

JOSE LLOREDA CAMACHO & CO

ABOC
Calle 72 No. 5-83 Piso 5, Bogotá, C

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-062727-00001-0000

Fecha: 2011-05-27 16:19:28 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 329 CTOINFORMACION Folios: 42

Señor

SUPERINTENDENTE DE INDUSTRIA Y COM
DIVISIÓN DE NUEVAS CREACIONES

E. S.



No. 11-062727-00001-0000

Fecha: 2011-05-27 16:19:28 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 329 CTOINFORMACION Folios: 43

Re: PI.-ROHM AND HAAS COMPANY.-Solicitud de Patente de Invención
para "RECUBRIMIENTOS CEROSOS SOBRE PARTES DE
PLANTA".-Clase A01N 27/00.-Expediente número 11-062.727.-

1. Me refiero a mi Solicitud de Patente de Invención radicada ante ese Despacho el 20 de Mayo de 2011.
2. Atentamente me permito presentar a ese Despacho el documento que acredita el traspaso, que los autores de la patente de la referencia hacen a favor de mi representado, de los derechos sobre la misma, debidamente apostillado y junto con su Traducción Oficial No. 2011-05-23-339, debidamente legalizada hasta por el Ministerio de Relaciones Exteriores de Colombia bajo el número 071152 de 26 de Mayo de 2011.
3. Adicionalmente, me permito presentar a ese Despacho copia debidamente certificada de la Solicitud de Patente **respecto de la cual reclamo prioridad**, dentro del trámite de la Solicitud arriba referida, a saber, la Solicitud Estadinense número **61/347,977** de 25 de Mayo de 2010, junto con su Traducción Oficial número 2011-05-23-340, correspondiente a dicho documento.
4. Ruego a usted tomar atenta nota de lo anterior y proceder de conformidad.

Señor Superintendente,

ALICIA LLOREDA RICAURTE

T.P. 53.215

TRADUCCION OFICIAL No. 2011-05-23-339
DE UN DOCUMENTO ESCRITO EN INGLES

APOSTILLA

(Convención de La Haya del 5 de octubre de 1961)

1. País: Estados Unidos de América
2. Este documento público ha sido firmado por Jacqueline L Pearlman
3. actuando como Notario Público
4. lleva el sello/estampilla de Jacqueline L Pearlman, Notario Público,
Condado de Filadelfia, Commonwealth de Pennsylvania

Certificado

- | | |
|--|--|
| 5. en Harrisburg, Pennsylvania | 6. el día 4 de mayo de 2011 |
| 7. por Carol Aichele, Secretario Encargado del Commonwealth de
Pennsylvania | |
| 8. No. 201114931 | |
| 9. Sello/Estampilla
Secretario del Commonwealth
de Pennsylvania | 10. Firma: (ilegible)
Carol Aichele |

Esta Apostilla exclusivamente certifica la autenticidad de la firma y la competencia de la persona que ha firmado el documento público, y, si es apropiado, la identidad del sello o estampilla que el documento lleva.

Esta Apostilla no certifica el contenido del documento para el cual fue emitido

Esta Apostilla no es válida para ser usada en ninguna parte dentro de los Estados Unidos de América, sus territorios o posesiones.

TRADUCTORA OFICIAL
RES. 2177/89 MINJUSTICIA


ANITA ESCOBAR DE TAMAYO

COPIA FIEL

A TODOS AQUELLOS A QUIENES LOS PRESENTES LLEGAREN,

Por el presente certifico que el documento(s) adjunto es una COPIA(S) FIEL del documento(s) original que he comparado.

en Filadelfia, PA 19106, EE.UU.

este día 19 de abril de 2011

(firma: ilegible)

Janice Soulas

Profesional

THE DOW CHEMICAL COMPANY

CERTIFICADO NOTARIAL

ESTADOS UNIDOS DE AMERICA)

COMMONWEALTH DE PENNSYLVANIA) SS

Condado/Parroquia de Filadelfia)

En este día 19 de abril de 2011, compareció personalmente ante mí, Janice Soulas, a quien conozco o quien se identificó ante mí como la persona que firmó el documento anterior y reconoció el mismo como un acto y acción libres para los fines ahí expresados.

Sello Commonwealth of Pennsylvania

(firma: ilegible)

Sello Notarial
Jacqueline L. Pearlman, Notario Público
Ciudad de Filadelfia Condado de Filadelfia
Mi nombramiento expira el 21 de agosto de 2014

Jacqueline Pearlman
Notario Público, Filadelfia,
Pennsylvania

Mi nombramiento expira:
21 de agosto de 2014

Expediente No.: 69931EE.UU.

TRASPASO INDIVIDUO Y DECLARACION DEL INVENTOR
(con Derechos de Prioridad)

Yo/Nosotros verdaderamente creo que yo/nosotros soy el inventor original, primero y único/conjunto de la materia objeto comprendida por y para la cual se busca una patente sobre la invención llamada: RECUBRIMIENTOS CEROSOS SOBRE PARTE DE PLANTA

invención que fue hecha e inventada por mí/nosotros de y en el curso de mi/nuestro empleo con mis/nuestros respectivos empleadores según se indica debajo de mi /nuestros nombre(s). Reconozco que yo/nosotros poseo la invención y todas las patentes y otros derechos y facultades obtenidos o ejercibles respecto de ello en fiducia para nuestros respectivos empleadores. Como fiduciario(s), y por consideraciones y/o remuneraciones buenas y valiosas recibidas por mi/nuestro trabajo, yo/nosotros vendo, cede y transfiero a:

Rohm and Haas Company
100 Independence Mall West
Filadelfia, PA 19106

ESTADOS UNIDOS DE AMERICA

una sociedad organizada y existente bajo las leyes del Estado de Delaware (en adelante llamada el "Cesionario"), todo mi/nuestro derecho, título e interés en todo el mundo, en y de la invención y todos los derechos y facultades para hacer solicitudes, incluyendo solicitudes provisionales cuando la ley lo permita, para Patente de Invención en su propio nombre, o en el nombre de su designado (o nominatario(s)); y todos los derechos y facultades para presentar cualquier solicitud correspondiente o equivalente en cualquiera y todos los países, incluyendo todos los derechos para reivindicar prioridad bajo todas las leyes de los

Estados Unidos, Convención(es) Internacional y Tratados en nombre del Cesionario, y por el presente autorizo al Cesionario o a su designado que inserte acá el Número de Prioridad, Fecha de Presentación y País de Presentación

Número de Prioridad	Fecha de Presentación	País de Presentación
61/347,977	25 de mayo de 2010	Estados Unidos de América

de la solicitud, sobre la cual la reivindicación de prioridad se basará; y en y de cualquier Patente de Invención que se expida para la invención en cualquiera y todos los países. Yo/Nosotros por el presente acuerdo ayudarle al Cesionario en la prosecución de la solicitud(es) y en cualquier interferencia, conflicto, oposición o litigio que pudiese surgir que comprenda la invención o la patente o patentes sobre ella, y firmar para cualquiera y todos los países cualquier documento relacionado con solicitudes que se deriven de, correspondientes a o equivalentes a la solicitud anteriormente identificada como el Cesionario solicite; y yo/nosotros por el presente autorizo al Cesionario o a su designado (o nominatario(s) que *inserte acá cualquier Número de Prioridad, Fecha de Presentación y País de Presentación correspondientes.*

Número de Prioridad	Fecha de Presentación	País de Presentación

a la solicitud de Prioridad anterior de un país donde esa propiedad de patente del país deba ser identificada y registrada anteriormente para registro de este Traspaso. Yo/Nosotros autorizo al Cesionario o a su designado que traduzca este Traspaso a todos los idiomas que sean necesarios; y le solicito que dicha Patente de Invención sea expedida al Cesionario; y consiento el registro de este Traspaso, o una Copia Fiel Notarial del mismo; estando bajo acuerdo no sólo que yo/nosotros tengo plena facultad para hacer el mismo, pero también que dichas

facultades traspasadas no están gravadas por ningún otorgamiento, licencia u otra facultad dada por el presente.

