifluorometil)fenil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[3-fluoro-5-(trifluorometil)fenil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-(3-yodo-5-metoxifenil)-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-(3-bromofenil)-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-3-[3'-(trifluorometoxi)[1,1'-bifenil]-3-il]-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2',5'-difluoro[1,1'-bifenil]-3-il)-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-[3-(6-cloro-3-piridinil)-5-(trifluorometoxi)fenil]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio y

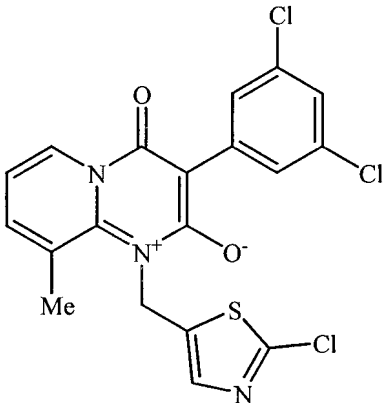
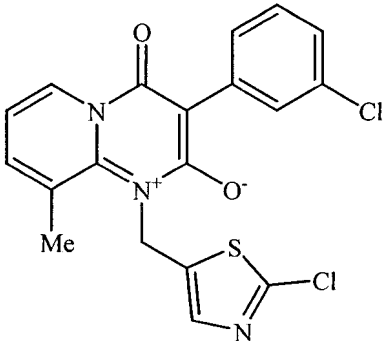
sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2',4'-dicloro[1,1'-bifenil]-3-il)-2-hidroxi-9-metil-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio.

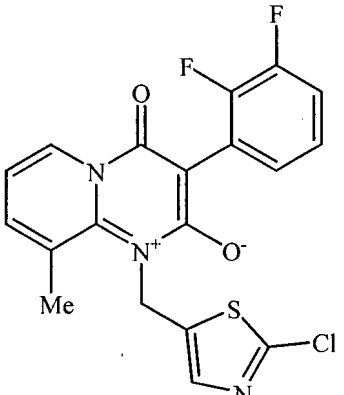
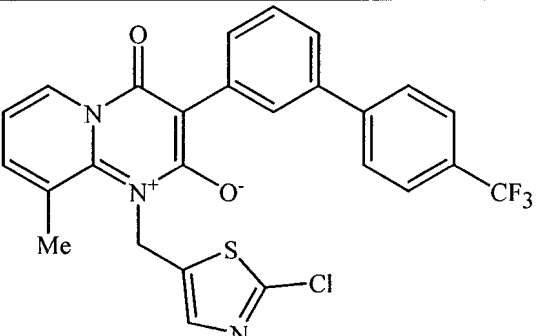
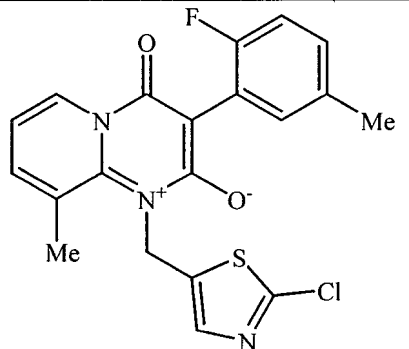
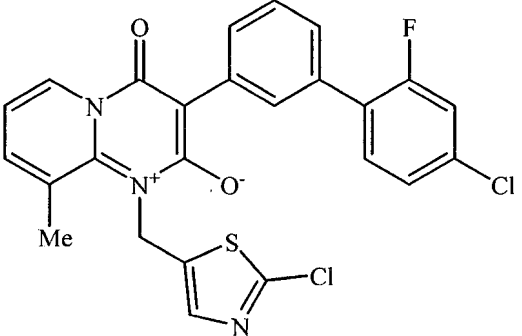
7. Una composición que comprende un compuesto de conformidad con la reivindicación 1 y al menos un compuesto adicional biológicamente activo seleccionado del grupo que

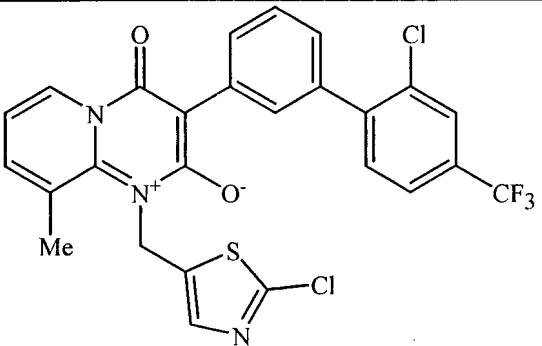
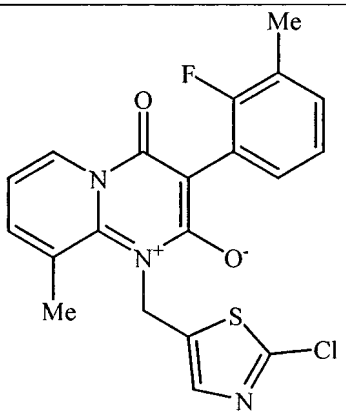
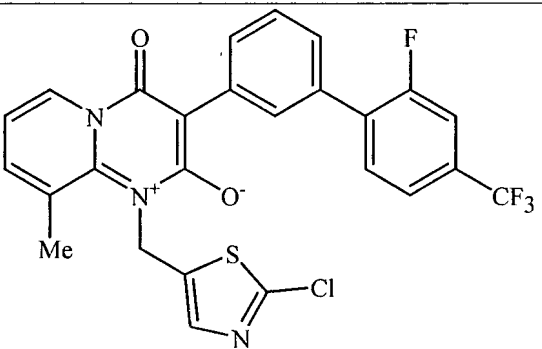
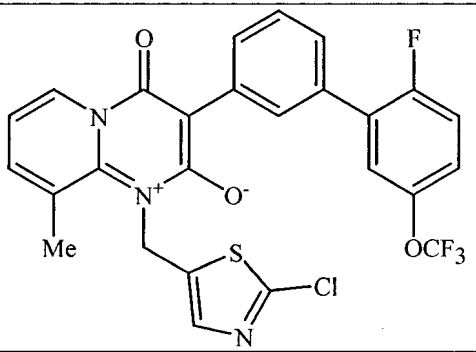
consiste de abamectina, acefato, acequinocilo, acetamiprid, acrinatrina, amidoflomet, amitraz, avermectina, azadiractina, metil azinfos, bensultap, bifentrina, bifenazato, bistriflurón, borato, buprofezin, cadusafos, carbarilo, carbofurano, cartap, carzol, clorantraniliprol, clorfenapir, clorfluazurón, clorpirifos, clorpirifos-metil, cromafenozida, clofentezina, clotianidina, ciantraniliprol, ciflumetofén, ciflutrina, beta-ciflutrina, cihalotrina, gamma-cihalotrina, lambda-cihalotrina, cipermetrina, alfa-cipermetrina, zeta-cipermetrina, ciromazina, deltametrina, diafentiurón, diazinón, dieldrina, diflubenzurón, dimeflutrina, dimehipo, dimetoato, dinotefurán, diofenolán, emamectina, ensodulfán, esfenvalerato, etiprol, etofenprox, etoxazol, óxido de fenbutatina, fenotiocarb, fenoxicarb, fenpropatrina, fenvaleriato, fipronil, flonicamid, flubendiamida, flucitrinato, flufenerim, flufenoxurón, fluvalinato, tau-fluvalinato, fonofós, formetanato, fostiazato, halofenozida, hexaflumuron, hexitiazox, hidrametilnón, imidacloprid, indoxacarb, jabones insecticidas, isofenfos, lufenurón, malatión, metaflumizona, metaldehído, metamidofos, metidation, metiodicarb, metomilo, metopreno, metoxicloro, metoflutrina, monocrotofós, metoxifenoazida, nitenpiram, nitiazina, novalurón, noviflumurón, oxamil, parationa, parationa-metil, permetrina, forato, fosalona, fosmet, fosfamidón, pirimicarb, profenofos, proflutrina, propargita, protrifenbuto, pimetrozina, pirafluprol, piretrina, piridabén, piridalil, pirifluquinazón, piriprole, piriproxifén, rotenona, rianodina, espinetoram, espinosad, espirodiclofén,

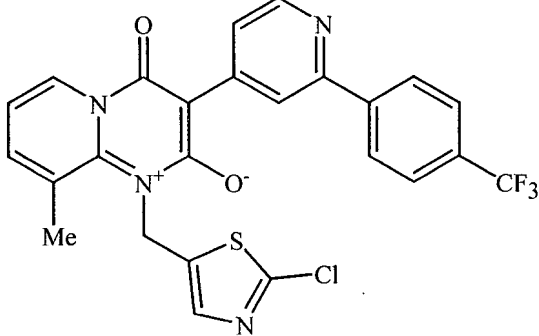
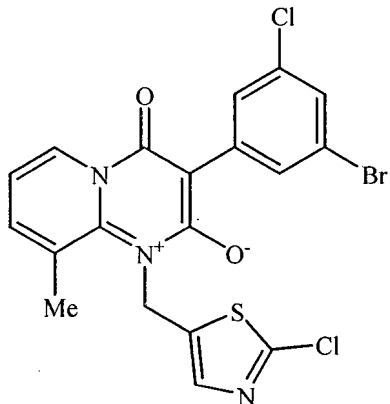
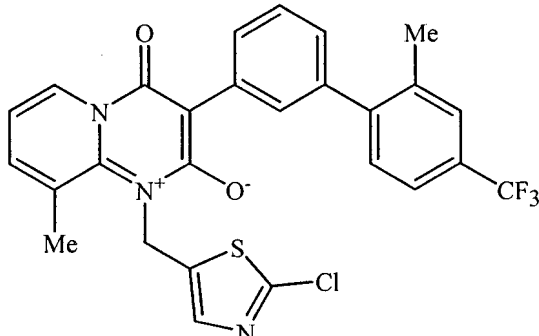
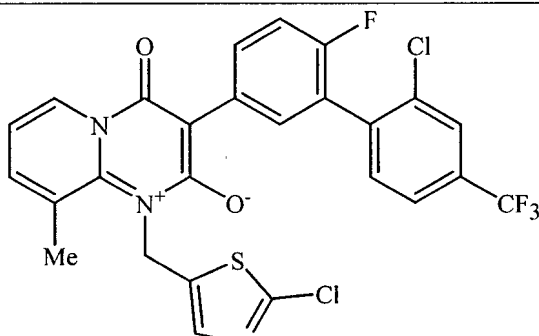
espiromesifén, espirotetramat, sulprofos, sulfoxaflor, tebufenozida, tebufenpirad, teflubenzurón, teflutrina, terbufos, tetraclorvinfós, tetrametrina, tiacloprid, tiametoxam, tiodicarb, tiosultap-sodio, tolfenpirad, tralometrina, triazamato, triclorfón, triflumurón, *Bacillus thuringiensis* delta-endotoxinas, bacterias entomopatógenas, virus entomopatógenos y hongos entomopatógenos.

