

**HUMBERTO RUBIO & CIA
ABOGADOS**

Correa 7 No. 74-64 Oficina 806
Teléfonos 313 24 08 - 313 24 10 - 313 24 23 - 313 17 59
Fax: (57) 313 16 - 47 - (57) 313 23 87
Email: rubiolaw@unetel.com
Apartado Aéreo 21848
Santafé de Bogotá, D.C. - Colombia

2/2A

SUPERINDUSTRIA Y COMERCIO

Radicación : 00064242 00000001

Folios: 30

Fecha (AMD): 2000-10-10 15:26:36

Tramite : 002 PATENTES D 1 REGISTRO/ 329 COMPLETEN

Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

Señor

**SUPERINTENDENTE DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES**

E. S. D.

REF. Expediente:

00-064.242

Patente de Invención:

**"AGENTE OPACIFICANTE DE
DIOXIDO DE TITANIO, DE ALTO
RENDIMIENTO, Y METODO PARA
SU FABRICACION"**

Titular:

KRAFT FOODS, INC.

DESTINO: 09

HUMBERTO RUBIO CAMACHO, mayor de edad, vecino de Bogotá, D.C., identificado con la cédula de ciudadanía número 17'192.062 de Bogotá, Abogado en ejercicio portador de la Tarjeta Profesional No. 50.007, expedida por el Consejo Superior de la Judicatura, en carácter de apoderado de la Sociedad **KRAFT FOODS, INC.**; encontrándome dentro del termino legal establecido en el Artículo 4° del Convenio de París, me permito anexar los siguientes documentos:

- 1.- Copia certificada de la Solicitud No. **09/388,849** de 02 de septiembre de 1.999, expedida por la Autoridad Competente, junto con su respectiva traducción al Castellano; base de la prioridad reivindicada en la solicitud de registro de la Patente de Invención citada en la referencia; todo de conformidad con el Artículo 4° del Convenio de la Unión de París y el Concepto 5 de enero de 1.999 de la SIC.

Atentamente,



**HUMBERTO RUBIO CAMACHO
C.C. 17'192.062 de Bogotá
T.P. 50.007 Consejo Superior
de la Judicatura
COD 4134**

00/1064-05/PI

25
22

TRADUCCIÓN DE UN DOCUMENTO ESCRITO EN INGLES, HOY 09 DE OCTUBRE DEL 2000 EN LA CIUDAD DE SANTA FE DE BOGOTÁ D.C., REPÚBLICA DE COLOMBIA.

NOTA DEL TRADUCTOR: DE LOS DOCUMENTOS QUE SE TRADUCEN A CONTINUACIÓN FORMA PARTE DE UN PAQUETE DE DOCUMENTOS PERTINENTES A UNA PATENTE SOLICITADA EN ESTADOS UNIDOS DE AMÉRICA, TODOS LOS CITADOS DOCUMENTOS ESTÁN UNIDOS MEDIANTE UN GANCHO.

LOS ESTADOS UNIDOS DE AMÉRICA

A TODOS A QUIENES ESTE DOCUMENTO LES INTERESE:

EL DEPARTAMENTO DE COMERCIO DE LOS ESTADOS UNIDOS DE AMÉRICA Oficina de Marcas y Patentes de los Estados Unidos.

Septiembre 19, 2000

CERTIFICA QUE LO ANEXO AQUÍ ES UNA COPIA VERDADERA DE LOS ARCHIVOS DE LA OFICINA DE PATENTES Y MARCAS DE LOS ESTADOS UNIDOS DE AMÉRICA DE AQUELLOS PAPELES DE LA SOLICITUD DE PATENTE IDENTIFICADA ABAJO Y QUE CUMPLEN LOS REQUERIMIENTOS PARA CONCEDERLE UNA FECHA DE PRESENTACIÓN BAJO 35 USC 111.