Suscrito y Declarado ante mí/nosotros:

En: Davis, CA este día 6 de abril de 2011 Con vigencia el 25 de mayo de 2010 Firma: (ilegible) Nombre: DEIRDRE MARGARET HOLCROFT Residencia: 2827 Zamora Lane Davis, CA 95618 País: Estados Unidos de América Ciudadanía: Estados Unidos de América Dirección Postal: la misma residencia Empleado por: The Dow Chemical Company De: Estados Unidos de América	En: este día ____ de ____ de 20__ Con vigencia el 25 de mayo de 2010 Firma: _____ Nombre: WALTER SERGIO PINTO PEREIRA Residencia: Rua Napoleao Laureano, 72 13,418-160 – Piracicaba - SP País: Brasil Ciudadanía: Brasil Dirección Postal: la misma residencia Empleado por: The Dow Chemical Company De: Estados Unidos de América
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CERTIFICADO NOTARIAL

ESTADOS UNIDOS DE AMERICA)
Estado de California) SS
Condado de Yolo)

En este día 6 de abril de 2011, compareció personalmente ante mí,

DEIRDRE MARGARET HOLCROFT

a quien conozco o quien se identificó ante mí como la persona que firmó el documento anterior y reconoció el mismo como un acto y acción libres para los fines ahí expresados.

SELLO

(firma: ilegible)

Scott K. Yoder
Nombramiento # 1735256
Notario Público - California
Mi nombramiento expira el 27 de abril de 2011

Expediente No.: 69931EE.UU.

TRASPASO INDIVIDUO Y DECLARACION DEL INVENTOR
(con Derechos de Prioridad)

Yo/Nosotros verdaderamente creo que yo/nosotros soy el inventor original, primero y único/conjunto de la materia objeto comprendida por y para la cual se busca una patente sobre la invención llamada: RECUBRIMIENTOS CEROSOS SOBRE PARTE DE PLANTA

invención que fue hecha e inventada por mí/nosotros de y en el curso de mi/nuestro empleo con mis/nuestros respectivos empleadores según se indica debajo de mi /nuestros nombre(s). Reconozco que yo/nosotros poseo la invención y todas las patentes y otros derechos y facultades obtenidos o ejercibles respecto de ello en fiducia para nuestros respectivos empleadores. Como fiduciario(s), y por consideraciones y/o remuneraciones buenas y valiosas recibidas por mi/nuestro trabajo, yo/nosotros vendo, cede y transfiero a:

Rohm and Haas Company
100 Independence Mall West
Filadelfia, PA 19106

ESTADOS UNIDOS DE AMERICA

una sociedad organizada y existente bajo las leyes del Estado de Delaware (en adelante llamada el "Cesionario"), todo mi/nuestro derecho, título e interés en todo el mundo, en y de la invención y todos los derechos y facultades para hacer solicitudes, incluyendo solicitudes provisionales cuando la ley lo permita, para Patente de Invención en su propio nombre, o en el nombre de su designado (o nominatario(s)); y todos los derechos y facultades para presentar cualquier solicitud correspondiente o equivalente en cualquiera y todos los países, incluyendo todos los derechos para reivindicar prioridad bajo todas las leyes de los

Estados Unidos, Convención(es) Internacional y Tratados en nombre del Cesionario, y por el presente autorizo al Cesionario o a su designado que inserte acá el Número de Prioridad, Fecha de Presentación y País de Presentación

Número de Prioridad	Fecha de Presentación	País de Presentación
61/347,977	25 de mayo de 2010	Estados Unidos de América

de la solicitud, sobre la cual la reivindicación de prioridad se basará; y en y de cualquier Patente de Invención que se expida para la invención en cualquiera y todos los países. Yo/Nosotros por el presente acuerdo ayudarle al Cesionario en la prosecución de la solicitud(es) y en cualquier interferencia, conflicto, oposición o litigio que pudiese surgir que comprenda la invención o la patente o patentes sobre ella, y firmar para cualquiera y todos los países cualquier documento relacionado con solicitudes que se deriven de, correspondientes a o equivalentes a la solicitud anteriormente identificada como el Cesionario solicite; y yo/nosotros por el presente autorizo al Cesionario o a su designado (o nominatario(s) que *inserte acá cualquier Número de Prioridad, Fecha de Presentación y País de Presentación correspondientes.*

Número de Prioridad	Fecha de Presentación	País de Presentación

a la solicitud de Prioridad anterior de un país donde esa propiedad de patente del país deba ser identificada y registrada anteriormente para registro de este Traspaso. Yo/Nosotros autorizo al Cesionario o a su designado que traduzca este Traspaso a todos los idiomas que sean necesarios; y le solicito que dicha Patente de Invención sea expedida al Cesionario; y consiento el registro de este Traspaso, o una Copia Fiel Notarial del mismo; estando bajo acuerdo no sólo que yo/nosotros tengo plena facultad para hacer el mismo, pero también que dichas

facultades traspasadas no están gravadas por ningún otorgamiento, licencia u otra facultad dada por el presente.

Suscrito y Declarado ante mí/nosotros:

En: _____ este día ____ de _____ de 20__ Con vigencia el 25 de mayo de 2010 Firma: _____ Nombre: DEIRDRE MARGARET HOLCROFT Residencia: 2827 Zamora Lane Davis, CA 95618 País: Estados Unidos de América Ciudadanía: Estados Unidos de América Dirección Postal: la misma residencia Empleado por: The Dow Chemical Company De: Estados Unidos de América	En: Piracicaba, SP - Brasil este día 08 de abril de 2011 Con vigencia el 25 de mayo de 2010 Firma: (ilegible) Nombre: WALTER SERGIO PINTO PEREIRA Residencia: Rua Napoleao Laureano, 72 13,418-160 – Piracicaba - SP País: Brasil Ciudadanía: Brasil Dirección Postal: la misma residencia Empleado por: The Dow Chemical Company De: Estados Unidos de América
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Caso Dow No.: 69931

TESTIGO QUE SUSCRIBE
AFFIDAVIT DE EJECUCION
DE UN TRASPASO

Yo, Angélica Aparecida Pagotto Pereira

Cuya dirección postal es: Rua Napoléao Laureano, 72 - Piracicaba - S.Paulo -
Brasil - CEP 13418-160

Juro y afirmo que estaba personalmente presente y vi a:

WALTER SERGIO PINTO PEREIRA

a quien conozco o quien se identificó ante mí como el inventor(es) nombrado en el
traspaso adjunto, debidamente firma el mismo para los fines ahí expresados.

Firmado en: Piracicaba, SP, Brasil

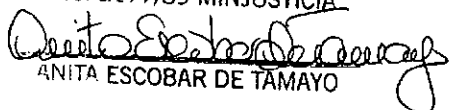
En este día 08 de _____ de 2011

(firma: ilegible)

Sellos

Testigo que Suscribe

Traducido según mi mejor saber y entender, este día 23 de mayo de 2011,
en la ciudad de Bogotá, D.C., por Anita Escobar de Tamayo, Traductora Oficial,
Res. 2177 de 1989, Ministerio de Justicia, República de Colombia.

TRADUCTORA OFICIAL
RES. 2177/89 MINJUSTICIA

ANITA ESCOBAR DE TAMAYO

APOSTILLE
(Convention de La Haye du 5 octobre 1961)

1. Country : United States of America
2. This public document has been signed by **JACQUELINE L PEARLMAN**
3. acting in the capacity of **NOTARY PUBLIC**
4. bears the seal/stamp **JACQUELINE L PEARLMAN , NOTARY PUBLIC, PHILADELPHIA COUNTY, COMMONWEALTH OF PENNSYLVANIA**

Certified

5. at Harrisburg, Pennsylvania
6. The 4th day of May, 2011
7. by Carol Aichele, Secretary of the Commonwealth of Pennsylvania
8. No: 201114931
9. Seal/Stamp
10. Signature



Carol Aichele

Carol Aichele

This Apostille only certifies the authenticity of the signature and the capacity of the person who has signed the public document, and, where appropriate, the identity of the seal or stamp which the public document bears.

This Apostille does not certify the content of the document for which it was issued.

This Apostille is not valid for use anywhere within the United States of America, its territories or possessions.

TRUE COPY

TO ALL TO WHOM THESE PRESENTS SHALL COME,

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

at **Philadelphia, PA 19106, USA**

this 19th day of April, 2011



Janice Soulas
Office Professional
THE DOW CHEMICAL COMPANY

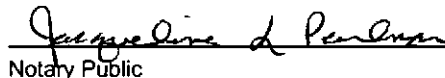
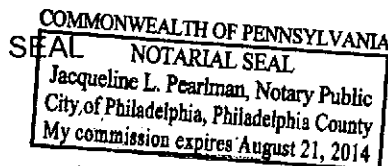
NOTARIAL CERTIFICATE

UNITED STATES OF AMERICA)
COMMONWEALTH OF PENNSYLVANIA) SS
County/Parish of PHILADELPHIA)

On this 19th day of April, 2011, personally appeared before me,

Janice Soulas

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.