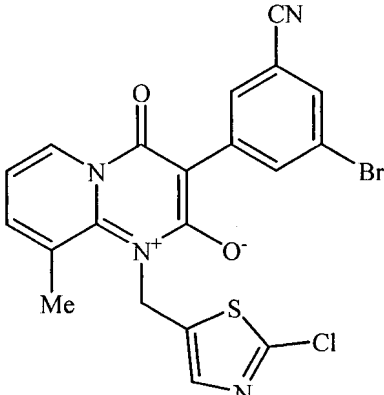
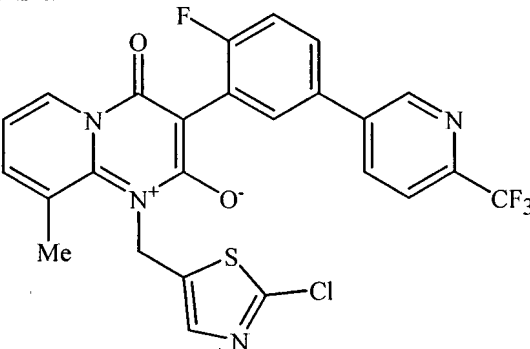
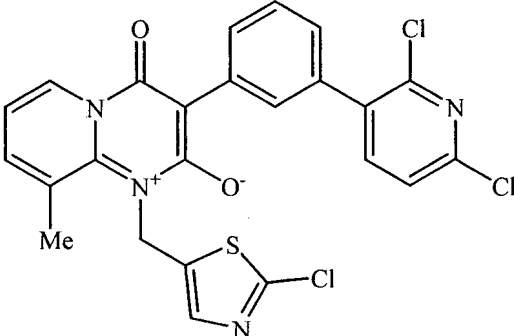
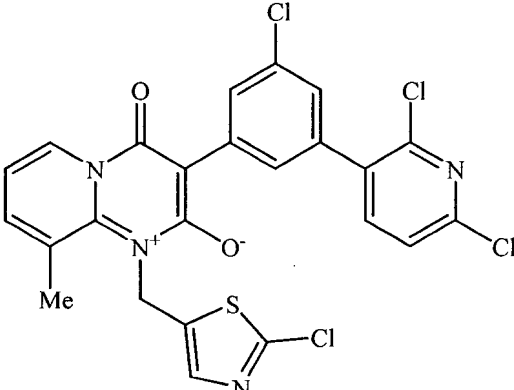
8. Un compuesto de la reivindicación 1 que se selecciona del grupo que consiste de:

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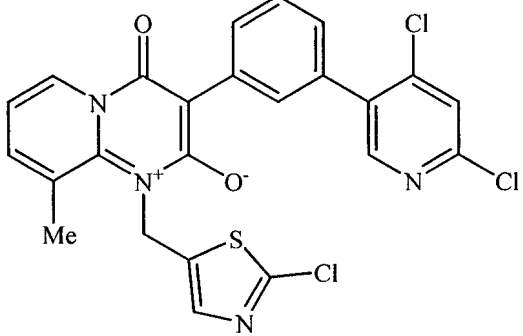
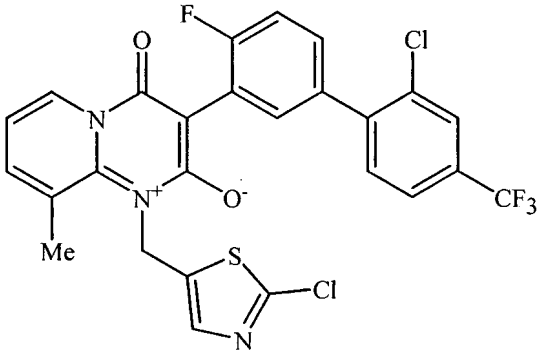
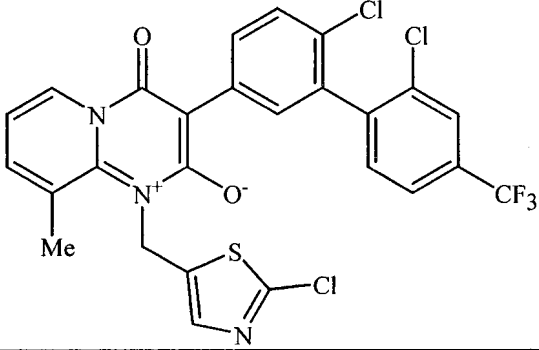
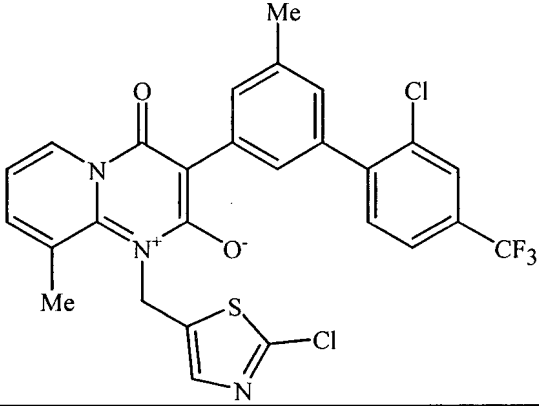
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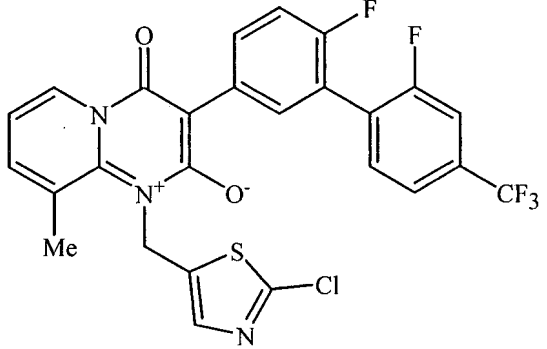
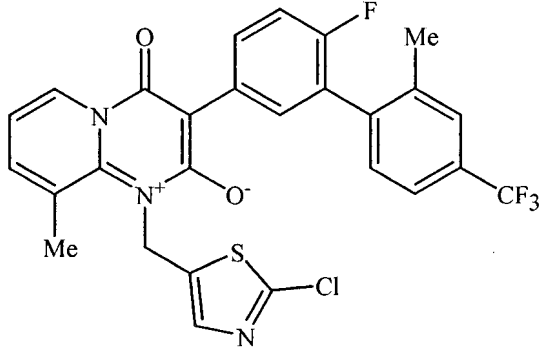
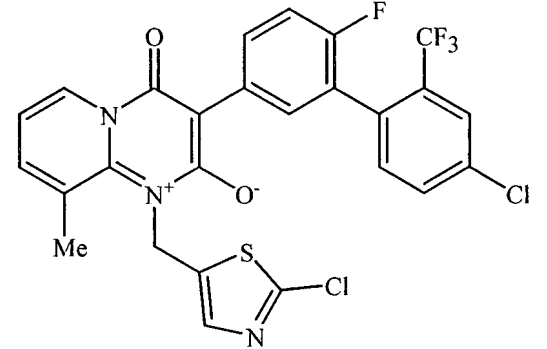
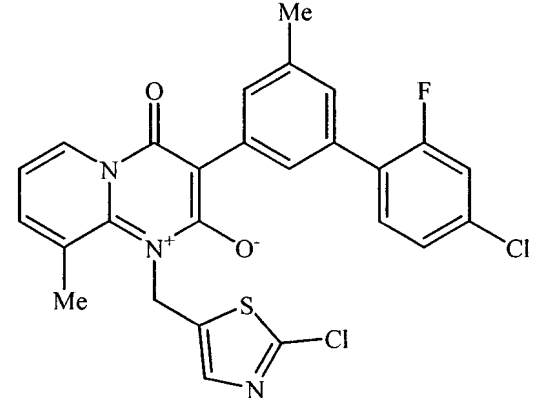
 <chem>Cc1ccc2c(c1)c(=O)n(c2)CSC3=CC(=CN=C3)ClC4=CC=C(C=C4)C5=CC=C(C=C5)C(Cl)=CC=C5C(F)(F)F</chem>	,
 <chem>Cc1ccc2c(c1)c(=O)n(c2)CSC3=CC(=CN=C3)ClC4=CC=C(C=C4)C5=CC(=CC=C5)C(F)=CC=C5C</chem>	,
 <chem>Cc1ccc2c(c1)c(=O)n(c2)CSC3=CC(=CN=C3)ClC4=CC=C(C=C4)C5=CC=C(C=C5)C(F)=CC=C5C(F)(F)F</chem>	,
 <chem>Cc1ccc2c(c1)c(=O)n(c2)CSC3=CC(=CN=C3)ClC4=CC=C(C=C4)C5=CC=C(C=C5)C(F)=CC=C5COC(F)(F)F</chem>	,

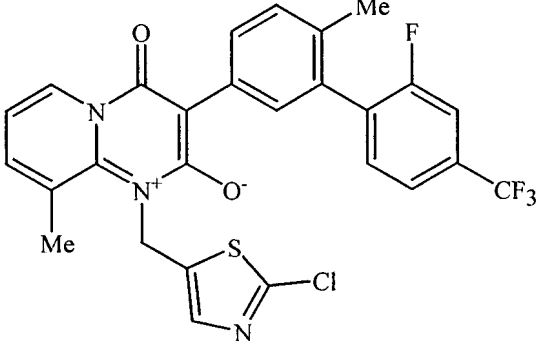
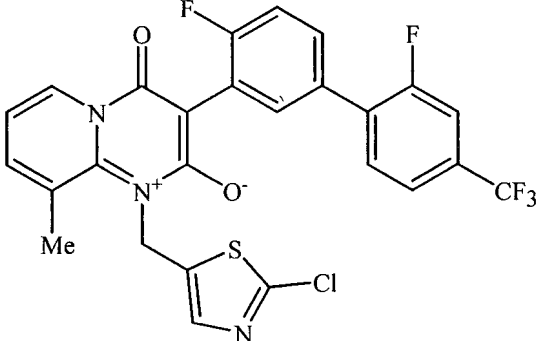
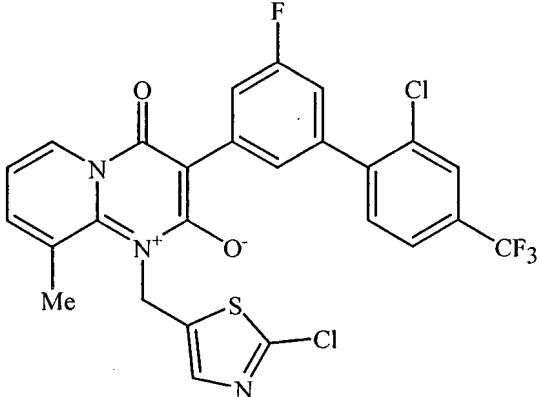
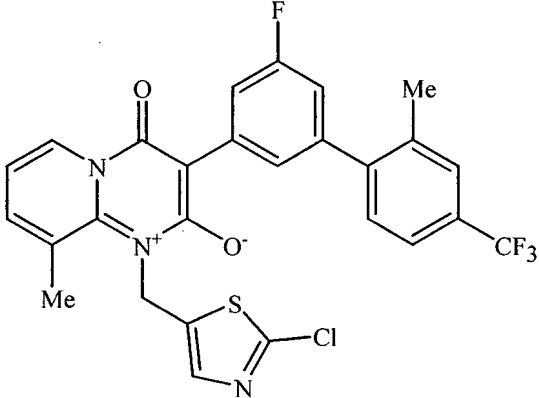
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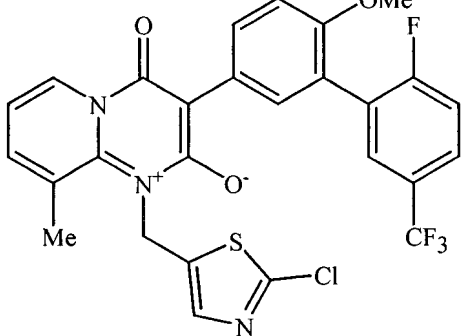
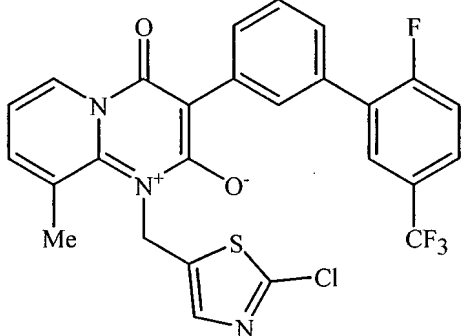
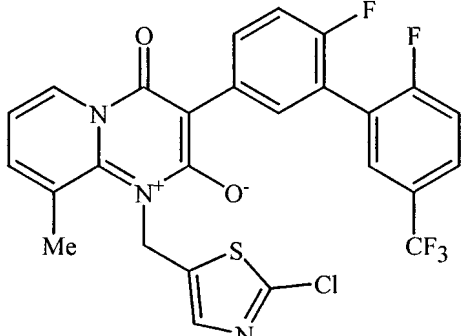
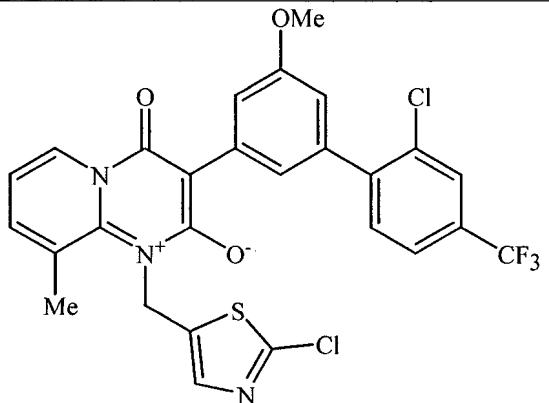
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 <chem>Cc1cccc2c1c(=O)c(c([O-])n2CNC3=CC=NC=C3Cl)C4=CC=C(C=C4)C5=CC=C(C=C5)C(F)=CC(F)=C5</chem>	,
 <chem>Cc1cccc2c1c(=O)c(c([O-])n2CNC3=CC=NC=C3Cl)C4=CC=C(C=C4)C(F)=CC(F)=C5</chem>	,
 <chem>Cc1cccc2c1c(=O)c(c([O-])n2CNC3=CC=NC=C3Cl)C4=CC=C(C=C4)C(F)=CC(F)=C5</chem>	,
 <chem>Cc1cccc2c1c(=O)c(c([O-])n2CNC3=CC=NC=C3Cl)C4=CC=C(C=C4)C(F)=CC(F)=C5</chem>	,