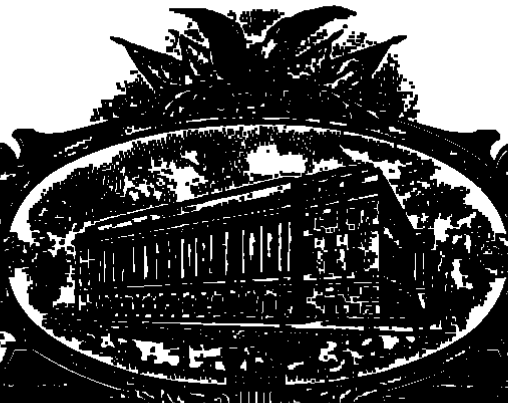
SOLICITUD NUMERO 09/388,849
FECHA PRESENTACIÓN: Septiembre 02, 1999

Mediante la autoridad otorgada por
EL COMISIONADO DE PATENTES Y MARCAS

(fdo)
P.R. GRANT
Funcionario Certificador

NOTA DEL TRADUCTOR: EN LA PARTE INFERIOR IZQUIERDA DEL DOCUMENTO HAY UN SELLO DORADO Y EN ALTO RELIEVE DE LA OFICINA DE MARCAS Y PATENTES DE LOS ESTADOS UNIDOS DE AMÉRICA.

26
4
23



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

September 19, 2000

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: 09/388,849

FILING DATE: September 02, 1999



By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS

P. R. GRANT
Certifying Officer



Kraft Foods

September 2, 1999

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Re: Our Case: 21666

Sir:

Transmitted herewith for filing is the Patent Application of inventor(s)
Locus Chuang
Jane L. MacDonald

for invention entitled:

HIGH PERFORMANCE TITANIUM DIOXIDE CLOUDING AGENT

Enclosed are:

1. Complete application of 17 page(s) of text, which includes 1 page of abstract and 3 page(s) of claims, 15 claim(s) in all, with 2 independent claim(s), 0 multiple dependent claim(s) and 0 page(s) of drawings.
2. Combined Declaration and Power of Attorney.
3. Information Disclosure Statement with PTO-1449 and 2 references.
4. Assignment together with Recordation Form Cover Sheet (Form PTO-1595).
5. Self-addressed post card to be returned after being stamped to indicate receipt of the foregoing in the Patent Office.

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date SEPTEMBER 2, 1999 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL42744391US addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Diana D. Winters
(Type or print name of person mailing paper)

Diana D. Winters
(Signature of person mailing paper)

Page 1

tn0324/d

6-28
25

Please charge our Deposit Account No. 07-0885 in the amount of \$760.00. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Account No. 07-0885. One copy of this letter is enclosed for accounting purposes.

Please address all communications to:

Thomas R. Savoie
Patent Law Department
Kraft Foods, Inc.
555 South Broadway
Tarrytown, New York 10591

Very truly yours,



Thomas R. Savoie
Attorney for Applicant(s)
Registration No. 25,259

Tel. (914) 335-4009
Fax. (914) 335-4300

**HIGH PERFORMANCE TITANIUM DIOXIDE CLOUDING AGENT
AND METHOD OF MANUFACTURE THEREOF**

Field of the Invention

The present invention is directed to a titanium dioxide-containing clouding agent for particulate dry beverage mixes and to a method of producing the clouding agent which provides a higher throughput, better yield and higher titanium dioxide content than conventional methods of manufacturing such clouding agents.

Background of the Invention

Dry beverage mixes, particularly imitation fruit juice beverage mixes, are typically formulated with a particulate clouding agent in order to imitate the opacity of a natural juice. Most clouding agents are prepared by combining a spacing agent such as maltodextrin, a suspending agent such as gum arabic, and titanium dioxide. Titanium dioxide is the key ingredient which provides opacity in the clouding agent. U.S. Patent No. 4,187,326 to Serafino et al. discloses a particulate clouding composition for dry mix beverages containing TiO_2 . U.S. Patent No. 4,529,613 to Mezzino et al. describes a particulate, dry beverage mix clouding agent containing up to 20% by weight TiO_2 .

In typical methods of preparing a clouding agent, including the methods described in U.S. Patent No. 4,187,326 and 4,529,613, the spacing agent and suspending agent are

07388817-070277

26 7/28

27 30

added to water and subjected to high shear mixing. The titanium dioxide is added after the spacing agent and suspending agents are dispersed by the initial high shear mixing and the mixture is again subjected to further high shear mixing. The resulting slurry is then dried, typically by spray drying. The resulting clouding agent may then be included in a dry beverage mix, particularly a fruit flavored dry beverage mix.