Notary Public
JACQUELINE PEARLMAN
NOTARY PUBLIC, PHILADELPHIA, PENNSYLVANIA
MY COMMISSION EXPIRES: August 21, 2014

[illegible]

This Assignment 110 is in the ESK/J15H format and has the same meaning as other assignments with the same 110 number and H/O.

FORM 110 (R. 5/97)

(with Priority Rights)

which invention was made and invented by me/us out of and in the course of my/our employment with my/our respective employers as stated below my/our name(s). I/we acknowledge that I/we hold the invention and all patent and other rights and powers obtainable or exercisable in respect thereof in trust for our respective employers. As trustee(s), and for good and valuable consideration and/or the remuneration received for my/our work, I/we sell, assign and transfer unto:

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106
UNITED STATES OF AMERICA

a corporation organized and existing under the laws of the State of Delaware (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, including provisional applications when permitted by law, for Letters 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 United States domestic laws, International Convention(s) and Treaties in the name of Assignee, and do hereby authorize Assignee or its designee to insert here the Priority Number, Filing Date, and Filing Country

Priority Number	Filing Date	Filing Country
61/347,977	May 25, 2010	United States of America

of the application, on which the claim for priority will be based; and 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; and I/we do hereby authorize Assignee or its designee (or nominee(s)) to insert here any corresponding equivalent Application Number, Filing Date, and Filing Country

Application Number	Filing Date	Filing Country

to the above Priority application of any country where that country's patent property must be identified and entered hereinabove for recordal of this Assignment. 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 mc/us:

At: DAVIS, CA
 this 6 day of APRIL, 20 11
 Effective as of May 25, 2010
 Signature: 
 Full Name: DEIRDRE MARGARET HOLCROFT
 Residence: 2827 Zamora Lane
Davis, CA 95618
 Country: United States of America
 Citizenship: United States of America
 P.O. Address: Same as residence
 Employed By: The Dow Chemical Company
 Of Country: United States of America

At: _____
this _____ day of _____, 20 _____
Effective as of May 25, 2010

Signature: _____
Full Name: WALTER SERGIO PINTO PEREIRA
Residence: Rua Napoleao Laureano, 72
13.418-160 - Piracicaba - SP
Country: Brazil
Citizenship: Brazil
P.O. Address: Same as residence
Employed By: The Dow Chemical Company
Of Country: United States of America

[illegible]

This Assignment 220 is in the ENGLISH language and has the same meaning in other languages with the same 220 number and R/Dates.

FORM 220

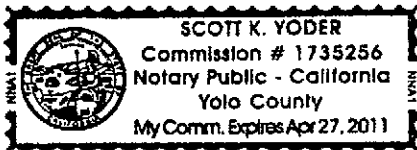
UNITED STATES OF AMERICA)

STATE of California) SS
County of Yo'llo)

On this 6 day of April 6, 20 11, personally appeared before me,

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.

James H. Hill



[illegible]

This Assignment 110 is in the **ENGLISH** language and has the same meaning in other languages with the same 110 number and R/D code.

FORM 110 (R 5/97)

I/we 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: **WAXY COATINGS ON PLANT PARTS**

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106
UNITED STATES OF AMERICA

a corporation organized and existing under the laws of the State of Delaware (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, including provisional applications when permitted by law, for Letters 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 United States domestic laws, International Convention(s) and Treaties in the name of Assignee, and do hereby authorize Assignee or its designee to insert here the Priority Number, Filing Date, and Filing Country

Priority Number	Filing Date	Filing Country
61/347,977	May 25, 2010	United States of America

of the application, on which the claim for priority will be based; and 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; and I/we do hereby authorize Assignee or its designee (or nominee(s)) to insert here any corresponding equivalent Application Number, Filing Date, and Filing Country

Application Number	Filing Date	Filing Country

to the above Priority application of any country where that country's patent property must be identified and entered hereinabove for recordal of this Assignment. 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: _____
this _____ day of _____, 20 _____
Effective as of May 25, 2010

Signature: _____
Full Name: DEIRDRE MARGARET HOLCROFT
Residence: 2827 Zamora Lane
Davis, CA 95618
Country: United States of America
Citizenship: United States of America
P.O. Address: Same as residence
Employed By: The Dow Chemical Company
Of Country: United States of America

At: Piracicaba, SP - Brazil
this 08 day of April, 20 11
Effective as of May 25, 2010

Signature: [Signature]

Full Name: WALTER SERGIO PINTO PEREIRA

Residence: Rua Napoleao Laureano, 72
13.418-160 - Piracicaba - SP

Country: Brazil

Citizenship: Brazil

P.O. Address: Same as residence

Employed By: The Dow Chemical Company

Of Country: United States of America

FORM 881

Dow Case No. 69931

**SUBSCRIBING WITNESS
AFFIDAVIT OF EXECUTION
OF AN ASSIGNMENT**

I,
Angelica Aparecida Pagotto Pereira

Whose full post office address is:
Rua Napoleão Laureano, 72 - Piracicaba - S.Paulo - Brazil - CEP 13418-160

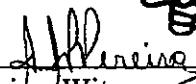
Make oath and say that I was personally present and did see:

WALTER SERGIO PINTO PEREIRA

Who is/are personally known or identified to me to be the inventor(s)
named in the attached assignment, duly sign and execute the same for
the purposes therein stated.

Signed at: ___Piracicaba, SP , Brazil_____

On this _08_ day of _April_, 2011


Subscribing Witness

 1 TABELIÃO
DE NOTAS

08/90

VALIDO SOMENTE COM SELO AUTENTICIDADE

1º TABELIÃO DE NOTAS DE PIRACICABA
RUA BOA MORTE, 1220 - CENTRO - FONE: (19) 3422-2026
BEL. BENNUR GALVÃO DO AMARAL JR. - TAB. DESIGNADO

Reconheço por SEMELHANÇA SEM VALOR ECONOMICO a(s) Firma(s)
de: ANGELICA APARECIDA PAGOTTO PEREIRA, a qual confere com
o original depositado em cartório.
Piracicaba/SP, 08/04/2011 - 14:19:30

Em Testemunho da verdade, Total R\$ 3,50
Maria Aparecida Correia de Souza - ESCRIVENTE
Biqueta: 421377 Selos: 163571AA

MARIA AF. CORREIA DE SOUZA
ESCRIV. HABILITADA

1º Tabelião de Notas de Piracicaba-SP

Firmas:

24º Tab. S. Paulo - Capital

27º Tab. S. Paulo - Capital

28º Tab. S. Paulo - Capital

Cartório Proença - RJ



TRADUCCION OFICIAL No. 2011-05-23-340
DE UN DOCUMENTO ESCRITO EN INGLES

LOS ESTADOS UNIDOS DE AMERICA
A TODOS A QUIENES LOS PRESENTES LLEGAREN:
DEPARTAMENTO DE COMERCIO DE LOS ESTADOS UNIDOS
Oficina de Marcas y Patentes de los Estados Unidos

01 de abril de 2011

POR MEDIO DEL PRESENTE CERTIFICO QUE ADJUNTO AL PRESENTE SE
ENCUENTRA UNA COPIA FIEL DE LOS REGISTROS DE LA OFICINA DE
PATENTES Y MARCAS DE LOS ESTADOS UNIDOS DE AQUELLOS
DOCUMENTOS DE LA SOLICITUD DE PATENTE IDENTIFICADA A
CONTINUACION QUE CUMPLIO LOS REQUERIMIENTOS PARA QUE SE LE
OTORQUE UNA FECHA DE PRESENTACION BAJO 35 USC 111.