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 <chem>Cc1cccc2c1n(c(=O)c2C3=CC=C(C=C3)C(F)C(F)(F)=CC=C3)C4=CC=CC(=C4)S=C(Cl)N=C4</chem>	,
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 <chem>Cc1cccc2c1n(c(=O)c2C3=CC=C(C=C3)C(Cl)C(F)(F)=CC=C3)C4=CC=CC(=C4)S=C(Cl)N=C4</chem>	,

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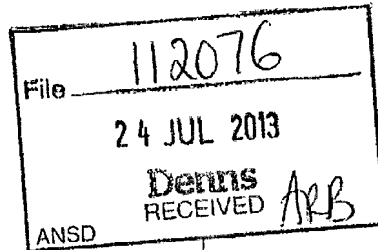
Reissued 71(3)

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Application No. 10 740 817.1 - 1462	Ref. 61.55.112076	Date 18.07.2013
Applicant E. I. du Pont de Nemours and Company		

Communication under Rule 71(3) EPC

1. Intention to grant

You are informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings and the related bibliographic data as indicated below.

A copy of the relevant documents is enclosed.

1.1 In the text for the Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT
RO SE SI SK SM TR

Description, Pages

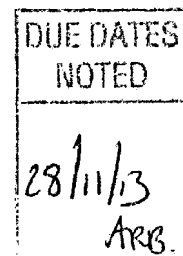
4-11, 14-18, 20-30, as published
34-40, 42-46, 48-55,
57-60, 62, 63, 66,
68-91, 95-119,
121-182, 188,
192-197, 207-258,
260-262, 264-288,
291-295, 301

1-3, 12, 12a, 13, 19, received on
31-33, 41, 47, 56, 61,
64, 65, 67, 92-94,
120, 183-187,
189-191, 198, 199,
202-206, 259, 263,
289, 290, 296-300,
302, 303

17-09-2012 with letter of

14-09-2012

Claims, Numbers



Registered letter

EPO Form 2004C 06.13TRI

1-6, 7(part 1)	received on	24-05-2011	with letter of	24-05-2011
7(part 2), 8-14	received on	21-03-2013	with letter of	21-03-2013

1.2 Bibliographic data

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States, the registered name(s) of the applicant(s) and the other bibliographic data are shown on the **enclosed EPO Form 2056**.

2. Invitation

You are invited, **within a non-extendable period of four months** of notification of this communication,

2.1 to EITHER approve the text communicated above and verify the bibliographic data (R. 71(5) EPC)

(1)	by filing a translation of the claim(s) in the other two official languages of the EPO		
		Fee code	EUR
(2a)	by paying the fee for grant including the fee for publication: minus any amount already paid (R. 71a(5) EPC):	007	875.00 0.00
		Total amount:	875.00
(3)	by paying additional claims fees under Rule 71(4) EPC; number of claims fees payable: 0 minus any amount already paid (R. 71a(5) EPC):	016	0.00 0.00
		Total amount:	0.00

Important: If the translations of the claims and fees have already been filed and paid respectively in reply to a previous communication under Rule 71(3) EPC, e.g. in the case of resumption of examination after approval (see Guidelines C-V, 6), **agreement as to the text to be granted** (R. 71a(1) EPC) must be expressed within the same time limit (e.g. by approving the text and verifying the bibliographic data, by confirming that grant proceedings can go ahead with the documents on file and/or by stating which translations of the claims already on file are to be used).

Note 1: See "Important notes concerning fee payments" below.
Note 2: Any overpaid "minus" amounts will be refunded when the decision to grant (EPO Form 2006A) has been issued.

2.2 OR, in the case of disapproval, to request reasoned amendments or corrections to the text communicated above or keep to the latest text submitted by you (R. 71(6) EPC).

In this case the translations of the claims and fee payments mentioned under point 2.1 above are NOT due.

The terms "amendment(s)" and "correction(s)" refer only to amendments or corrections of the application documents and not of other documents (e.g. bibliographic data, the designation of the inventor, etc.).

If filing amendments, you must identify them and indicate the basis for them in the application as filed. Failure to meet either requirement may lead to a communication from the Examining Division requesting that you correct this deficiency (R. 137(4) EPC).

2.3 Bibliographic data

Where you request a change or correction of bibliographic data in response to the Rule 71(3) communication, this will **not** cause the sending of a second communication under Rule 71(3) EPC. You will still have to pay the fees and file translations in reply to the Rule 71(3) communication in the case of 2.1 above, unless you also file a reasoned request for amendments or corrections in response to the Rule 71(3) communication (see case 2.2 above).

3. Loss of rights

If neither of the two possible actions above (see points 2.1 or 2.2) is performed in due time, the European patent application will be deemed to be withdrawn (R. 71(7) EPC).

4. Further procedure

4.1 In the case of point 2.1 above

- 4.1.1 The decision to grant the European patent will be issued, and the **mention of the grant** of the patent will be published in the European Patent Bulletin, if the requirements concerning the translation of the claims and the payment of all fees are fulfilled and there is agreement as to the text to be granted (R. 71a(1) EPC).

Note on payment of the renewal fee:

If a renewal fee becomes due before the next possible date for publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee have been paid (R. 71a(4) EPC).

Under Article 86(2) EPC, the obligation to pay renewal fees to the European Patent Office terminates with the payment of the renewal fee due in respect of the year in which the mention of the grant of the European patent is published.

Note on payment of the designation fee(s):

If the designation fee(s) become(s) due after the communication under Rule 71(3) EPC, the mention of the grant of the European patent will not be published until the designation fee(s) has/have been paid (R. 71a(3) EPC).

- 4.1.2 After publication, the **European patent specification** can be downloaded free of charge from the EPO publication server <https://data.epo.org/publication-server> or ordered from the Vienna sub-office upon payment of a fee (OJ EPO 2005, 126).

Upon request in writing each proprietor will receive the certificate for the European patent together with a copy of the patent specification, provided that the request is filed within the time limit of Rule 71(3) EPC. If such a request has been previously filed, it has to be confirmed within the time limit of Rule 71(3) EPC. The requested copy is free of charge. If the request is filed after expiry of the Rule 71(3) time limit, the certificate will be delivered without a copy of the patent specification (R. 74 EPC, Decision of the President of the EPO, Special edition No. 3, OJ EPO 2007, D.2.).

4.1.3 Filing of translations in the Contracting States

As regards translation requirements prescribed by the Contracting States under Article 65(1) EPC, please consult the website of the European Patent Office

www.epo.org → Law & practice → Legal texts, National law relating to the EPC

www.epo.org → Law & practice → All Legal texts → London Agreement

In the case of a valid extension

As regards translation requirements prescribed by the Extension States, please consult the website of the European Patent Office

www.epo.org → Law & practice → Legal texts, National law relating to the EPC

Failure to supply a prescribed translation in a Contracting State or an Extension State may result in the patent being deemed to be void *ab initio* in the State concerned (Art. 65(3) EPC).

4.2 In case of 2.2 above

If the present communication under Rule 71(3) EPC is based on upon an auxiliary request and, within the time limit, you maintain the main request or a higher ranking request which is not allowable, the application will be refused (Art. 97(2) EPC).

If the Examining Division gives its consent to the requested amendments or corrections, it will issue a new communication under Rule 71(3) EPC; otherwise, it shall resume the examination proceedings (R. 71(6) EPC).

5. Filing of a divisional application

Any divisional application relating to this European patent application must be filed directly with the European Patent Office in Munich, The Hague or Berlin and will be in the language of the proceedings for the present application, or if the latter was not in an official language of the EPO, the divisional application may be filed in the language of the present application as filed (see Article 76(1) and Rule 36(2) EPC). Any such divisional application must be filed while the present application is still pending and the time limit for filing divisional applications must be observed (R. 36(1) EPC; Guidelines A-IV, 1.1.1).

6. Important notes concerning fee payments

6.1 For all payments, please refer to the relevant **fee code(s)**.

6.2 Automatic debiting procedure

The fee for grant, including the fee for publication, and any additional claims fees due under Rule 71(4) EPC will be debited automatically on the date of filing of the translations of the claims, or on the last day of the period of this communication. However, if the designation fee(s) become(s) due as set out in Rule 71a(3) EPC and/or a renewal fee becomes due as set out in Rule 71a(4) EPC, these should be paid separately by another permitted way of payment in order not to delay the publication of the mention of the grant. The same applies in these circumstances to the payment of extension fees. For further details see the Arrangements for the automatic debiting procedure (AAD) and accompanying information from the EPO concerning the automatic debiting procedure (Annexes A.1 and A.2 to the Arrangements for deposit accounts (ADA) in Supplement to OJ EPO 3/2009).

6.3 Fee amounts

Following any amendment to the Rules relating to Fees, the amount(s) mentioned in this communication may be different from the amount(s) **actually due on the date of payment**. The latest version of the Schedule of fees and expenses, published as a Supplement to the Official Journal of the EPO, is also available on the EPO website (www.epo.org) and can be found under www.epo.org/schedule-of-fees, which allows you to view, download and search for individual fee amounts, both current and previous.

6.4 **Payments by cheque** delivered or sent direct to the EPO are no longer accepted as from 1 April 2008 (see OJ EPO 2007, 626).

Date 18.07.2013

Sheet 5

Application No.: 10 740 817.1

Examining Division:

Chairman:	Rudolf, Manfred
2nd Examiner:	Schmid, Arnold
1st Examiner:	Bareyt, Sébastien



Pfützner, Gabriele
For the Examining Division
Tel. No.: +49 89 2399 - 8032

Enclosure(s): Text intended for grant(327 pages)

EPO Form 2056

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Annex to EPO Form 2004, Communication pursuant to Rule 71(3) EPC

Bibliographical data of European patent application No. 10 740 817.1

For the intended grant of the European patent, the bibliographical data are set out below, for information:

Title of invention:

- MESOIONISCHE PESTIZIDE
- MESOIONIC PESTICIDES
- PESTICIDES MÉSIOINIQUES

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*) If the time limit for the payment of designation fees according to Rule 39(1) EPC has not yet expired and the applicant has not withdrawn any designation, **all Contracting States/Extension States** are currently still deemed to be designated. See also Rule 71(8) EPC and, if applicable, the above Note to users of the automatic debiting procedure.