There are several drawbacks associated with conventional clouding agents and methods of preparation thereof. One problem is that while it is desirable to have a relatively high level of titanium dioxide to provide the right opacity, the amount of titanium dioxide which may be included in the clouding agent is limited because of its tendency to precipitate out and create sedimentation in the reconstituted beverage. Another problem is that in conventional methods of preparing clouding agents, the processing rates are slowed because the inner surfaces of the processing vessels tend to become caked, requiring significant cleaning efforts before subsequent batches may be manufactured. Loss of the ingredients in this way also reduces yield. It has been found that in these prior art processes, higher titanium dioxide content in the slurry made it harder to spray dry the slurry, further reducing yield and lowering throughput.

Accordingly, there is a need for a clouding agent having increased opacity on an equal weight basis and a process of manufacture thereof which reduces undesirable buildup of material on the sides of the mixing tank thereby improving the throughput and yield of the process.

20 21

Summary of the Invention

The foregoing and other objects which will be apparent to those of ordinary skill in the art are achieved in accordance with the invention by providing a method of making a particulate clouding agent for a dry beverage mix comprising: (a.) subjecting particulate titanium dioxide and water to high shear mixing to form a first aqueous mixture; (b.) adding a spacing agent and a suspending agent to said first aqueous mixture to form a second mixture; (c.) subjecting the second mixture to high shear mixing to form a further aqueous mixture; and (d.) spray drying the second aqueous mixture to form a particulate clouding agent, thereby providing an improved particulate dry mix beverage clouding agent comprising TiO_2 , spacing agent, and suspending agent in which the TiO_2 content is from 21 to 30% by weight based on the total weight of the clouding agent, on a dry weight basis, and by providing a particulate dry beverage mix including the improved clouding agent.

The particulate titanium dioxide and other constituents of the clouding agent are food grade. The titanium dioxide has an average particle size of 0.3 microns with a particle size distribution of 100% through a 200 mesh screen. Mesh size referred to in the present specification is U.S. mesh size unless indicated to the contrary. The TiO_2 is preferably a purified inorganic white, named by the 1971 Colour Index, 6 pigment white

32
10
29

6, C.I. 77891, and available commercially from Witter, Clark & Daniels, Inc., South Plainfield, NJ or Warner-Jenkinson, St. Louis, MO.

The spacing agent, which is also referred to in the art as a carrier or bulking agent or filler, functions to disperse and maintain the titanium dioxide as separate particles.

5 The spacing agent, which typically has a particle size distribution of 90% minimum through 140 mesh and 50% maximum through 325 mesh, is suitably a water-soluble, polymeric substance, including maltodextrins and other starch hydrolyzates. Suitable spacing agents are described in U.S. Patent No. 4,187,326 and U.S. Patent No. 4,529,613, the disclosures of which are herein incorporated by reference. Maltodextrins, which are
10 starch hydrolyzates produced by converting refined corn starch into nutritive saccharides through the use of acids or enzymes, are preferred. Suitable maltodextrins are bland in flavor and without appreciable sweetness. Preferred maltodextrins have a DE of less than 20, and more preferably from 10 to 20. Other suitable spacing agents, when employed, are preferably used in combination with the preferred maltodextrin spacing agent.

15 The suspending agent is suitably a gum, such as gum arabic, xanthan gum, or a pectic substance such as pectin. Suitable suspending agents are described in U.S. Patent No. 4,187,326 and U.S. Patent No. 4,529,613.

In the method of this invention, the solids are subjected to high shear mixing with water. Various types of high shear mixers may be employed such as those described in
20 U.S. Patent No. 4,187,326 and U.S. Patent No. 4,529,613. A homogenizer is preferred,

33
4
30

and an in-line 3-stage homogenizer is particularly preferred. A suitable shear rate of mixing is generally in the range of 3000 rpm to 4000 rpm. In general, a mixing time of from 10 to 60 minutes for each high shear mixing step is suitable.

It is a key aspect of the invention that a TiO_2 -water mixture is formed first and subjected to high shear mixing as described above before addition of the spacing agent or suspending agent. The spacing and suspending agent may then be added either simultaneously or sequentially, in which case the spacing agent may be added prior to the suspending agent or vice versa. In each of these process variations, however, the mixture is subjected to high shear mixing as described above as each ingredient is added.