NUMERO DE SOLICITUD: 61/347,977

FECHA DE PRESENTACION: 25 de mayo de 2010

EL CODIGO DEL PAIS Y EL NUMERO DE SU SOLICITUD DE PRIORIDAD,
PARA SER USADOS PARA PRESENTACION EN EL EXTERIOR BAJO LA
CONVENCION DE PARIS, ES US61/347,977

Oficina de Patentes y Marcas de los
Estados Unidos
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Por Autoridad del
Subsecretario de Comercio para
Propiedad Intelectual
y Director de la Oficina de Patentes y

Recibo de Reconocimiento Electrónico					
ID EFS:		7679431			
Número de Solicitud:		61347977			
Número de Solicitud Internacional					
Número de Confirmación:		3413			
Título de la Invención:		Recubrimientos Cerosos sobre Partes de Planta			
Primer Inventor/Nombre del Solicitante:		Deirdre Margaret Holcroft			
Número del Cliente:		21898			
Registrador		Carl P. Hemenway/Janice Soulas			
Registrador Autorizado por:		Carl P. Hemenway			
Número de Expediente:		69931			
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Listas de Archivos:					
Número del Documento	Descripción del Documento	Nombre del Archivo	Tamaño del Archivo(Bytes)/ Message Digest	MultiPartes/ zip	Páginas (si aplica)
1	Hoja de Datos de la Solicitud	ADS.pdf	1029525 557575740d2efa85e 924e9c62534a85743 062b7	no	4
Advertencias:					
Información:					
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Descripción del Documento			Inicio	Fin	

	Descripción	1	17		
	Reivindicaciones	18	18		
	Resumen	19	19		
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3	Hoja de Cálculo de Derechos (PTO-875)	fee-info.pdf	29285 02cc2dccb d8f6593cee d4771c8b8e 28c47593fd	no	2
Advertencias:					
Información:					
Tamaño Total de Archivos (en bytes):			1377150		

Este Recibo de Reconocimiento evidencia el recibo en la fecha indicada por la USPTO de los documentos indicados, caracterizados por el solicitante, e incluyendo conteo de páginas, donde aplica. Sirve como evidencia de recibo semejante a una Tarjeta Postal, según se describe en MPEP 503.

Nuevas Solicitudes Bajo 35 U.S.C. 111

Si una nueva solicitud se presenta y la solicitud incluye los componentes necesarios para una fecha de presentación (ver 37 CFR 1.53(b)-(d) y MPEP 506), se expedirá un Recibo de Presentación (37 CFR 1.54) en el debido curso y la fecha mostrada en este Recibo de Reconocimiento establecerá la fecha de presentación de la solicitud.

Fase Nacional de una Solicitud Internacional Bajo 35 U.S.C. 371

Si una presentación oportuna para registro en la fase nacional de una solicitud internacional cumple con las condiciones de 35 U.S.C. 371 y otros requerimientos que aplican se expedirá un Formato PCT/DO/EO/903 indicando aceptación de la solicitud como presentación en la fase nacional bajo 35 U.S.C. 371 además del Recibo de Presentación, en el curso debido.

Nueva Solicitud Internacional Presentada ante la USPTO como Oficina que Recibe

Si se presenta una nueva solicitud internacional y la solicitud internacional incluye los componentes necesarios para una fecha de presentación internacional (ver Artículo 11 PCT y MPEP 1810), se expedirá una Notificación del Número de la Solicitud Internacional y de la Fecha de Presentación Internacional (Formato PCT/RO/105) en el curso debido, sujeta a las prescripciones relacionadas con la seguridad nacional, y la fecha que aparece en este Recibo de Reconocimiento establecerá la fecha de presentación internacional de la solicitud.

Reivindicaciones:

1. Un método para tratar partes de planta que comprende formar un recubrimiento sobre la superficie de dichas partes de planta mediante la aplicación de una capa de una composición de recubrimiento a dicha superficie de dichas partes de planta, en donde dicha composición de recubrimiento comprende
 - (a) una o más ceras, y
 - (b) uno o más compuestos de ciclopropeno.
2. El método de la reivindicación 1, en donde dicha composición de recubrimiento comprende además uno o más agentes encapsulantes moleculares.
3. El método de la reivindicación 1, en donde algo o todo de dicho ciclopropeno está encapsulado en un agente encapsulante molecular.
4. El método de la reivindicación 1, en donde la relación en peso de dicho compuesto de ciclopropeno a dicha cera es de 0.2 ppm a 0.2%.
5. El método de la reivindicación 1, en donde dichas partes de planta se seleccionan del grupo que consiste de frutas y vegetales.
6. El método de la reivindicación 1, en donde dichas partes de planta se seleccionan del grupo que consiste de manzanas, aguacates, tomates, guayabas y melones.

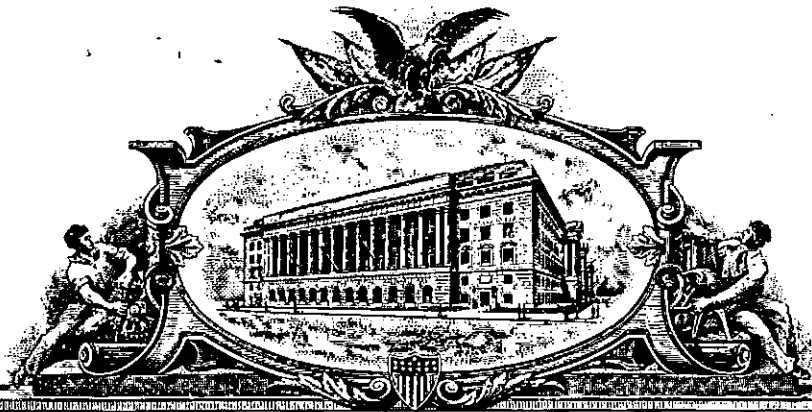
7. El método de la reivindicación 1, en donde dichas partes de planta son seleccionadas del grupo que consiste de tomates y aguacates.
8. El método de la reivindicación 1, en donde dicha cera comprende oleato de morfolina, ceras de petróleo, y mezclas de las mismas.
9. El método de la reivindicación 1, en donde dicho ciclopropeno comprende 1-metilciclopropeno.

Traducido según mi mejor saber y entender, este día 23 de mayo de 2011, en la ciudad de Bogotá, D.C., por Anita Escobar de Tamayo, Traductora Oficial, Res. 2177 de 1989, Ministerio de Justicia, República de Colombia.

TRADUCTORA OFICIAL
RES. 2177/89 MINJUSTICIA


ANITA ESCOBAR DE TAMAYO

AL



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office**

April 01, 2011

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM
THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK
OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT
APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A
FILING DATE UNDER 35 USC 111.**

APPLICATION NUMBER: 61/347,977

FILING DATE: May 25, 2010

**THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY
APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS
CONVENTION, IS US61/347,977**

**By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office**

**T. LAWRENCE
Certifying Officer**



Electronic Acknowledgement Receipt

EFS ID:	7679431
Application Number:	61347977
International Application Number:	
Confirmation Number:	3413
Title of Invention:	Waxy Coatings for Plant Parts
First Named Inventor/Applicant Name:	Deirdre Margaret Holcroft
Customer Number:	21898
Filer:	Carl P. Hemenway/Janice Soulas
Filer Authorized By:	Carl P. Hemenway
Attorney Docket Number:	69931
Receipt Date:	25-MAY-2010
Filing Date:	
Time Stamp:	14:34:23
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 220
RAM confirmation Number	744
Deposit Account	181850
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Application Data Sheet	ADS.pdf	1029525	no	4
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Warnings:

Information:

2		69931.pdf	318340	yes	19
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Multipart Description/PDF files in .zip description

Document Description		Start	End
Specification		1	17
Claims		18	18
Abstract		19	19

Warnings:

Information:

3	Fee Worksheet (PTO-875)	fee-info.pdf	29285	no	2
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Warnings:

Information:

Total Files Size (in bytes):	1377150
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

WAXY COATINGS ON PLANT PARTS

BACKGROUND:

[0001] It is sometimes desired to expose plant parts to a cyclopropene compound. For example, in some cases, exposure of plant parts to a cyclopropene compound will inhibit the effects of ethylene, and such inhibition is sometimes desirable. For example, some plant parts are harvested when they are at a stage of ripeness prior to the stage of ripeness at which it is most desirable to consume them. For another example, some plant parts are harvested at a stage of ripeness that is either at or immediately before the stage at which it is most desirable to consume them. In either example, such plant parts are sometimes stored and/or shipped, and it is desirable to delay further ripening during shipping and/or storage to be sure that the plant parts do not become over-ripe prior to purchase and/or consumption by the consumer.

[0002] In some cases, certain fruits or vegetables are normally given a coating prior to shipment and/or storage. US 6,165,529 describes coatings for fresh produce that contains hydrolyzed polyvinyl alcohol, soluble starch, and surfactant. Some of these coatings prevent water from evaporating from the fruit, thus maintaining fruit quality and preventing loss of weight. It is desired to provide treatments for plant parts that have the advantages that such coatings provide while also providing the advantages provided by treatment with a cyclopropene compound.

STATEMENT OF THE INVENTION:

[0003] In a first aspect of the present invention, there is provided a method of treating plant parts comprising forming a coating on the surface of said plant parts by applying a layer of a coating composition to said surface of said plant parts, wherein said coating composition comprises

- (a) one or more wax, and
- (b) one or more cyclopropene compound.