**) If two or more applicants have designated different Contracting States, this is indicated here.

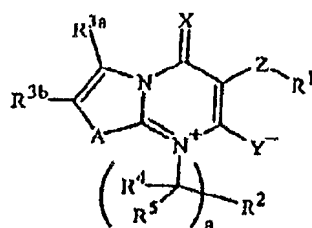
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CLAIMS

What is claimed is:

1. A compound of Formula 1, an *N*-oxide, or salt thereof,



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wherein

- X is O or S;
- Y is O or S;
- A is O, S, NR^{3c} or C(R^{3c})=C(R^{3d}), provided that the C(R^{3c})=C(R^{3d}) moiety is oriented so the carbon atom bonded to R^{3d} is connected directly to the pyrimidinium ring of Formula 1;
- Z is a direct bond, O, S(O)_n, NR⁶, C(R⁷)₂O, OC(R⁷)₂, C(=X¹), C(=X¹)E, EC(=X¹), C(=NOR⁸) or C(=NN(R⁶)₂);
- X¹ is O, S or NR⁹;
- E is O, S or NR^{9a};
- R¹ is a 3- to 10-membered ring or a 7- to 11-membered ring system, each ring or ring system containing ring members selected from carbon atoms and up to 4 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 4 N, wherein up to 3 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_n(=NR²⁴)₂, each ring or ring system optionally substituted with up to 5 substituents independently selected from R¹⁴;
- R² is H, halogen, cyano, hydroxy, amino, nitro, OCN, SCN, ClIO, C(=O)OII, C(=O)NH₂, C(=S)NH₂, SO₂NH₂, C(=O)R¹⁸, C(=O)OR¹⁸, NHR¹⁸, NR¹⁸R¹⁹, C(=O)NR²¹R¹⁹, C(=S)NR²¹R¹⁹, SO₂NR²¹R¹⁹, OC(=O)R²¹, OC(=O)OR¹⁸, OC(=O)NR²¹R¹⁹, N(R²¹)C(=O)R²¹, N(R²¹)C(=O)OR¹⁹, N(R²¹)C(=O)NR²¹R²², OSO₂R¹⁸, OSO₂NR²¹R²², NR²¹SO₂R¹⁸, NR²¹SO₂NR²¹R²² or Si(R¹⁸R¹⁹R²⁰); or C₁-C₈ alkyl, C₂-C₈ alkenyl, C₂-C₈ alkynyl, C₃-C₁₀ cycloalkyl, C₄-C₁₀ alkylcycloalkyl, C₄-C₁₀ cycloalkylalkyl, C₆-C₁₄ cycloalkylcycloalkyl, C₅-C₁₀

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alkylcycloalkylalkyl, C₃-C₈ cycloalkenyl, C₁-C₈ alkoxy, C₃-C₈ cycloalkoxy, C₄-C₁₀ cycloalkylalkoxy, C₂-C₈ alkenyloxy, C₂-C₈ alkynyloxy, C₁-C₈ alkylthio, C₁-C₈ alkylsulfinyl, C₁-C₈ alkylsulfonyl, C₃-C₈ cycloalkylthio, C₃-C₈ cycloalkylsulfinyl, C₃-C₈ cycloalkylsulfonyl, C₄-C₁₀ cycloalkylalkylthio, C₄-C₁₀ cycloalkylalkylsulfinyl, C₄-C₁₀ cycloalkylalkylsulfonyl, C₂-C₈ alkenylthio, C₂-C₈ alkenylsulfinyl, C₂-C₈ alkenylsulfonyl, C₂-C₈ alkynylthio, C₂-C₈ alkynylsulfinyl or C₂-C₈ alkynylsulfonyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³ and Si(R¹⁰)₃; or a 3- to 10-membered ring or a 7- to 11-membered ring system, each ring or ring system containing ring members selected from carbon atoms and up to 4 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 4 N, wherein up to 3 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_n(=NR²⁴)_z, each ring or ring system optionally substituted with up to 5 substituents independently selected from R¹⁵;

R^{3a}, R^{3b}, R^{3c} and R^{3d} are independently H, halogen, cyano, hydroxy, amino, nitro, SF₅, OCN, SCN, CHO, C(=O)OH, C(=O)NH₂, C(=S)NH₂, SO₂NH₂, C(=O)R¹⁸, C(=O)OR¹⁸, NHR¹⁸, NR¹⁸R¹⁹, C(=O)NR²¹R¹⁹, C(=S)NR²¹R¹⁹, SO₂NR²¹R¹⁹, OC(=O)R²¹, OC(=O)OR¹⁸, OC(=O)NR²¹R¹⁹, N(R²¹)C(=O)R²¹, N(R²¹)C(=O)OR¹⁹, N(R²¹)C(=O)NR²¹R²², OSO₂R¹⁸, OSO₂NR²¹R²², NR²¹SO₂R¹⁸, NR²¹SO₂NR²¹R²², Si(R¹⁸R¹⁹R²⁰) or Z¹Q¹; or C₁-C₈ alkyl, C₂-C₈ alkenyl, C₂-C₈ alkynyl, C₃-C₁₀ cycloalkyl, C₄-C₁₀ alkylcycloalkyl, C₄-C₁₀ cycloalkylalkyl, C₆-C₁₄ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₈ cycloalkenyl, C₁-C₈ alkoxy, C₃-C₈ cycloalkoxy, C₄-C₁₀ cycloalkylalkoxy, C₂-C₈ alkenyloxy, C₂-C₈ alkynyloxy, C₁-C₈ alkylthio, C₁-C₈ alkylsulfinyl, C₁-C₈ alkylsulfonyl, C₃-C₈ cycloalkylthio, C₃-C₈ cycloalkylsulfinyl, C₃-C₈ cycloalkylsulfonyl, C₄-C₁₀ cycloalkylalkylthio, C₄-C₁₀ cycloalkylalkylsulfinyl, C₄-C₁₀ cycloalkylalkylsulfonyl, C₂-C₈ alkenylthio, C₂-C₈ alkenylsulfinyl, C₂-C₈ alkenylsulfonyl, C₂-C₈ alkynylthio, C₂-C₈ alkynylsulfinyl or C₂-C₈ alkynylsulfonyl, each unsubstituted or substituted with at least one substituent independently selected from R¹⁷; or R^{3a} and R^{3b}, or R^{3b} and R^{3c}, or R^{3c} and R^{3d} are taken together with the adjacent carbon atoms to which they are attached to form a 5- to 7-membered carbocyclic or heterocyclic ring, each ring containing ring members selected from carbon atoms and up to 3 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 3 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_n, each ring optionally substituted with up to 3 substituents independently selected from the group

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consisting of halogen, cyano, hydroxy, amino, nitro, C(=O)OH, C(=O)NH₂, SO₂NH₂, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₄ alkenyl, C₂-C₄ haloalkenyl, C₂-C₄ alkynyl, C₂-C₄ haloalkynyl, C₃-C₇ cycloalkyl, C₃-C₇ halocycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ haloalkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₄-C₈ halocycloalkylalkyl, C₁-C₆ alkoxy, C₁-C₆ haloalkoxy, C₂-C₆ alkoxycarbonyl, C₂-C₆ haloalkoxycarbonyl, C₂-C₆ alkylcarbonyl and C₂-C₆ haloalkylcarbonyl; R^{3e} is H, hydroxy, amino, CHO, C(=O)NH₂, C(=S)NH₂, SO₂NH₂, C(=O)R¹⁸, C(=O)OR¹⁸, NHR¹⁸, NR¹⁸R¹⁹, C(=O)NR²¹R¹⁹, C(=S)NR²¹R¹⁹, SO₂NR²¹R¹⁹, OC(=O)R²¹, OC(=O)OR¹⁸, OC(=O)NR²¹R¹⁹, N(R²¹)C(=O)R²¹, N(R²¹)C(=O)OR¹⁹, N(R²¹)C(=O)NR²¹R²², OSO₂R¹⁸, OSO₂NR²¹R²², NR²¹SO₂R¹⁸, NR²¹SO₂NR²¹R²², Si(R¹⁸R¹⁹R²⁰) or Z¹Q¹; or C₁-C₈ alkyl, C₂-C₈ alkenyl, C₂-C₈ alkynyl, C₃-C₁₀ cycloalkyl, C₄-C₁₀ alkylcycloalkyl, C₄-C₁₀ cycloalkylalkyl, C₆-C₁₄ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₈ cycloalkenyl, C₁-C₈ alkoxy, C₃-C₈ cycloalkoxy, C₄-C₁₀ cycloalkylalkoxy, C₂-C₈ alkenyloxy, C₂-C₈ alkynyloxy, C₁-C₈ alkylsulfinyl, C₁-C₈ alkylsulfonyl, C₃-C₈ cycloalkylsulfinyl, C₃-C₈ cycloalkylsulfonyl, C₄-C₁₀ cycloalkylalkylsulfinyl, C₄-C₁₀ cycloalkylalkylsulfonyl, C₂-C₈ alkenylsulfinyl, C₂-C₈ alkenylsulfonyl, C₂-C₈ alkynylsulfinyl or C₂-C₈ alkynylsulfonyl, each unsubstituted or substituted with at least one substituent independently selected from R¹⁷; or R^{3e} and R^{3b} are taken together with the adjacent carbon atoms to which they are attached to form a 5- to 7-membered carbocyclic or heterocyclic ring, each ring containing ring members selected from carbon atoms and up to 3 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 3 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_n, each ring optionally substituted with up to 3 substituents independently selected from the group consisting of halogen, cyano, hydroxy, amino, nitro, C(=O)OH, C(=O)NH₂, C(=S)NH₂ or SO₂NH₂; or C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₂ cycloalkylcycloalkyl, C₅-C₈ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, C₁-C₆ alkoxy, C₃-C₆ cycloalkoxy, C₄-C₈ cycloalkylalkoxy, C₂-C₆ alkenyloxy or C₂-C₆ alkynyloxy, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen,

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cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹,
C(-O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³ and Si(R¹⁰)₃; or

R⁴ and R⁵ are taken together with the carbon atom to which they are attached to form a 3- to 7-membered ring containing ring members selected from carbon atoms and up to 2 heteroatoms independently selected from one O, one S, and up to 2 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring member is selected from S, S(O) or S(O)₂, said ring optionally substituted with up to 4 substituents independently selected from the group consisting of halogen, cyano and C₁-C₄ alkyl;

each R⁶ is independently H; or C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, C₂-C₆ alkylcarbonyl or C₂-C₆ alkoxy carbonyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(-O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³ and Si(R¹⁰)₃; or

two R⁶ substituents are taken together with the nitrogen atom to which they are attached to form a 3- to 7-membered ring containing ring members selected from carbon atoms and up to 2 heteroatoms independently selected from one O, one S, and up to 2 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring member is selected from S, S(O) or S(O)₂, said ring optionally substituted with up to 4 substituents independently selected from the group consisting of halogen, cyano and C₁-C₄ alkyl;

each R⁷ and R⁸ is independently H; or C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, C₂-C₆ alkylcarbonyl or C₂-C₆ alkoxy carbonyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³ and Si(R¹⁰)₃;

each R⁹ is independently C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, C₂-C₆ alkylcarbonyl or C₂-C₆ alkoxy carbonyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³ and Si(R¹⁰)₃;

each R^{9a} is independently H; or C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, C₂-C₆

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alkylcarbonyl or C₂-C₆ alkoxy carbonyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³ and Si(R¹⁰)₃;

each R¹⁰ and R¹¹ is independently C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl or C₃-C₆ cycloalkenyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₁-C₄ alkylthio, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ haloalkylthio, C₁-C₄ haloalkylsulfinyl, C₁-C₄ haloalkylsulfonyl, C₁-C₄ alkylamino, C₂-C₈ dialkylamino, C₃-C₆ cycloalkylamino, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylcarbonyl, C₂-C₆ alkoxy carbonyl, C₂-C₆ alkylcarbonyloxy, C₂-C₆ alkylcarbonylthio, C₂-C₆ alkylaminocarbonyl, C₃-C₈ dialkylaminocarbonyl and C₃-C₆ trialkylsilyl; or phenyl or a 5- or 6-membered heteroaromatic ring, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of C₁-C₆ alkyl, C₁-C₆ haloalkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₁-C₄ alkylthio, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ haloalkylthio, C₁-C₄ haloalkylsulfinyl, C₁-C₄ haloalkylsulfonyl, C₁-C₄ alkylamino, C₂-C₈ dialkylamino, C₃-C₆ cycloalkylamino, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylcarbonyl, C₂-C₆ alkoxy carbonyl, C₂-C₆ alkylcarbonyloxy, C₂-C₆ alkylcarbonylthio, C₂-C₆ alkylaminocarbonyl, C₃-C₈ dialkylaminocarbonyl and C₃-C₆ trialkylsilyl;

each R¹² and R¹³ is independently C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl or C₃-C₆ cycloalkenyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₁-C₄ alkylthio, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ haloalkylthio, C₁-C₄ haloalkylsulfinyl, C₁-C₄ haloalkylsulfonyl, C₁-C₄ alkylamino, C₂-C₈ dialkylamino, C₃-C₆ cycloalkylamino, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylcarbonyl, C₂-C₆ alkoxy carbonyl, C₂-C₆ alkylcarbonyloxy, C₂-C₆ alkylcarbonylthio, C₂-C₆ alkylaminocarbonyl, C₃-C₈ dialkylaminocarbonyl and C₃-C₆ trialkylsilyl; or phenyl or a 5- or 6-membered heteroaromatic ring, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of C₁-C₆ alkyl, C₁-C₆ haloalkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-