The total amount of the key ingredients (TiO_2 , spacing agent, and suspending agent) is suitably from 20 to 45% and preferably 25 to 35% by weight based on the aqueous mixture. The total amount of the TiO_2 based on the total weight of the key ingredients, is at least 21% by weight, on a dry weight basis. As mentioned above, it has previously proven difficult to obtain a satisfactory clouding agent having a high TiO_2 content. Preferably, the total amount of TiO_2 based on the total weight of the key ingredients for the clouding agent of this invention, is from 23 to 30% by weight, on a dry weight basis. The spacing agent is suitably present in an amount of 40 to 70% by weight and preferably in an amount of 50 to 60% by weight, on the same basis. The suspending agent is suitably present in an amount of 10 to 30% by weight and preferably from 15 to 25% by weight, on the same basis.

12/31
31

Water content of the aqueous mixture is suitably 55 to 80%, and preferably 65 to 75% by weight, based on the weight of the aqueous mixture.

After preparation of the aqueous mixture by high shear mixing as described above, the aqueous mixture is dried, preferably by spray drying, to form a particulate clouding agent for a dry beverage mix. Other methods of drying, such as freeze drying, fluidized bed drying, vacuum drying, air drying, or drum drying may be used.

The amount of the key ingredients in the dried product will be the same as given above. Moisture content of the dried product is suitably less than 6% and preferably less than 5% by weight, based on the weight of the product.

A flow control agent is preferably included to enhance flow of the particulate product. A particulate flow control agent, such as tricalcium phosphate ("TCP"), is preferred. TCP is preferably included in a spray dried product by addition as a particulate powder to the spray drying tower. The amount of flow control agent is suitably from 0.1 to 5% and preferably 1 to 3% by weight based on the weight of the dried product.

The particulate clouding agent is intended to be utilized in dry beverage mixes such as those described in U.S. Patent No. 4,187,326 and U.S. Patent No. 4,529,613. Preferred dry beverage mixes are fruit-flavored and may include a natural and/or artificial sweetener. Typical ingredients of such dry beverage mixes include food grade acids, such as tartaric acid and citric acid, coloring, fruit or other flavors, and other ingredients

135
32

such as vitamins. The amount of clouding agent included in a dry beverage mix is suitably from 0.1 to 10% and preferably from 0.5 to 5.0% by weight based on the weight of the sweetener-free dry beverage mix. The particle size of the particulate clouding agent is suitably 90% minimum through 140 mesh and 50% maximum through 325 mesh.

5

Example 1

830 gallons of room temperature water is added to an agitated kettle equipped with a Greenco Corp. (Hudson, New Hampshire), in-line, 3-stage homogenizer. The agitator within the kettle was obtained from Chemineer, Inc. (Dayton, OH). The agitator and in-line homogenizer were started up at shear rates of about 34 rpms and 3430 rpms, respectively. 1000 pounds of TiO_2 (average particle size 0.3 microns) was added to the kettle and high shear mixing was continued for 30 minutes. 787.2 pounds of gum arabic was then fed into the circulating mixture and the high shear mixing is continued for an additional 30 minutes. 2,212.8 pounds of 15 D.E. maltodextrin (LoDex™ 15 - Grain Processing Corp; Muscatine, Iowa) is added to the circulating mixture and high shear mixing is again continued for an additional 30 minutes.

The mixture is then heated to 150 to 160°F. The heated mixture is then transferred to a mixing tank and subjected to high shear mixing for at least 90 minutes while maintaining a temperature of 150 to 160°F. Mixing the heated mixture is continued until

436
33

the mixture is fed to a spray-drying tower. The mixture, which contains 35% by weight solids, is then spray dried. During spray drying, 81.6 lbs. of particulate tricalcium phosphate is metered to the spray drying tower to provide a TCP content of 2% by weight in the spray dried product.

5 The empty mixing tank is observed to be clean, with little or no material stuck to the bottom or side walls. The particular spray-dried product has a moisture content of about 4.5% by weight and a particle size distribution of 100% through 60 mesh, at least 99% through 100 mesh, at least 90% through 140 mesh, and at most 50% through 325 mesh.