DETAILED DESCRIPTION:

[0004] The following definitions are used herein. A "plant part" is a portion of a plant that is separated from a whole plant. "Treatment" of a plant part means bringing that plant part into contact with a composition. Removal of useful plant parts from a

whole plant is "harvesting." A "fatty chain" is a hydrocarbon chain having 8 or more carbon atoms. A compound containing one or more fatty chain is a "fatty" compound. A compound that does not contain any fatty chain is a "non-fatty" compound. A "hydrocarbon chain" is a group of covalently bound atoms that contains only atoms of carbon and hydrogen. A "liquid composition" is liquid over a temperature range of at least 15°C to 40°C. A material is "dispersed" in a continuous medium if that material is present as isolated particles of 1 micrometers or larger and if those particles are distributed throughout the continuous medium. A "negligible amount" of an ingredient in a composition is an amount that is 0.05% or less by weight of that ingredient, based on the weight of that composition.

[0005] A spreadable solid composition is defined herein as a composition that is capable of being spread as a layer onto plant parts and are mechanically stable over a temperature range of at least 15°C to 40°C when they are not under the mechanical stress of the application process. That is, when a layer of such a composition is present on a surface and is not subject to any mechanical force other than gravity, the layer retains its shape for 5 days or more over a temperature range of at least 15°C to 40°C. One type of spreadable solid composition is a meltable solid, which becomes a liquid at some temperature higher than 40°C, and that liquid is capable of being spread onto plant parts, subsequently cooling and becoming mechanically stable. Another type of spreadable solid composition is a semisolid composition.

[0006] A semisolid composition is defined herein as a composition that has the following characteristics over a temperature range of at least 15°C to 40°C. These compositions are capable of being spread with an applicator but are mechanically stable when they are not under the mechanical stress of the application process. That is, when a layer of such a composition is present on a surface and is not subject to any mechanical force other than gravity, the layer retains its shape for 5 days or more. Semisolid coating compositions have viscosity at 0.01 sec⁻¹ of 10 Pa*s (100 poise) or higher. When the same composition is put under mechanical stress, such as brushing, the composition is capable of flowing and forming a layer on a surface. Semisolid coating compositions have viscosity at 1,000 sec⁻¹ of 1 Pa*s (10 poise) or lower.

[0007] The method of the present invention involves treating plant parts. Preferred plant parts are edible and non-edible flowers, buds, blooms, seeds, cuttings,

roots, bulbs, fruits, vegetables, leaves, and combinations thereof. More preferred are edible plant parts; more preferred are fruits and vegetables.

[0008] Many of the plant parts that are suitable for use in the practice of the present invention can be usefully divided into categories or groups. One useful method for defining such groups is the "Definition and Classification of Commodities," published on or before March 23, 2006, by the Food and Agriculture Organization ("FAO") of the United Nations as a "Draft."

[0009] Crop Group 1 is cereals. Crop Group 2 is roots and tubers. Crop Group 3 is sugar crops. Crop Group 4 is pulses, including, for example, beans, and garden pea. Crop Group 5 is nuts. Crop Group 6 is oil-bearing crops, including, for example, soybeans, groundnuts, olives, and canola.

[0010] Crop Group 7 is vegetables, including cabbages, artichokes, asparagus, lettuce, spinach, cassava leaves, tomatoes, cauliflower, cucurbits (including pumpkins, cucumbers and gherkins, squash, watermelon, cantaloupe, honeydew, and other mixed melons) eggplants, chilies and peppers, green onions, dry onions, garlic, leek, other alliaceous vegetables, green beans, green peas, green broad beans, string beans, carrots, okra, green corn, mushrooms, bamboo shoots, beets, chards, capers, cardoons, celery, chervil, cress, fennel, horseradish, marjoram, oyster plant, parsley, parsnips, radish, rhubarb, rutabaga, savory, scorzonera, sorrel, watercress, and other vegetables.

[0011] Crop Group 8, is fruits, including, for example, bananas and plantains; citrus fruits; pome fruits; stone fruits; berries; grapes; tropical fruits; miscellaneous fruits; and other fruits. Pome fruits include, for example, apple, pear, quince, and other pome fruits. Tropical fruits include, for example, fig, persimmon, kiwifruit, mango, avocado, pineapple, date, cashew apple, papaya, breadfruit, carambola, chirimoya, durian, feijoa, guava, mombin, jackfruit, longan, mammec, mangosteen, naranjillo, passion fruit, rambutan, sapote, sapodilla, star apple, and other tropical fruits.

[0012] Crop Group 9 is fibers. Crop Group 10 is spices. Crop Group 11 is fodder crops. Crop Group 12 is stimulant crops, including, for example, coffee and tea. Crop Group 13 is tobacco and rubber and other crops.

[0013] Preferred are Crop Groups 7 and 8. Within Crop Group 7, preferred are tomatoes and cucurbits; more preferred are tomatoes, melons, and cucumbers; more

preferred are tomatoes and melons. Within Crop Group 8, preferred are pome fruits and tropical fruits; more preferred are apples, avocados, and guavas; more preferred are avocados.

[0014] In the practice of the present invention, plant parts are treated after they are harvested.

[0015] The practice of the present invention involves the use of one or more wax. As used herein a wax is a fatty compound that is solid or semisolid over a temperature range that includes at least 15°C to 40°C. Each fatty chain may be saturated or unsaturated. In addition to the one or more fatty chain, suitable waxes may have any of a wide variety of other chemical groups. Preferred waxes are selected from hydrocarbons, monoesters, multi-esters, ketones, alcohols, aldehydes, acids, acid salts, sterol esters, terpenes, and mixtures thereof.

[0016] Hydrocarbon waxes include hydrocarbons having 12 to 120 carbon atoms. A hydrocarbon molecule in a hydrocarbon wax may be straight, branched, non-aromatic cyclic, or a combination thereof. Hydrocarbon waxes usually exist as a mixture of 2 or more different hydrocarbon molecules. Hydrocarbon waxes include petroleum waxes, which are separated from crude petroleum. Petroleum waxes include paraffin wax, microcrystalline wax, and petrolatum. Paraffin wax has 60% or more by weight straight-chain hydrocarbons, based on the weight of the paraffin, and most of the straight-chain hydrocarbons in paraffin wax typically have 18 to 45 carbon atoms each. Microcrystalline wax has a higher proportion of branched and cyclic hydrocarbons than paraffin wax. Petrolatum is a type of microcrystalline wax that blends well with mineral oil. Hydrocarbon waxes also include polyethylene wax, which is a polyethylene polymer having number-average molecular weight of 20,000 or lower. Preferred among hydrocarbon waxes are petroleum waxes, polyethylenes, and mixtures thereof.

[0017] Monoester waxes include any wax that has exactly one ester group. Preferred monoester waxes are esters of a fatty acid with an alcohol selected from fatty alcohols, sterols, terpenoids, hydrocarotenoid, vitamin A, and mixtures thereof. Preferred monoester waxes are esters of a fatty acid with a fatty alcohol. Preferred monoester waxes are esters of a fatty acid having a hydrocarbon chain of 15-19 carbon atoms and a fatty alcohol having a hydrocarbon chain of 29 to 33 carbon atoms.

[0018] Multi-ester waxes are waxes that contain two or more ester group in each molecule. These may be formed, for example, when a hydroxylated fatty acid forms two ester linkages with an acid and an alcohol. Other multi-ester waxes are formed when a branched-chain alcohol having two or more hydroxyl groups forms two or more ester linkages with two or more carboxylic acids.

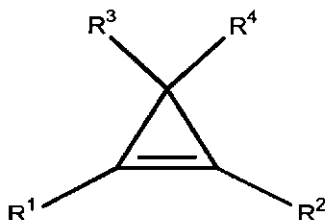
[0019] Fatty acid waxes include fatty acids that have hydrocarbon chain with 15-34 carbon atoms. Fatty acids are often found in mixtures of two or more different fatty acids. Fatty acids are also often found in mixtures with monoester waxes. Also included in the fatty acids are salts of fatty acids and acid-base complexes of a fatty acid with a basic compound such as amine compound. A preferred fatty acid wax contains one or more fatty acid and one or more amine compound. A more preferred fatty acid wax is morpholine oleate.

[0020] Alcohol waxes include alcohols with one, two or more hydroxyl groups. Some alcohol waxes have hydrocarbons with 19 to 33 carbon atoms. Ketone waxes have one or more ketone groups in each molecule.

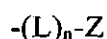
[0021] Some biologically produced waxes contain mixtures of two or more types of waxes. Biologically produced waxes include waxes obtained directly from plants or animals and waxes produced by alteration (such as, for example, hydrogenation) of materials obtained from plants or animals. Preferred biologically produced waxes are beeswax, insect wax, shellac wax, spermaceti, lanolin, carnauba wax, other plant waxes, and mixtures thereof.