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C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₁-C₄ alkylthio, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ haloalkylthio, C₁-C₄ haloalkylsulfinyl, C₁-C₄ haloalkylsulfonyl, C₁-C₄ alkylamino, C₂-C₈ dialkylamino, C₃-C₆ cycloalkylamino, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylcarbonyl, C₂-C₆ alkoxycarbonyl, C₂-C₆ alkylcarbonyloxy, C₂-C₆ alkylcarbonylthio, C₂-C₆ alkylaminocarbonyl, C₃-C₈ dialkylaminocarbonyl and C₃-C₆ trialkylsilyl; or R¹² and R¹³ are taken together with the nitrogen atom to which they are attached to form a 3- to 7-membered ring containing ring members selected from carbon atoms and up to 2 heteroatoms independently selected from one O, one S, and up to 2 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring member is selected from S, S(O) or S(O)₂, said ring optionally substituted with up to 4 substituents independently selected from the group consisting of halogen, cyano and C₁-C₄ alkyl;

each R¹⁴ is independently halogen, cyano, hydroxy, amino, nitro, SF₅, OCN, SCN, CHO, C(=O)OH, C(=O)NH₂, C(=S)NH₂, SO₂NH₂, C(=O)R¹⁸, C(=O)OR¹⁸, NHR¹⁸, NR¹⁸R¹⁹, C(=O)NR²¹R¹⁹, C(=O)NR²¹NR²²R²³, C(=S)NR²¹R¹⁹, SO₂NR²¹R¹⁹, OC(=O)R²¹, OC(=O)OR¹⁸, OC(=O)NR²¹R¹⁹, N(R²¹)C(=O)R²¹, N(R²¹)C(=O)OR¹⁹, N(R²¹)C(=O)NR²¹R²², OSO₂R¹⁸, OSO₂NR²¹R²², NR²¹SO₂R¹⁸, NR²¹SO₂NR²¹R²², Si(R¹⁸R¹⁹R²⁰), C(=NR²¹)R²², C(=NOR²¹)R²², C(=NNR²¹R²²)R²³, C(=NN(C(=O)R¹⁹)R²¹)R²², C(=NN(C(=O)OR¹⁹)R²¹)R²², ON=CR²¹R²², ONR²¹R²², S(=O)(=NR²¹)R²², SO₂NR²¹C(=O)NR²²R²³, P(=X²)R¹⁸R¹⁹, OP(=X²)R¹⁸R¹⁹, OP(=X²)(OR¹⁸)R¹⁹, OP(=X²)(OR¹⁸)OR¹⁹, N=CR²¹R²², NR²¹N=CR²²R²³, NR²¹NR²²R²³, NR²¹C(=X²)NR²²R²³, NR²¹C(=NR²¹)NR²²R²³, NR²¹NR²¹C(=X²)NR²²R²³, NR²¹NR²¹SO₂NR²²R²³, Z¹Q¹ or Z¹Q¹Z¹Q¹; or C₁-C₈ alkyl, C₂-C₈ alkenyl, C₂-C₈ alkynyl, C₃-C₁₀ cycloalkyl, C₄-C₁₀ alkylcycloalkyl, C₄-C₁₀ cycloalkylalkyl, C₆-C₁₄ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₈ cycloalkenyl, C₁-C₈ alkoxy, C₃-C₈ cycloalkoxy, C₄-C₁₀ cycloalkylalkoxy, C₂-C₈ alkenyloxy, C₂-C₈ alkynyloxy, C₁-C₈ alkylthio, C₁-C₈ alkylsulfinyl, C₁-C₈ alkylsulfonyl, C₃-C₈ cycloalkylthio, C₃-C₈ cycloalkylsulfinyl, C₃-C₈ cycloalkylsulfonyl, C₄-C₁₀ cycloalkylalkylthio, C₄-C₁₀ cycloalkylalkylsulfinyl, C₄-C₁₀ cycloalkylalkylsulfonyl, C₂-C₈ alkenylthio, C₂-C₈ alkenylsulfinyl, C₂-C₈ alkenylsulfonyl, C₂-C₈ alkynylthio, C₂-C₈ alkynylsulfinyl or C₂-C₈ alkynylsulfonyl, each unsubstituted or substituted with at least one substituent independently selected from R¹⁷; or

two R¹⁴ substituents on adjacent ring atoms are taken together with the adjacent ring atoms to form a 5- to 7-membered carbocyclic or heterocyclic ring, each ring containing ring members selected from carbon atoms and up to 3 heteroatoms

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independently selected from up to 2 O, up to 2 S, and up to 3 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_n, each ring optionally substituted with up to 3 substituents independently selected from the group consisting of halogen, cyano, hydroxy, amino, nitro, C(=O)OH, C(=O)NH₂, SO₂NH₂, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₄ alkenyl, C₂-C₄ haloalkenyl, C₂-C₄ alkynyl, C₂-C₄ haloalkynyl, C₃-C₇ cycloalkyl, C₃-C₇ halocycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ haloalkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₄-C₈ halocycloalkylalkyl, C₁-C₆ alkoxy, C₁-C₆ haloalkoxy, C₂-C₆ alkoxycarbonyl, C₂-C₆ haloalkoxycarbonyl, C₂-C₆ alkylcarbonyl and C₂-C₆ haloalkylcarbonyl; each X² is independently O or S;

each Z¹ is independently a direct bond, O, S(O)_n, NR⁶, C(R⁷)₂, C(R⁷)=C(R⁷), C≡C, C(R⁷)₂O, OC(R⁷)₂, C(=X¹), C(=X¹)E, EC(=X¹), C(=NOR⁸) or C(=NN(R⁶)₂);

each Qⁱ is independently a 3- to 10-membered ring or a 7- to 11-membered ring system, each ring or ring system containing ring members selected from carbon atoms and up to 4 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 4 N, wherein up to 3 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_u(=NR²⁴)_z, each ring or ring system optionally substituted with up to 4 substituents independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³, Si(R¹⁰)₃ and R¹⁶;

each Q¹ is independently a 3- to 10-membered ring or a 7- to 11-membered ring system, each ring or ring system containing ring members selected from carbon atoms and up to 4 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 4 N, wherein up to 3 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_u(=NR²⁴)_z, each ring or ring system optionally substituted with up to 5 substituents independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, C(=O)NR²¹NR²²R²³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³, S(=O)(=NR²¹)R²², Si(R¹⁰)₃ and R¹⁶;

each R¹⁵ is independently halogen, cyano, hydroxy, amino, nitro, SF₅, OCN, SCN, CHO, C(=O)OH, C(=O)NH₂, C(=S)NH₂, SO₂NH₂, C(=O)R¹⁸, C(=O)OR¹⁸, NHR¹⁸, NR¹⁸R¹⁹, C(=O)NR²¹R¹⁹, C(=O)NR²¹NR²²R²³, C(=S)NR²¹R¹⁹, SO₂NR²¹R¹⁹, S(=O)(=NR²¹)R²², OC(=O)R²¹, OC(=O)OR¹⁸, OC(=O)NR²¹R¹⁹, N(R²¹)C(=O)R²¹, N(R²¹)C(=O)OR¹⁹, N(R²¹)C(=O)NR²¹R²², OSO₂R¹⁸, OSO₂NR²¹R²², NR²¹SO₂R¹⁸, NR²¹SO₂NR²¹R²², Si(R¹⁸R¹⁹R²⁰) or Z¹Q¹; or C₁-C₈ alkyl, C₂-C₈ alkenyl, C₂-C₈ alkynyl, C₃-C₁₀ cycloalkyl, C₄-C₁₀ alkylcycloalkyl, C₄-C₁₀ cycloalkylalkyl, C₄-C₁₄ cycloalkylcycloalkyl, C₅-C₁₀

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alkylcycloalkylalkyl, C₃-C₈ cycloalkenyl, C₁-C₈ alkoxy, C₃-C₈ cycloalkoxy, C₄-C₁₀ cycloalkylalkoxy, C₂-C₈ alkenyloxy, C₂-C₈ alkynyloxy, C₁-C₈ alkylthio, C₁-C₈ alkylsulfinyl, C₁-C₈ alkylsulfonyl, C₃-C₈ cycloalkylthio, C₃-C₈ cycloalkylsulfinyl, C₃-C₈ cycloalkylsulfonyl, C₄-C₁₀ cycloalkylalkylthio, C₄-C₁₀ cycloalkylalkylsulfinyl, C₄-C₁₀ cycloalkylalkylsulfonyl, C₂-C₈ alkenylthio, C₂-C₈ alkenylsulfinyl, C₂-C₈ alkenylsulfonyl, C₂-C₈ alkynylthio, C₂-C₈ alkynylsulfinyl or C₂-C₈ alkynylsulfonyl, each unsubstituted or substituted with at least one substituent independently selected from R¹⁷; or

two R¹⁵ substituents on adjacent ring atoms are taken together with the adjacent ring atoms to form a 5- to 7-membered carbocyclic or heterocyclic ring, each ring containing ring members selected from carbon atoms and up to 3 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 3 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring members are independently selected from S(=O)_n, each ring optionally substituted with up to 3 substituents independently selected from the group consisting of halogen, cyano, hydroxy, amino, nitro, C(=O)OH, C(=O)NH₂, SO₂NH₂, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₄ alkenyl, C₂-C₄ haloalkenyl, C₂-C₄ alkynyl, C₂-C₄ haloalkynyl, C₃-C₇ cycloalkyl, C₃-C₇ halocycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ haloalkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₄-C₈ halocycloalkylalkyl, C₁-C₆ alkoxy, C₁-C₆ haloalkoxy, C₂-C₆ alkoxycarbonyl, C₂-C₆ haloalkoxycarbonyl, C₂-C₆ alkylcarbonyl and C₂-C₆ haloalkylcarbonyl; each R¹⁶ is independently C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl or C₃-C₆ cycloalkenyl, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₁-C₄ alkylthio, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ haloalkylthio, C₁-C₄ haloalkylsulfinyl, C₁-C₄ haloalkylsulfonyl, C₁-C₄ alkylamino, C₂-C₈ dialkylamino, C₃-C₆ cycloalkylamino, C₂-C₄ alkoxylalkyl, C₂-C₄ alkylcarbonyl, C₂-C₆ alkoxycarbonyl, C₂-C₆ alkylcarbonyloxy, C₂-C₆ alkylcarbonylthio, C₂-C₆ alkylaminocarbonyl, C₃-C₈ dialkylaminocarbonyl and C₃-C₆ trialkylsilyl; or phenyl or a 5- or 6-membered heteroaromatic ring, each unsubstituted or substituted with at least one substituent independently selected from the group consisting of C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₆ cycloalkenyl, halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₁-C₄ alkylthio, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ haloalkylthio, C₁-C₄ haloalkylsulfinyl, C₁-C₄ haloalkylsulfonyl, C₁-C₄ alkylamino, C₂-C₈ dialkylamino, C₃-C₆

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cycloalkylamino, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylcarbonyl, C₂-C₆ alkoxy carbonyl, C₂-C₆ alkylcarbonyloxy, C₂-C₆ alkylcarbonylthio, C₂-C₆ alkylaminocarbonyl, C₃-C₈ dialkylaminocarbonyl and C₃-C₆ trialkylsilyl; each R¹⁷ is independently halogen, cyano, nitro, OH, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³, Si(R¹⁰)₃ or Z¹Q¹;

each R¹⁸, R¹⁹ and R²⁰ is independently Q¹; or C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl or C₃-C₆ cycloalkenyl, each unsubstituted or substituted with at least one substituent independently selected from R¹⁷;

each R²¹ is independently Q¹ or H; or C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl or C₃-C₆ cycloalkenyl, each unsubstituted or substituted with at least one substituent independently selected from R¹⁷;

each R²² and R²³ is independently Q¹ or H; or C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₈ cycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₆-C₁₀ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl or C₃-C₆ cycloalkenyl, each unsubstituted or substituted with at least one substituent independently selected from R¹⁷; or