10 The solids content of the spray dried product, on a dry basis, is:

Ingredient	Amount (% by weight)
TiO ₂	24.5
Maltodextrin-LoDex 15	54.2
Gum Arabic	19.3
TCP	2
Total	100

Example 2

15 The procedure of Example 1 is followed except that the spacing agent (maltodextrin) is added prior to the suspending agent (gum arabic). After feeding the contents of the mixing tank to the spray drier, the mixing tank is observed to be clean, with little or no material stuck to the bottom of side wall of the tank.

15
34
37

Comparison Example A

The procedure of Example 1 is followed except that the sequence of introduction of ingredients is changed. In Example 1, TiO_2 is added first, followed by the suspending agent and then the spacing agent. In Example 2, TiO_2 is added first, followed by the spacing agent and then the suspending agent. In this comparison example, the suspending agent (gum arabic) is added first, followed by TiO_2 and then by the spacing agent (maltodextrin). The processing vessels are observed to have a sticky deposit of material, requiring cleaning. As compared to Examples 1 and 2, the throughput and yield are therefore lower and the measured opacity is lower while the measured sedimentation rate is higher.

Comparison Example B

The procedure of Comparison Example A is followed, except that the sequence of addition of the ingredients is changed. In this example, the spacing agent is introduced first, followed by TiO_2 and then by the suspending agent. Again, a substantial amount of material remains adhered to the processing vessels. As compared to Examples 1 and 2, the throughput, yield, and opacity are lower and sedimentation rate is higher.

16/38
35

Comparison Example C

The procedure of Comparison Example 1 is followed except that the sequence of the introduction of the ingredients is suspending agent first, then spacing agent, then TiO₂ the amount of TiO₂ is reduced, and the amount of spacing agent is increased by a corresponding amount. The composition of the spray dried clouding agent, on a dry basis, is:

Ingredient	Amount (% by weight)
TiO ₂	19
Spacing Agent	60
Suspending Agent	19
TCP	2

Example C had the expected lower TiO₂ loading. There was again a coating of material in the empty tanks resulting in a reduced yield versus Example 1 and 2, and it was more difficult to pump the aqueous mixture to and through the nozzles of the spray drier resulting in a reduced throughput versus Examples 1 and 2. The sedimentation rate for Example C was equivalent to Examples 1 and 2. The opacity for Example C was equivalent to Examples 1 and 2 on an equal TiO₂ weight basis; but significantly lower than Examples 1 and 2 on an equal clouding agent basis.

Comparison Example D

The procedure of Comparison Example C is followed except that the amount of TiO₂ is raised from 19 to 25%, and the amount of spacing agent is reduced by a

17
36

corresponding amount. The composition of the spray dried clouding agent, on a dry basis, is:

Ingredient	Amount (% by weight)
TiO ₂	25
Spacing Agent	54
Suspending Agent	19
TCP	2

As compared to Examples 1 and 2, Example D had a lower yield due to build-up on equipment surfaces, lower throughput due to a lower feed rate to spray tower. The resulting clouding agent had a lower opacity on an equal weight basis, and a higher sedimentation rate.

Evaluation of Cloud Compositions

The cloud compositions of Examples 1-2 and of Comparison Examples A-D are evaluated for opacity and sedimentation rate as determined by the procedures described below. Results are as follows:

Example	Average Opacity	Sedimentation Rate
1	45% transmission	0.25 cm after 1 week
2	45% transmission	0.25 cm after 1 week
A	60% transmission	2.5 cm after 1 week
B	60% transmission	2.5 cm after 1 week
C	70% transmission	0.25 cm after 1 week
D	60% transmission	2.5 cm after 1 week

073888113-000233

42
37

Test Procedure

Opacity – a measurement of the % light transmission through a standardized aqueous medium containing equal weight levels of the clouding agent as measured by a Spectrometer™ 20 (Spectronic Instruments Co. Rochester, New York) at a wavelength of 5 600nm.

Sedimentation Rate – a standardized beverage from reconstituted powdered soft drink mix and containing equal amounts of TiO_2 is filled into an Imhoff™ cone (Fisher Scientific, Inc., Specialty Glass Division – Springfield, New Jersey). The beverage is allowed to stand still for the test period after which the height of TiO_2 sediment residing at the bottom of the cone is measured. 10

Throughput – a measurement of production rate (pounds/hour of clouding agent) collected as product from the spray tower. Production rates 67% higher have been achieved through the use of this invention as compared to prior art procedures.