[0022] Preferred waxes are petroleum waxes, fatty acid waxes, monoester waxes, polyethylene waxes, and mixtures thereof.

[0023] The practice of the present invention involves the use of one or more cyclopropene compound. As used herein, a cyclopropene compound is any compound with the formula



where each R^1 , R^2 , R^3 and R^4 is independently selected from the group consisting of H and a chemical group of the formula:



where n is an integer from 0 to 12. Each L is a bivalent radical. Suitable L groups include, for example, radicals containing one or more atoms selected from H, B, C, N, O, P, S, Si, or mixtures thereof. The atoms within an L group may be connected to each other by single bonds, double bonds, triple bonds, or mixtures thereof. Each L group may be linear, branched, cyclic, or a combination thereof. In any one R group (i.e., any one of R^1 , R^2 , R^3 and R^4) the total number of heteroatoms (i.e., atoms that are neither H nor C) is from 0 to 6. Independently, in any one R group the total number of non-hydrogen atoms is 50 or less. Each Z is a monovalent radical. Each Z is independently selected from the group consisting of hydrogen, halo, cyano, nitro, nitroso, azido, chlorate, bromate, iodate, isocyanato, isocyanido, isothiocyanato, pentafluorothio, and a chemical group G, wherein G is a 3 to 14 membered ring system.

[0024] The R^1 , R^2 , R^3 , and R^4 groups are independently selected from the suitable groups. Among the groups that are suitable for use as one or more of R^1 , R^2 , R^3 , and R^4 are, for example, aliphatic groups, aliphatic-oxy groups, alkylphosphonato groups, cycloaliphatic groups, cycloalkylsulfonyl groups, cycloalkylamino groups, heterocyclic groups, aryl groups, heteroaryl groups, halogens, silyl groups, other groups, and mixtures and combinations thereof. Groups that are suitable for use as one or more of R^1 , R^2 , R^3 , and R^4 may be substituted or unsubstituted.

[0025] Among the suitable R^1 , R^2 , R^3 , and R^4 groups are, for example, aliphatic groups. Some suitable aliphatic groups include, for example, alkyl, alkenyl, and alkynyl groups. Suitable aliphatic groups may be linear, branched, cyclic, or a combination thereof. Independently, suitable aliphatic groups may be substituted or unsubstituted.

[0026] As used herein, a chemical group of interest is said to be "substituted" if one or more hydrogen atoms of the chemical group of interest is replaced by a substituent.

[0027] Also among the suitable R^1 , R^2 , R^3 , and R^4 groups are, for example, substituted and unsubstituted heterocyclyl groups that are connected to the cyclopropene compound through an intervening oxy group, amino group, carbonyl

group, or sulfonyl group; examples of such R^1 , R^2 , R^3 , and R^4 groups are heterocycloxy, heterocyclylcarbonyl, diheterocyclylamino, and diheterocyclylaminosulfonyl.

[0028] Also among the suitable R^1 , R^2 , R^3 , and R^4 groups are, for example, substituted and unsubstituted heterocyclic groups that are connected to the cyclopropene compound through an intervening oxy group, amino group, carbonyl group, sulfonyl group, thioalkyl group, or aminosulfonyl group; examples of such R^1 , R^2 , R^3 , and R^4 groups are diheteroarylamino, heteroarylthioalkyl, and diheteroarylaminosulfonyl.

[0029] Also among the suitable R^1 , R^2 , R^3 , and R^4 groups are, for example, hydrogen, fluoro, chloro, bromo, iodo, cyano, nitro, nitroso, azido, chlorato, bromato, iodato, isocyanato, isocyanido, isothiocyanato, pentafluorothio; acetoxo, carboethoxy, cyanato, nitrato, nitrito, perchlorato, allenyl, butylmercapto, diethylphosphonato, dimethylphenylsilyl, isoquinolyl, mercapto, naphthyl, phenoxy, phenyl, piperidino, pyridyl, quinolyl, triethylsilyl, trimethylsilyl; and substituted analogs thereof.

[0030] As used herein, the chemical group G is a 3 to 14 membered ring system. Ring systems suitable as chemical group G may be substituted or unsubstituted; they may be aromatic (including, for example, phenyl and naphthyl) or aliphatic (including unsaturated aliphatic, partially saturated aliphatic, or saturated aliphatic); and they may be carbocyclic or heterocyclic. Among heterocyclic G groups, some suitable heteroatoms are, for example, nitrogen, sulfur, oxygen, and combinations thereof. Ring systems suitable as chemical group G may be monocyclic, bicyclic, tricyclic, polycyclic, spiro, or fused; among suitable chemical group G ring systems that are bicyclic, tricyclic, or fused, the various rings in a single chemical group G may be all the same type or may be of two or more types (for example, an aromatic ring may be fused with an aliphatic ring).

[0031] Preferably, one or more of R^1 , R^2 , R^3 , and R^4 is hydrogen or (C_1 - C_{10}) alkyl. More preferably, each of R^1 , R^2 , R^3 , and R^4 is hydrogen or (C_1 - C_8) alkyl. In some embodiments, each of R^1 , R^2 , R^3 , and R^4 is hydrogen or (C_1 - C_4) alkyl. More preferably, each of R^1 , R^2 , R^3 , and R^4 is hydrogen or methyl. More preferably, R^1 is (C_1 - C_4) alkyl and each of R^2 , R^3 , and R^4 is hydrogen. More preferably, R^1 is methyl

and each of R^2 , R^3 , and R^4 is hydrogen, and the cyclopropene compound is known herein as "1-MCP."

[0032] Preferably, a cyclopropene compound is used that has boiling point at one atmosphere pressure of 50°C or lower; or 25°C or lower; or 15°C or lower.

Independently, preferably a cyclopropene compound is used that has boiling point at one atmosphere pressure of -100°C or higher; -50°C or higher; or -25°C or higher; or 0°C or higher.

[0033] The composition of the present invention preferably includes at least one molecular encapsulating agent. More preferably, at least one molecular encapsulating agent encapsulates one or more cyclopropene compound or a portion of one or more cyclopropene compound. A complex that contains a cyclopropene compound molecule or a portion of a cyclopropene compound molecule encapsulated in a molecule of a molecular encapsulating agent is known herein as a "cyclopropene compound complex."

[0034] Preferably, at least one cyclopropene compound complex is present that is an inclusion complex. In such an inclusion complex, the molecular encapsulating agent forms a cavity, and the cyclopropene compound or a portion of the cyclopropene compound is located within that cavity.

[0035] Independently, in some of such inclusion complexes, the interior of the cavity of the molecular encapsulating agent is substantially apolar or hydrophobic or both, and the cyclopropene compound (or the portion of the cyclopropene compound located within that cavity) is also substantially apolar or hydrophobic or both. While the present invention is not limited to any particular theory or mechanism, it is contemplated that, in such apolar cyclopropene compound complexes, van der Waals forces, or hydrophobic interactions, or both, cause the cyclopropene compound molecule or portion thereof to remain within the cavity of the molecular encapsulating agent.

[0036] The amount of molecular encapsulating agent can usefully be characterized by the ratio of moles of molecular encapsulating agent to moles of cyclopropene compound. Preferably, the ratio of moles of molecular encapsulating agent to moles of cyclopropene compound is 0.1 or larger; more preferably 0.2 or larger; more preferably 0.5 or larger; more preferably 0.9 or larger; more preferably 1.0 or larger. Independently, in some of such embodiments, the ratio of moles of

molecular encapsulating agent to moles of cyclopropene compound is preferably 10 or lower; more preferably 5 or lower; more preferably 2 or lower; more preferably 1.5 or lower.

[0037] Suitable molecular encapsulating agents include, for example, organic and inorganic molecular encapsulating agents. Suitable organic molecular encapsulating agents include, for example, substituted cyclodextrins, unsubstituted cyclodextrins, and crown ethers. Suitable inorganic molecular encapsulating agents include, for example, zeolites. Mixtures of suitable molecular encapsulating agents are also suitable. Preferably, the encapsulating agent is alpha-cyclodextrin, beta-cyclodextrin, gamma-cyclodextrin, or a mixture thereof. In some embodiments of the invention, alpha-cyclodextrin is used. The preferred encapsulating agent will vary depending upon the structure of the cyclopropene compound or cyclopropene compounds being used. When 1-MCP is used, the preferred molecular encapsulating agent is alpha-cyclodextrin. Any cyclodextrin or mixture of cyclodextrins, cyclodextrin polymers, modified cyclodextrins, or mixtures thereof can also be utilized pursuant to the present invention.