R²² and R²³ are taken together with the nitrogen atom to which they are attached to form a 3- to 7-membered ring containing ring members selected from carbon atoms and up to 2 heteroatoms independently selected from one O, one S, and up to 2 N, wherein up to 2 carbon atom ring members are independently selected from C(=O) and C(=S) and the sulfur atom ring member is selected from S, S(O) or S(O)₂, said ring optionally substituted with up to 4 substituents independently selected from the group consisting of halogen, cyano and C₁-C₄ alkyl;

each R²⁴ is independently H, cyano, OCN, SCN, CHO, C(=O)OH, C(=O)NH₂, C(=S)NH₂, SO₂NH₂, C(=O)R¹⁸, C(=O)OR¹⁸, NHR¹⁸, NR¹⁸R¹⁹, C(=O)NR²¹R¹⁹, C(=S)NR²¹R¹⁹, SO₂NR²¹R¹⁹, OC(=O)R²¹, OC(=O)OR¹⁸, OC(=O)NR²¹R¹⁹, N(R²¹)C(=O)R²¹, N(R²¹)C(=O)OR¹⁹, N(R²¹)C(=O)NR²¹R²², OSO₂R¹⁸, OSO₂NR²¹R²², NR²¹SO₂R¹⁸, NR²¹SO₂NR²¹R²², Si(R¹⁸R¹⁹R²⁰) or Z¹Q¹; or C₁-C₈ alkyl, C₂-C₈ alkenyl, C₂-C₈ alkynyl, C₃-C₁₀ cycloalkyl, C₄-C₁₀ alkylcycloalkyl, C₄-C₁₀ cycloalkylalkyl, C₆-C₁₄ cycloalkylcycloalkyl, C₅-C₁₀ alkylcycloalkylalkyl, C₃-C₈ cycloalkenyl, C₁-C₈ alkoxy, C₃-C₈ cycloalkoxy, C₄-C₁₀ cycloalkylalkoxy, C₂-C₈ alkenyloxy, C₂-C₈ alkynyloxy, C₁-C₈ alkylthio, C₁-C₈ alkylsulfinyl, C₁-C₈ alkylsulfonyl, C₃-C₈ cycloalkylthio, C₃-C₈ cycloalkylsulfinyl, C₃-C₈ cycloalkylsulfonyl, C₄-C₁₀ cycloalkylalkylthio, C₄-C₁₀ cycloalkylalkylsulfinyl, C₄-C₁₀ cycloalkylalkylsulfonyl, C₂-C₈ alkenylthio,

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C_2-C_8 alkenylsulfinyl, C_2-C_8 alkenylsulfonyl, C_2-C_8 alkynylthio, C_2-C_8 alkynylsulfinyl or C_2-C_8 alkynylsulfonyl, each unsubstituted or substituted with at least one substituent independently selected from R^{17} ;

a is 1, 2 or 3;

each n is independently 0, 1 or 2; and

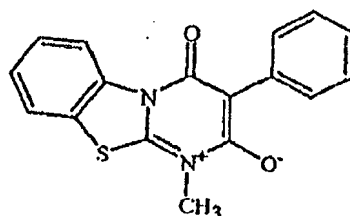
u and z in each instance of $S(=O)_u(=NR^{24})_z$ are independently 0, 1 or 2, provided that

the sum of u and z in each instance of $S(=O)_u(=NR^{24})_z$ is 0, 1 or 2;

provided that (i) when A is O, S, NCH_3 or $C(R^{3c})=C(R^{3d})$, R^{3c} is H or F, and R^{3d} is H,

F, CF_2H or CF_3 , then at least one of R^{3a} or R^{3b} is other than H; and (ii) the

compound of Formula 1 is other than



2. A compound of Claim 1 wherein

X is O;

Y is O;

Z is a direct bond, $C(=X^1)$ or $C(=X^1)E$;

X^1 is O;

E is O;

A is $C(R^{3c})=C(R^{3d})$ or NR^{3e} ;

R^2 is $C(=O)OR^{18}$; or C_1-C_8 alkyl optionally substituted with halogen; or a 3- to 10-membered ring or a 7- to 11-membered ring system, each ring or ring system containing ring members selected from carbon atoms and up to 4 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 4 N, wherein up to 3 carbon atom ring members are independently selected from $C(=O)$ and $C(=S)$ and the sulfur atom ring members are independently selected from $S(=O)_u(=NR^{24})_z$, each ring or ring system optionally substituted with up to 5 substituents independently selected from R^{15} ;

R^{3a} , R^{3b} , R^{3c} are independently H or halogen;

R^{3d} is halogen, C_1-C_8 alkyl, C_1-C_8 alkoxy, C_1-C_8 haloalkyl or C_1-C_8 haloalkoxy; or

R^{3c} and R^{3d} are taken together to form a 5- to 7-membered carbocyclic or heterocyclic ring, each ring containing ring members selected from carbon atoms and up to 3 heteroatoms independently selected from up to 2 O, up to 2 S, and up to 3 N, wherein up to 2 carbon atom ring members are independently selected from $C(=O)$ and $C(=S)$ and the sulfur atom ring members are independently selected from $S(=O)_u$, each ring optionally substituted with up to 3 substituents

independently selected from the group consisting of halogen, cyano, hydroxy,

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amino, nitro, C(=O)OH, C(=O)NH₂, SO₂NH₂, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₄ alkenyl, C₂-C₄ haloalkenyl, C₂-C₄ alkynyl, C₂-C₄ haloalkynyl, C₃-C₇ cycloalkyl, C₃-C₇ halocycloalkyl, C₄-C₈ alkylcycloalkyl, C₄-C₈ haloalkylcycloalkyl, C₄-C₈ cycloalkylalkyl, C₄-C₈ halocycloalkylalkyl, C₁-C₆ alkoxy, C₁-C₆ haloalkoxy, C₂-C₆ alkoxycarbonyl, C₂-C₆ haloalkoxycarbonyl, C₂-C₆ alkylcarbonyl and C₂-C₆ haloalkylcarbonyl;

R^{3e} is C₁-C₄ alkyl;

R⁴ and R⁵ are H; and

a is 1.

3. A compound of Claim 2 wherein

R¹ is phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with up to 3 substituents independently selected from R¹⁴;

R¹⁴ is halogen, cyano, C(=O)OR¹⁸, C(=O)NR²¹R¹⁹, C(=NOR²¹)R²² or Z¹Q^t; or C₁-C₈ alkyl, C₁-C₈ alkoxy or C₁-C₈ alkylthio, each optionally substituted with halogen;

R²¹ is C₁-C₄ alkyl;

R²² is C₁-C₄ alkyl;

Z is a direct bond;

each Z¹ is independently a direct bond or O; and

each Q^t is independently phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with up to 5 substituents independently selected from the group consisting of halogen, cyano, nitro, CHO, C(=O)OH, C(=O)NH₂, C(=O)R¹⁰, C(=O)OR¹¹, C(=O)NR¹²R¹³, C(=O)NR²¹NR²²R²³, OR¹¹, S(O)_nR¹⁰, SO₂NR¹²R¹³, S(=O)(=NR²¹)R²², Si(R¹⁰)₃ and R¹⁶.

4. A compound of Claim 3 wherein

R² is pyridinyl, pyrimidinyl, oxazolyl or thiazolyl, each optionally substituted with up to 3 substituents independently selected from the group consisting of halogen and C₁-C₄ alkyl.

5. A compound of Claim 4 wherein

R¹ is phenyl or pyridinyl, each optionally substituted with up to 3 substituents independently selected from R¹⁴; and

each Q¹ is independently phenyl, pyridinyl or pyrimidinyl, each optionally substituted with up to 5 substituents independently selected from the group consisting of halogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ alkoxy and C₁-C₄ haloalkoxy.

6. A compound of Claim 5 wherein

A is C(R^{3c})=C(R^{3d});

R^{3a}, R^{3b} and R^{3c} are H; and

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R^{3d} is halogen, C₁-C₄ alkyl or C₁-C₄ alkoxy.

7. A compound of Claim 1 that is selected from the group consisting of:

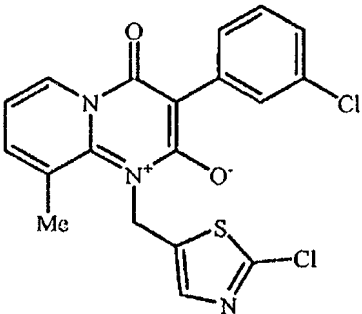
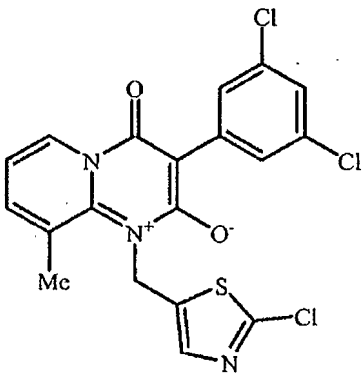
- 9-bromo-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-[3-(trifluoromethoxy)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 9-bromo-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-[3-(trifluoromethyl)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 9-bromo-3-(3-bromophenyl)-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 9-bromo-1-[(2-chloro-5-thiazolyl)methyl]-3-[3-chloro-5-(trifluoromethyl)phenyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 9-bromo-3-[3-chloro-2-fluoro-5-(trifluoromethyl)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 9-chloro-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-[3-(trifluoromethoxy)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-3-[3-(trifluoromethoxy)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-3-[3-(trifluoromethyl)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-(2-fluorophenyl)-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 9-bromo-1-[(2-chloro-5-thiazolyl)methyl]-3-[3-chloro-5-(trifluoromethoxy)phenyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-[3-chloro-5-(trifluoromethoxy)phenyl]-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-(2,6-difluorophenyl)-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-3-[3-[(trifluoromethyl)thio]phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 3-(2-fluorophenyl)-2-hydroxy-9-methyl-4-oxo-1-(5-pyrimidinylmethyl)-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-3-phenyl-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-[2-fluoro-5-(trifluoromethyl)phenyl]-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-(4-fluorophenyl)-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;

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- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methoxy-4-oxo-3-[3-(trifluoromethoxy)phenyl]-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-[2-fluoro-5-(trifluoromethyl)phenyl]-2-hydroxy-9-methoxy-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-[2-methoxy-5-(trifluoromethoxy)phenyl]-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-(2-methoxyphenyl)-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 3-[3-chloro-2-fluoro-5-(trifluoromethyl)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-3-[4-(trifluoromethyl)thio]phenyl]-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-(2,4-difluorophenyl)-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 3-(3-chloro-2-fluorophenyl)-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-(3-methoxyphenyl)-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 7-bromo-1-[(2-chloro-5-thiazolyl)methyl]-3-[2-fluoro-3-(trifluoromethyl)phenyl]-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-(3-iodophenyl)-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 2-hydroxy-9-methyl-1-[(2-methyl-5-thiazolyl)methyl]-4-oxo-3-[3-(trifluoromethoxy)phenyl]-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 2-hydroxy-9-methyl-1-[(2-methyl-5-thiazolyl)methyl]-4-oxo-3-[3-(trifluoromethyl)phenyl]-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 3-(2-fluorophenyl)-2-hydroxy-9-methyl-1-[(2-methyl-5-thiazolyl)methyl]-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 3-[3-bromo-5-(trifluoromethyl)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 3-[3-bromo-5-(trifluoromethoxy)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-[3-chloro-5-(trifluoromethyl)phenyl]-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-3-[3-fluoro-5-(trifluoromethyl)phenyl]-2-hydroxy-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-(3-iodo-5-methoxyphenyl)-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidinium inner salt;
- 3-(3-bromophenyl)-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-

4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-3-[3'-(trifluoromethoxy)[1,1'-biphenyl]-3-yl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-(2',5'-difluoro[1,1'-biphenyl]-3-yl)-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-[3-(6-chloro-3-pyridinyl)-5-(trifluoromethoxy)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-(2',4'-dichloro[1,1'-biphenyl]-3-yl)-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-phenyl-4*H*-pyrimido[2,1-*a*]isoquinolinium inner salt; and
 1-[(2-chloro-5-thiazolyl)methyl]-3-(3-ethenylphenyl)-2-hydroxy-9-methyl-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt.