Yield – a measurement (expressed as a %) of the dry-weight of collected product from the spray tower versus the dry weight of starting materials. Yield increases of 3.5% have been achieved throughout the use of this invention as compared to prior art procedures. 15

Although not wishing to be limited to any specific theory, it is believed that when TiO_2 is mixed and subjected to high shear in the presence of water alone, the resulting TiO_2 particles have a preferred small size and/or physical structure that is not achieved 20

✓ 7	4
38	

အသံထွက်ပုံ - သီလိက

38
39

What is Claimed is:

1. A method of making a particulate clouding agent for a dry beverage mix comprising:

5 (a) subjecting particulate titanium dioxide and water to high shear mixing to form a first aqueous mixture;

(b) adding a spacing agent and a suspending agent to said first aqueous mixture and subjecting the mixture to high shear mixing to form a further aqueous mixture; and

10 (c) drying the further aqueous mixture to form a particulate clouding agent.

15 2. The method according to claim 1 wherein step (b.) comprises adding said spacing agent and said suspending agent sequentially and subjecting the mixture to said high shear mixing after addition of said spacing agent and after addition of said suspending agent.

3. The method according to claim 1 wherein said spacing agent and said suspending agent are added simultaneously.

20 4. The method according to claim 1 wherein the total amount of TiO_2 spacing agent, and suspending agent in said further aqueous mixture is from 20 to 45% by weight, based on the weight of said further aqueous mixture.

40

5. The methods according to claim 1 wherein the further aqueous mixture is spray-dried.

6. The method according to claim 4 wherein the total amount of TiO_2 spacing agent and suspending agent on a dry weight basis comprises:

- 5 from 21 to 30% by weight TiO_2
from 50 to 60% by weight spacing agent, and
from 10 to 30% by weight suspending agent.

7. The method according to claim 1 further comprising incorporating a flow control agent in said particulate clouding agent.

10 8. The method according to claim 1 wherein each high shear mixing step is effected for a period of time of from 10 to 30 minutes.

9. The method according to claim 1 wherein said spacing agent is at least one member selected from the group consisting of:

maltodextrin, starch hydrolyzates or sugars.

15 10. The method according to claim 8 wherein said suspending agent is a hydrocolloid gum.

11. The particulate dry mix beverage clouding agent produced by the process of claim 1.

20 12. In a particulate dry mix beverage clouding agent which comprises TiO_2 spacing agent, and suspending agent, the improvement wherein the TiO_2 content is from

22	41
----	----

5

weight of a flow control agent based on the weight of the clouthing agent.

10

;

23/42

Abstract

A clouding agent for dry beverage mixes is prepared by first forming a mixture of titanium dioxide and water and then subjecting the mixture to high speed shear. A spacing agent and suspending agent are then added to the mixture and the mixture is again subjected to a high speed shear, followed by spray drying. The resultant clouding agent may contain higher quantities of titanium dioxide than conventional clouding agents to thereby provide increased opacity without increased sedimentation. Further, the method of the invention provides higher throughput through the spray dryer and better yields than conventional methods of preparation.

10

2646
43

COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION OR CIP)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (check one applicable item below)

- ☒ original
☐ design
☐ supplemental

NOTE: If the declaration is for an international Application being filed as a divisional, continuation or continuation-in-part application do not check next item; check appropriate of last three items.

- ☐ national stage of PCT

NOTE: If one of the following 3 items apply then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR CIP.

- ☐ divisional
☐ continuation
☐ continuation-in-part (CIP)

INVENTORSHIP IDENTIFICATION

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

HIGH-PERFORMANCE TITANIUM DIOXIDE CLOUDING AGENT

SPECIFICATION IDENTIFICATION

the specification of which: (complete (a), (b) or (c))

- (a) ☒ is attached hereto.
(b) ☐ was filed on _____ as ☐ Serial No. _____
or ☐ Express Mail No., as Serial No. not yet known _____ and
was amended on _____ (if applicable).
(c) ☐ was described and claimed in PCT International Application No. _____
filed on _____ and as amended under PCT Article 19 on _____ (if any).

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

003888110-000223

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Sec. 1.56.