[0038] The practice of the present invention involves a coating composition. A coating composition is a composition that is capable of being applied in a layer on the surface of a plant part. The layer may be continuous or discontinuous. Preferred are layers that, immediately after they are applied to the surface, have thickness of from 10 micrometer to 1 mm.

[0039] The coating composition contains wax and one or more cyclopropene compound. It is useful to characterize the ratio (the "CP/wax ratio") of the weight of the total of all cyclopropene compound(s) to the weight of the total of all wax(es). A useful unit for that ratio is "ppm," to denote the parts by weight of cyclopropene(s) per million parts by weight of wax(es). Another useful unit for that ratio is "%" to denote the parts by weight of cyclopropene(s) per hundred parts by weight of wax(es). Preferred are coating compositions having CP/wax ratio of 0.2 ppm or higher; more preferred is 0.5 ppm or higher; more preferred is 1 ppm or higher. Independently, preferred are coating compositions having CP/wax ratio of 0.5% or lower; or 0.2% or lower.

[0040] Preferred coating compositions are either liquid compositions or are spreadable solid compositions. More preferred are either liquid compositions or are semisolid composition.

[0041] Preferred liquid coating compositions contain 40% to 99% by weight, based on the weight of the composition, of a continuous liquid medium. Ingredients are dissolved or dispersed in the continuous liquid medium. Preferred continuous liquid media contain water; more preferred are continuous liquid media in which the amount of water, by weight based on the weight of the continuous liquid medium, is 50% or more; more preferred is 80% or more; more preferred is 95% or more.

[0042] In a liquid coating composition, if the continuous liquid medium contains 50% or more water by weight, it is preferred that some or all of the wax is dispersed in the continuous liquid medium. When the wax is so dispersed, it is preferred that one or more surfactant is present in the liquid coating composition.

[0043] Liquid coating compositions, when the continuous liquid medium contains water, preferably contain one or more chelating agents. A "chelating agent" is a compound that contains two or more electron-donor atoms that are capable of forming coordinate bonds with a metal atom, and a single molecule of the chelating agent is capable of forming two or more coordinate bonds with a single metal atom. Preferred chelating agents are aminocarboxylic acids, 1,3-diketones, hydroxycarboxylic acids, polyamines, aminoalcohols, aromatic heterocyclic bases, phenol, aminophenols, oximes, Schiff bases, sulfur compounds, and mixtures thereof. More preferred are one or more aminocarboxylic acids, one or more hydroxycarboxylic acids, one or more oximes, or a mixture thereof. Preferred aminocarboxylic acids are ethylenediaminetetraacetic acid (EDTA), hydroxyethylethylenediaminetriacetic acid (HEDTA), nitrilotriacetic acid (NTA), N-dihydroxyethylglycine (2-HxG), ethylenebis(hydroxyphenylglycine) (EHPG), and mixtures thereof. Preferred hydroxycarboxylic acids are tartaric acid, citric acid, gluconic acid, 5-sulfoslicylic acid, and mixtures thereof. More preferred is EDTA.

[0044] When a chelating agent is used, the preferred amount of chelating agent, by weight of chelating agent based on the parts by weight of water, is 1 part per million (ppm) or more; more preferred is 5 ppm or more. Independently, the preferred amount of chelating agent, by weight of chelating agent based on the parts

by weight of water, is 200 ppm or less; more preferred is 100 ppm or less; more preferred is 50 ppm or less.

[0045] In liquid coating compositions, the preferred amount of wax, by weight based on the weight of the liquid coating composition, is 5% or higher; more preferred is 10% or higher; more preferred is 15% or higher. Independently, in liquid coating compositions, the preferred amount of wax, by weight based on the weight of the liquid coating composition, is 60% or lower; more preferred is 50% or lower; more preferred is 40% or lower.

[0046] In a semisolid coating composition, the preferred amount of wax is, by weight based on the weight of the semisolid coating composition, 61% or more; more preferred is 75% or more; more preferred is 90% or more; more preferred is 95% or more.

[0047] When applying a semisolid coating composition to fruits or vegetables, the amount applied is preferably, in milligrams of coating composition per kilogram of fruits or vegetables, 1 mg/kg or more; more preferably 2 mg/kg or more; more preferably 5 mg/kg or more; more preferably 10 mg/kg or more. Independently, when applying a semisolid coating composition to fruits or vegetables, the amount applied is preferably, in milligrams of coating composition per kilogram of fruits or vegetables, 200 mg/kg or less; more preferably 100 mg/kg or less.

[0048] Coating compositions may contain one or more optional ingredients in addition to wax and cyclopropene compound. Preferred coating compositions also contain one or more molecular encapsulating agent; more preferred are molecular encapsulating agents that encapsulate one or more cyclopropene compound.

[0049] Coating compositions may contain one or more optional adjuvant. Suitable adjuvants include, for example, surfactants, oil, chelating agents, and mixtures thereof. Suitable oils include mineral oil.

[0050] Preferred coating compositions either contain no starch or else contain, at most, a negligible amount of starch. More preferred coating compositions contain no starch. Preferred coating compositions either contain no polyvinyl alcohol or else contain, at most, a negligible amount of polyvinyl alcohol. More preferred coating compositions contain no polyvinyl alcohol. Preferred coating compositions either contain no non-fatty polymer or else contain, at most, a negligible amount of non-fatty polymer. More preferred coating compositions contain no non-fatty polymer.

Preferred coating compositions either contain no non-fatty compound that has molecular weight of 5,000 or above or else contain, at most, a negligible amount of non-fatty compound that has molecular weight of 5,000 or above. More preferred coating compositions contain no non-fatty compound that has molecular weight of 5,000 or above.

[0051] The coating composition may be applied to the surface of the plant part by any method. Preferred methods are dipping the plant part into the coating composition; spraying the coating composition onto the surface of the plant part; applying the coating composition onto the surface of the plant part using an applicator; and combinations thereof. Preferred applicators are brushes, blades, rods, fabrics, and combinations thereof; more preferred are brushes.

[0052] Preferred methods of applying the coating composition to the surface of the plant part are the following: method 1, in which a plant part is dipped into a liquid coating composition, and method 2, in which a semisolid coating composition is brushed onto the surface of a plant part.

[0053] It is to be understood that for purposes of the present examples that each operation disclosed herein is performed at 25°C unless otherwise specified.

EXAMPLES

[0054] In the following Examples, these abbreviations are used:

MCP = 1-methylcyclopropene

DL231 = Decco LustrTM 231 coating, aqueous emulsion of morpholine oleate, carnauba wax, and shellac, from Decco, Cerexagri Inc.

DL202 = Decco LustrTM 220 coating, aqueous emulsion of morpholine oleate, paraffin, and polyethylene, from Decco, Cerexagri Inc.

PNPL251 = Peach, Nectarine & Plum LustrTM coating, aqueous emulsion of morpholine oleate, paraffin, mineral oil, and carnauba wax, from Decco, Cerexagri Inc.

RH = relative humidity

P1 = powder containing encapsulation complex of alpha-cyclodextrin and MCP, also contains dextrose and an amino acid salt.

P2 = powder containing encapsulation complex of alpha-cyclodextrin and MCP, also contains dextrose.

P3 = containing encapsulation complex of alpha-cyclodextrin and MCP.

Example 1: Wax Coatings on Avocados

[0055] Hass avocados were premium grade, color stage 1 (100% light green), were shipped from a commercial grower in Oxnard, CA to the testing laboratory in Davis, CA. Treatments were performed in the day of arrival.

[0056] Coating compositions were made by adding EDTA (10 parts by weight per million parts by weight of water), followed by the wax emulsion (if used), as supplied by the manufacturer, and mixed for 5 minutes. The ratio of water to wax emulsion was as follows:

<u>Sample No.</u>	<u>Wax Emulsion</u>	<u>parts by weight of wax emulsion as supplied.</u>	<u>parts by weight of water</u>
1-1C	none	--	--
1-2C	none	--	--
1-3	DL231	2	1
1-4	DL202	1	4
1-5	PNPL251	1	4

[0057] Sample 1-1C was a comparative example (dry control, not dipped at all). Sample 1-2C was a dipping solution of water with no wax but with powder P2, with the amount of powder P2 to yield 300 microgram of 1-MCP per liter of dipping solution.