8. A compound of Claim 1 that is selected from the group consisting of:

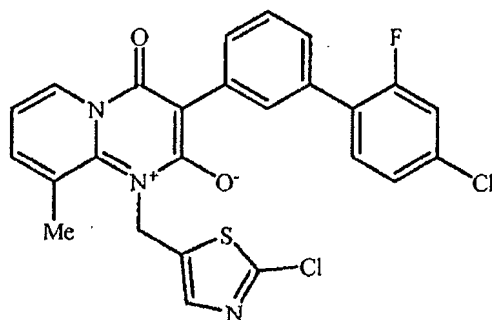
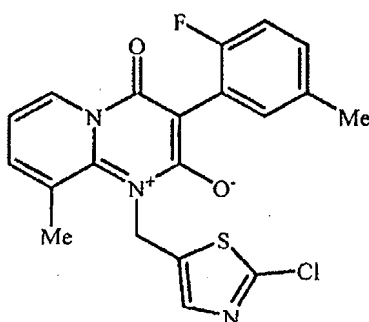
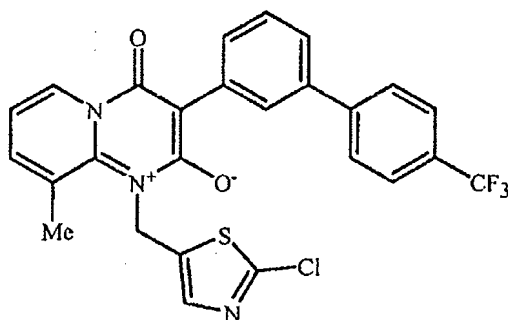
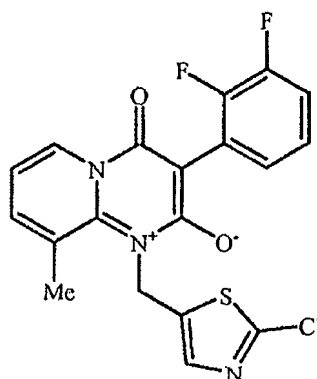


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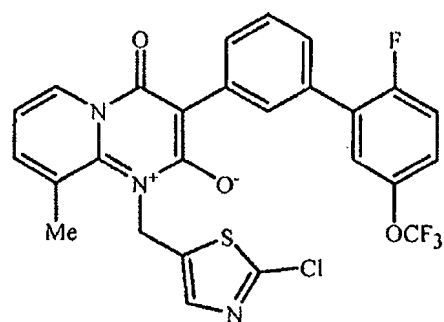
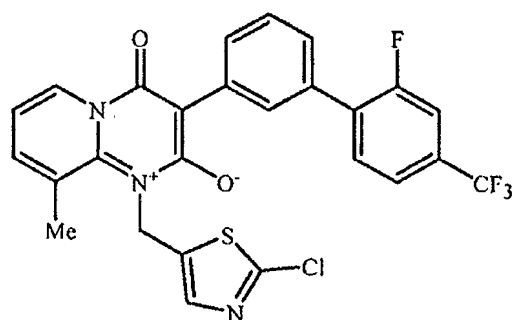
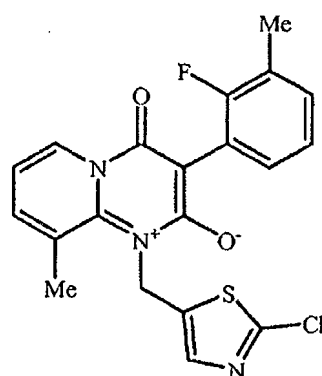
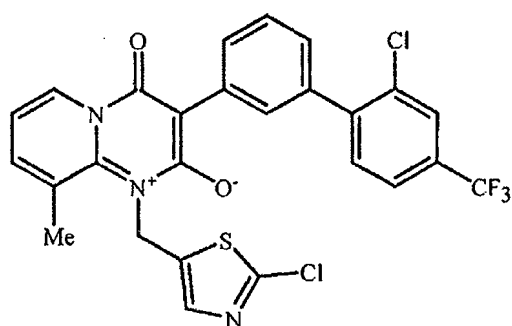


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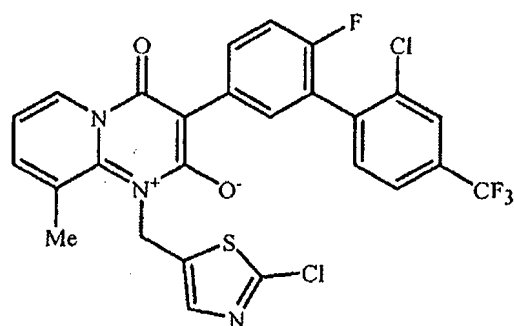
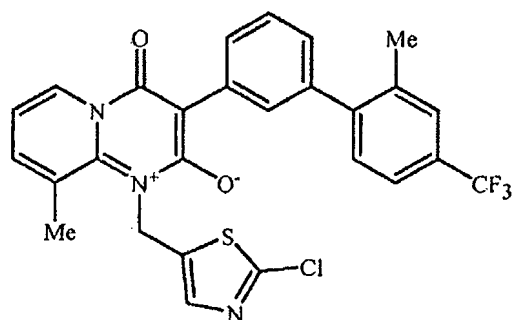
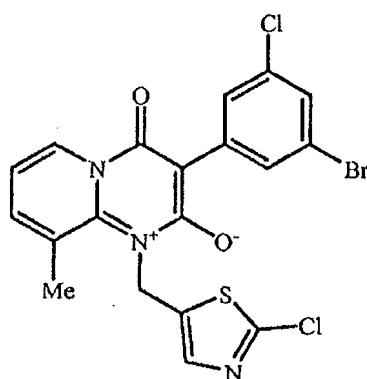
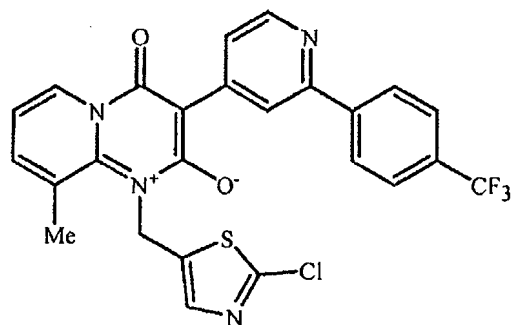


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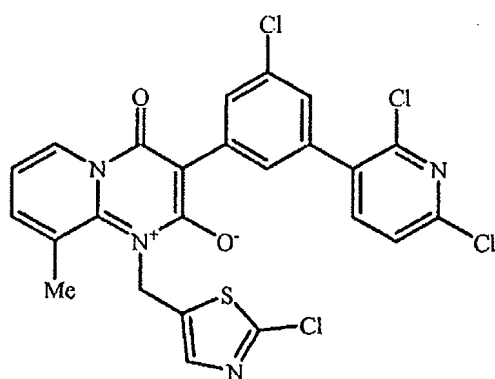
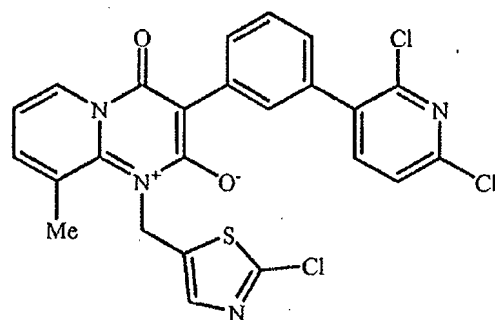
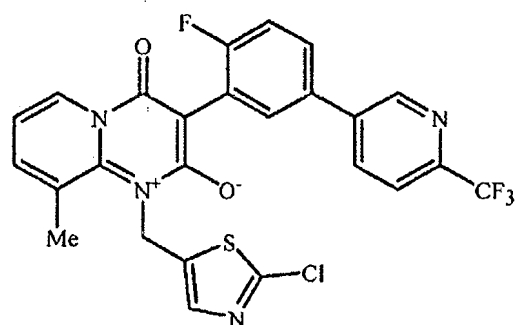
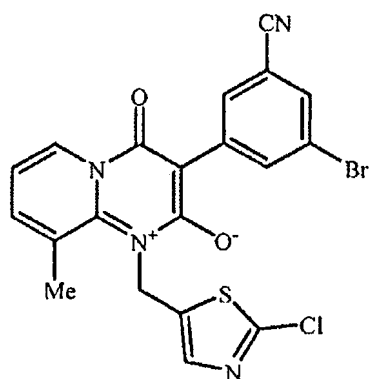


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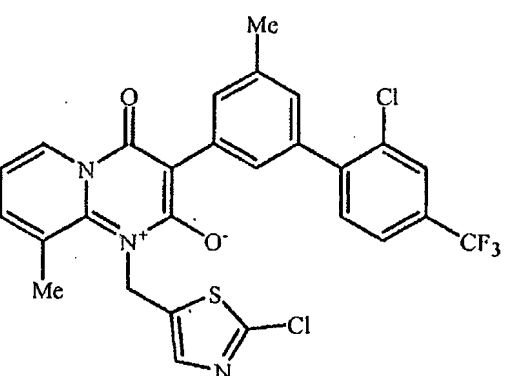
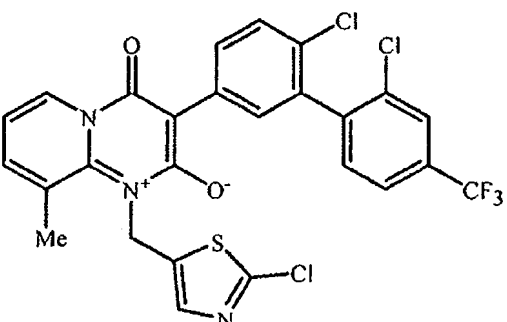
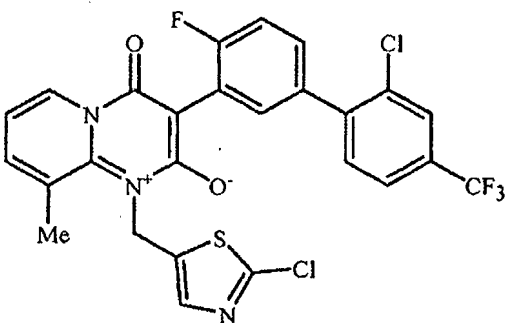
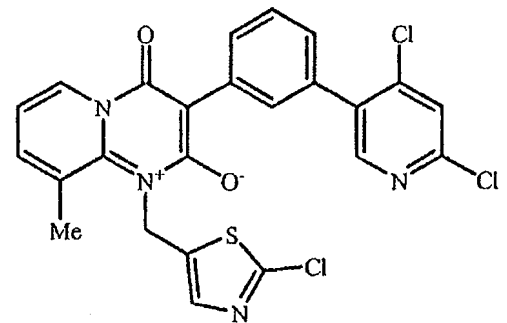
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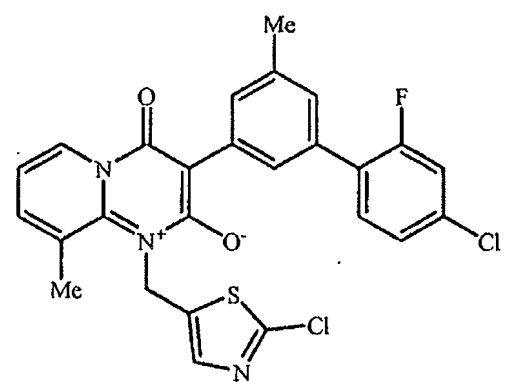
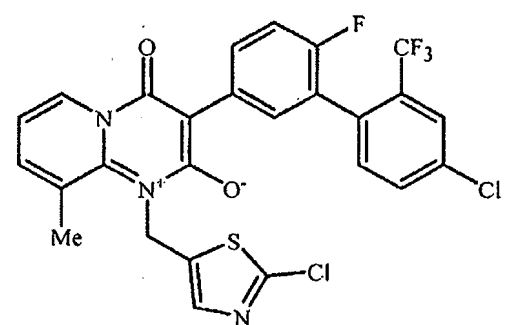
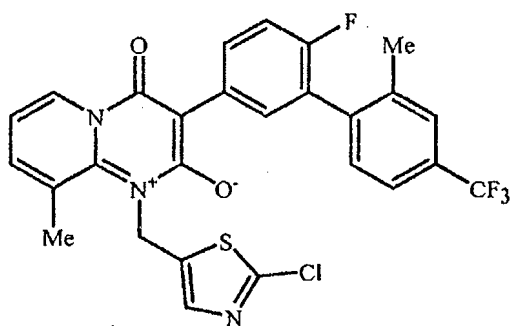
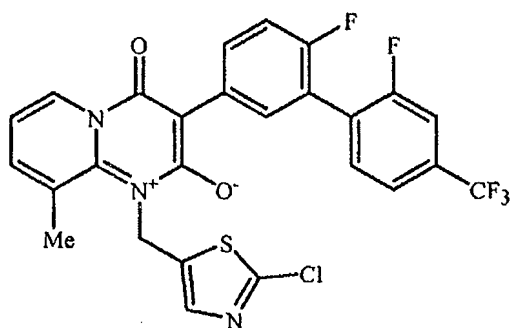