[0058] To make samples 1-3, 1-4, and 1-5, water was mixed with coating agent and with amino acid salt to yield the same concentration of amino acid salt as in 1-2C. Then powder P1 was added to give 300 microgram of 1-MCP per liter of dipping solution, and the composition was mixed for 2 minutes and then allowed to stand for 5 minutes. Avocados were then dipped into the dipping solution, held for 5 minutes, and set on a shelf at room temperature to dry. Dry avocados were placed in a cooler at 21°C and 65-75% RH. Control avocados were not dipped and were placed in a different cooler at the same temperature and relative humidity.

[0059] After 3 days, fruit color was rated every day using a hedonic scale where 1= 100% green, 2= 75% green, 3= 50% green-purple and 4=100 % purple. Fruit

firmness (Newtons and pounds) was measured at day 5 and 10 with the Fruit Texture Analyzer (FTA) with an 8-mm probe that penetrated to a depth of 5 mm depth. Skin was removed before firmness was measured, and two measurements were taken per fruit.

[0060] Ripeness was recorded every day after treatment, according to hand feel firmness and external appearance. Days to ripen were calculated from these observations.

[0061] The avocados were assessed for color development. Samples 1-3 and 1-5 developed color more slowly than the dry control but more quickly than the sample dipped in MCP-only. Sample 1-4 developed color the slowest of all.

[0062] The avocados were assessed for firmness. The results were as follows. All of the Example treatments gave better firmness than the comparative treatments.

<u>Example</u>	<u>Firmness at 5 days</u>		<u>Firmness at 10 days</u>	
	<u>Newtons</u>	<u>lb</u>	<u>Newtons</u>	<u>lb</u>
1-1C	3.27	0.74	2.19	0.49
1-2C	3.72	0.84	3.10	0.70
1-3	6.81	1.53	5.13	1.15
1-4	14.41	3.23	11.22	2.52
1-5	5.75	1.29	4.68	1.05

[0063] The avocados were also assessed for days to ripeness. All of the examples had equal or greater days to ripeness as the comparatives. Thus the examples had the benefits of the coating and had delayed ripening at least as high as 1-2C.

<u>Example</u>	<u>Days to Ripeness</u>
1-1C	3
1-2C	6
1-3	7
1-4	12
1-5	6

Comparative Example 2: Non-Waxy Coating

[0064] Tuscan melons were harvested and cooled in Cantua Creek, CA, then transported to the testing facility in Davis, CA the following day. The pulp temperature on arrival was 11°C to 12°C. The fruit was cooled overnight to 5°C and then, the following day, given a quality assessment and treated. After treatment, fruit

was stored for 8 days at 5°C and 80% to 90% RH, then transferred to room temperature for 8 days, then evaluated.

[0065] Freshseal™ coating is an aqueous coating, believed to contain non-fatty polymer, from BASF.

[0066] The treatments were as follows. Liquid coating composition was made with the ingredients shown below. Fruit was dipped in the coating composition and held for the amount of time shown below. "Coating solids" is the weight percent of the solids of the coating composition based on the total weight of the coating composition. Powder P1 was added to the coating composition so that the amount of MCP was one part by weight of MCP per million parts by weight of the coating composition. The samples were evaluated for the following criteria:

- weight loss
- external color, using a 5-point scale (1=100% green, and 5=100% yellow)
- average number of sunken discolored areas (SDA)
- Firmness, as tested in Example 1

Results were as follows:

<u>Com- parative Example No.</u>	<u>coating</u>	<u>ppm of MCP</u>	<u>dip time</u>	<u>% weight loss</u>	<u>color</u>	<u>SDA</u>	<u>Firm- ness (kgf)</u>
initial				0	2.50	0	2.27
2-1C	none	0	none	4.53	4.08	2.38	0.55
2-2C	none	1	5 min.	4.65	3.58	1.50	0.55
2-3C	Freshseal™	0	5 min.	5.06	4.50	2.13	0.32
2-4C	Freshseal™	1	5 min.	4.52	4.21	1.96	0.43
2-5C	Freshseal™	1	1 min.	4.09	3.88	1.63	0.45

[0067] There was no significant difference in weight loss among the samples tested. In external color, SDA, and firmness, all coated examples were worse than 2-2C, the sample with MCP without coating.

Example 3: Wax Coatings on Tomatos

[0068] Tomatoes were coated with Triwax™ coating (Tri-Pak Machinery, Inc.) For the "MCP" samples, Powder P3 was added to the Triwax™ coating to give 0.09% MCP by weight based on the weight of the coating composition. The coating composition was applied to a cloth and rubbed onto the tomatoes.

[0069] Tomatoes were stored at room temperature, and the hue was measured. In this hue measurement high numbers mean the color is more green (i.e., the tomato is less ripe). Results were as follows. The example treatment (3-3) desirably retarded ripening compared to the comparative examples.

Example No.	Treatment	hue		
		Day 1	Day 4	Day 6
3-1C	none	107	68	53
3-2C	Tri-wax only	109	75	57
3-3	Tri-wax + MCP	108	104	98

Example 4: Waxy Coating on Tomatoes and Guavas

[0070] Coating compositions were made. When wax was present, it was 3.6% by weight carnauba wax based on the weight of the coating composition. When MCP was present, sufficient P1 was added to give 30.7 mg MCP per liter. The control composition was water alone. Coating composition was mixed slowly for 1 minute. Fruit was immersed in the coating composition for 30 seconds. The treatments were as follows:

Example No.	Composition
4-1C	water only
4-2C	wax in water
4-3C	MCP in water
4-4	MCP and wax in water

Fruit was stored after treatment at 22°C and 80% RH for up to 14 days.

[0071] Tomato variety was Debora. When the tomatoes were tested, Samples 4-3C and 4-4 were comparable to each other, and both showed desirable delayed ripening compared to 4-1 and 4-2. It is assumed that 4-3C and 4-4 demonstrated the resistance to weight loss that is given by waxy coatings. Thus Sample 4-4 had the benefits of waxy coating and of treatment with 1-MCP, even though it received only one immersion treatment.

[0072] The guava variety was Pedro Sato. The treatments and the results were the same as for tomatoes.

Example 5: Waxy Coating on Hass Avocados

[0073] The treatments were the same as in Example 4. Fruit was evaluated for external color using a rating scale ("0" means 100% green, and "5" means 100%

black). The percent of black fruits was observed. External decay was observed (number of fruits out of 40 total that had at least one lesion). Internal decay was evaluated with a rating scale ("0" = no decay; "1" = light decay; "2" = moderate decay; "3" = severe decay). 40 fruits received each treatment. Average results after 14 days were as follows:

<u>Example No.</u>	<u>Composition</u>	<u>External Color</u>	<u>% Black</u>	<u>External Decay</u>	<u>Internal Decay</u>
5-1C	water only	4.7	70	12	1.7
5-2C	wax/water	4.2	45	9	1.0
5-3C	MCP/water	3.9	22	5	1.8
5-4	MCP/wax/water	2.3	10	2	0.8

Sample 5-4 showed desirable delay of ripening compared to all the other samples.

We claim:

1. A method of treating plant parts comprising forming a coating on the surface of said plant parts by applying a layer of a coating composition to said surface of said plant parts, wherein said coating composition comprises
 - (a) one or more wax, and
 - (b) one or more cyclopropene compound.
2. The method of claim 1, wherein said coating composition further comprises one or more molecular encapsulating agent.
3. The method of claim 1, wherein some or all of said cyclopropene is encapsulated in a molecular encapsulating agent.
4. The method of claim 1, wherein the weight ratio of said cyclopropene compound to said wax is from 0.2 ppm to 0.2%.
5. The method of claim 1, wherein said plant parts are selected from the group consisting of fruits and vegetables.
6. The method of claim 1, wherein said plant parts are selected from the group consisting of apples, avocados, tomatoes, guavas, and melons.
7. The method of claim 1, wherein said plant parts are selected from the group consisting of tomatoes and avocados.
8. The method of claim 1, wherein said wax comprises morpholine oleate, petroleum waxes, and mixtures thereof.
9. The method of claim 1, wherein said cyclopropene comprises 1-methylcyclopropene.

ABSTRACT

There is provided a method of treating plant parts comprising forming a coating on the surface of said plant parts by applying a layer of a coating composition to said surface of said plant parts, wherein said coating composition comprises

- (a) one or more wax, and
- (b) one or more cyclopropene compound.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	69931
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Title of Invention	Waxy Coatings on Plant Parts		
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Title of the Invention	Waxy Coatings on Plant Parts		
Attorney Docket Number	69931	Small Entity Status Claimed	☐
Application Type	Provisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
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