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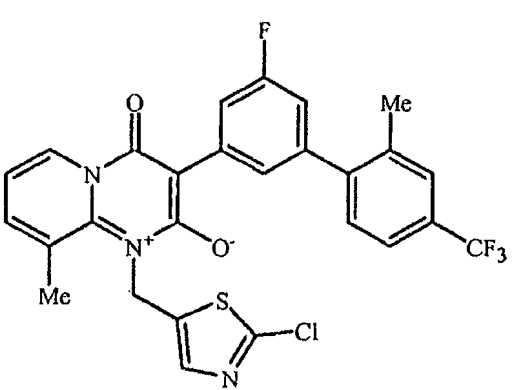
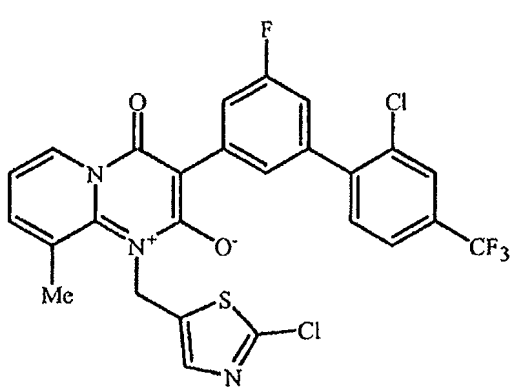
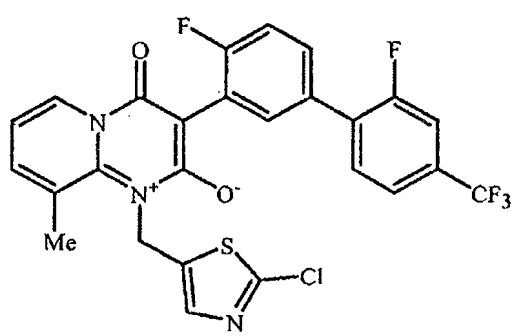
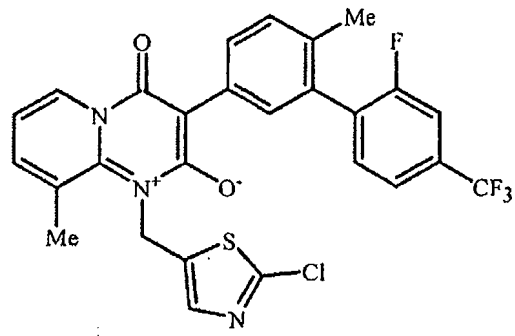
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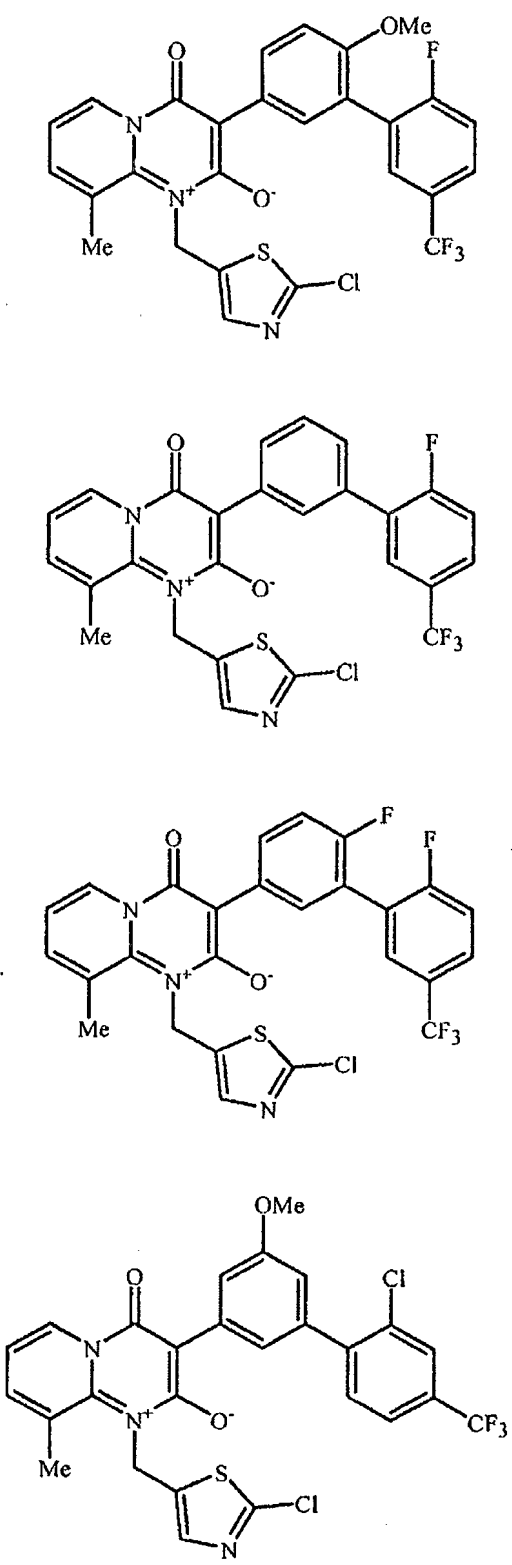


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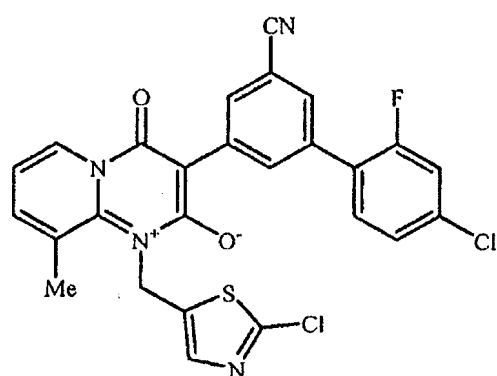
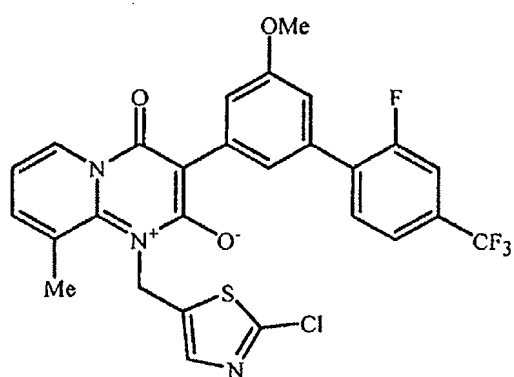
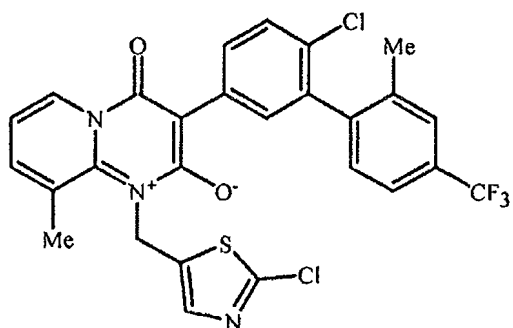
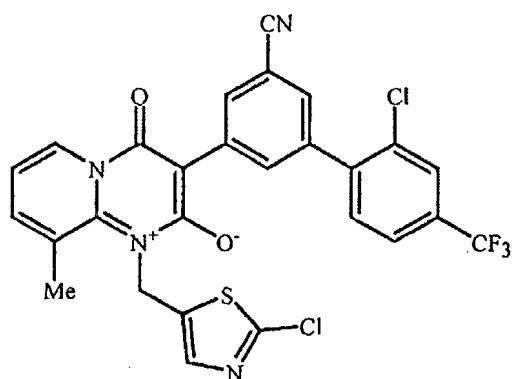


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9. A composition comprising a compound of any of Claims 1 to 8 and at least one additional component selected from the group consisting of surfactants, solid diluents and liquid diluents.

10. The composition of Claim 9 further comprising at least one additional biologically active compound or agent.

11. The composition of Claim 10 wherein the at least one additional biologically active compound or agent is selected from the group consisting of abamectin, acephate, acequinocyl, acetamiprid, acrinathrin, amidoflumet, amitraz, avermectin, azadirachtin, azinphos-methyl, bensultap, bifenthrin, bifenazate, bistrifluron, borate, buprofezin, cadusafos, carbaryl, carbofuran, cartap, carzol, chlorantraniliprole, chlorfenapyr, chlorfluazuron, chlorpyrifos, chlorpyrifos-methyl, chromafenozide, clofentezin, clothianidin, cyantraniliprole, cyflumetofen, cyfluthrin, beta-cyfluthrin, cyhalothrin, gamma-cyhalothrin, lambda-cyhalothrin, cypermethrin, alpha-cypermethrin, zeta-cypermethrin, cyromazine, deltamethrin, diafenthiuron, diazinon, dieldrin, diflubenzuron, dimefluthrin, dimehypo, dimethoate, dinotefuran, diofenolan, emamectin, endosulfan, esfenvalerate, ethiprole, etofenprox, etoxazole, fenbutatin oxide, fenothiocarb, fenoxycarb, fenpropathrin, fenvalerate, fipronil, flonicamid, flubendiamide, flucythrinate, flufenerim, flufenoxuron, fluvalinate, tau-fluvalinate, fonophos, formetanate, fosthiazate, halofenozide, hexaflumuron, hexythiazox, hydramethylnon, imidacloprid, indoxacarb, insecticidal soaps, isofenphos, lufenuron, malathion, metaflumizone, metaldehyde, methamidophos, methidathion, methiodicarb, methomyl, methoprene, methoxychlor, metofluthrin, monocrotophos, methoxyfenozide, nitenpyram, nithiazine, novaluron, noviflumuron, oxamyl, parathion, parathion-methyl, permethrin, phorate, phosalone, phosmet, phosphamidon, pirimicarb, profenofos, profluthrin, propargite, protrifenbute, pymetrozine, pyrafluprole, pyrethrin, pyridaben, pyridalyl, pyrifluquinazon, pyriprole, pyriproxifen, rotenone, ryanodine, spinetoram, spinosad, spirotetramat, spiromesifen, spirotetramat, sulprofos, sulfoxaflo, tebufenozide, tebufenpyrad, teflubenzuron, tefluthrin, terbufos, tetrachlorvinphos, tetramethrin, thiacloprid, thiamethoxam, thiodicarb, thiosultap-sodium, tolfenpyrad, tralomethrin, triazamate, trichlorfon, triflumuron, *Bacillus thuringiensis* delta-endotoxins, entomopathogenic bacteria, entomopathogenic viruses and entomopathogenic fungi.

12. A composition for protecting an animal from an invertebrate parasitic pest comprising a parasitically effective amount of a compound of any of Claims 1 to 8 and at least one carrier.

13. A non-therapeutic method for controlling an invertebrate pest comprising contacting the invertebrate pest or its environment with a biologically effective amount of a compound of any of Claims 1 to 8.

14. A treated seed comprising a compound of any of Claims 1 to 8 in an amount of from about 0.0001 to 1 % by weight of the seed before treatment.