☒ In compliance with this duty an information disclosure statement (37 CFR 1.97) is attached hereto or was filed on _____.

PRIORITY CLAIM (35 U.S.C. 119 (a) - (d))

I hereby claim foreign priority benefits under Title 35, United States Code, Sec. 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

(d) ☒ no such applications have been filed.
(e) ☐ such applications have been filed as follows.

NOTE: Where item (e) is entered above and the International Application which designated the U.S. claimed priority check item (e), enter the details below and make the priority claim.

PRIOR FOREIGN PCT APPLICATION(S), FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119 (a) - (d)

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)
(35 U.S.C. 119 (e))

I hereby claim the benefit under Title 35, United States Code, 119 (e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE

CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S)

UNDER 35 U.S.C. 120

26 48
45

- ☐ The claim for the benefit of any such applications are set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN PART (C-I-P) APPLICATION.

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

Note: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national state, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. 120.

0038819-000200

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Joseph T. Harcarik #26,904
Thomas A. Marcoux #29,826

Thomas R. Savoie #25,259
Debbie K. Wright #33,817

- ☐ Attached, as part of this declaration and power of attorney, is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

SEND CORRESPONDENCE TO

Thomas R. Savoie
Patent Law Department (TA1-2)
Kraft Foods, Inc.
555 South Broadway
Tarrytown, NY 10591

DIRECT TELEPHONE CALLS TO:

(Name and telephone number)
Thomas R. Savoie
(914) 335-4009

DECLARATION

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

SIGNATURE(S)

Note: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other documents.

Full name of sole or first inventor

Locus	Yaw-Jen	Chuang
(GIVEN NAME)	(MIDDLE INITIAL OR NAME)	FAMILY (OR LAST NAME)

Inventor's signature Chuang Jea

Date 9/1/59 Country of Citizenship U.S.A.

Residence New City, NY U.S.A.

Post Office Address 85 Zukor Road

New City, NY 10956

Full name of second joint inventor

<u>June</u> (GIVEN NAME)	<u>L.</u> (MIDDLE INITIAL OR NAME)	<u>MacDonald</u> FAMILY (OR LAST NAME)
-----------------------------	---------------------------------------	---

Investor's signature Gene L. McDonald

Date 9/1/99 Country of Citizenship U.S.A.

Residence Yorktown Heights, NY U.S.A.

Post Office Address 3595 Sunset Avenue

Yorktown Heights, NY 10598



10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100
 101
 102
 103
 104
 105
 106
 107
 108
 109
 110
 111
 112
 113
 114
 115
 116
 117
 118
 119
 120
 121
 122
 123
 124
 125
 126
 127
 128
 129
 130
 131
 132
 133
 134
 135
 136
 137
 138
 139
 140
 141
 142
 143
 144
 145
 146
 147
 148
 149
 150
 151
 152
 153
 154
 155
 156
 157
 158
 159
 160
 161
 162
 163
 164
 165
 166
 167
 168
 169
 170
 171
 172
 173
 174
 175
 176
 177
 178
 179
 180
 181
 182
 183
 184
 185
 186
 187
 188
 189
 190
 191
 192
 193
 194
 195
 196
 197
 198
 199
 200
 201
 202
 203
 204
 205
 206
 207
 208
 209
 210
 211
 212
 213
 214
 215
 216
 217
 218
 219
 220
 221
 222
 223
 224
 225
 226
 227
 228
 229
 230
 231
 232
 233
 234
 235
 236
 237
 238
 239
 240
 241
 242
 243
 244
 245
 246
 247
 248
 249
 250
 251
 252
 253
 254
 255
 256
 257
 258
 259
 260
 261
 262
 263
 264
 265
 266
 267
 268
 269
 270
 271
 272
 273
 274
 275
 276
 277
 278
 279
 280
 281
 282
 283
 284
 285
 286
 287
 288
 289
 290
 291
 292
 293
 294
 295
 296
 297
 298
 299
 300
 301
 302
 303
 304
 305
 306
 307
 308
 309
 310
 311
 312
 313
 314
 315
 316
 317
 318
 319
 320
 321
 322
 323
 324
 325
 326
 327
 328
 329
 330
 331
 332
 333
 334
 335
 336
 337
 338
 339
 340
 341
 342
 343
 344
 345
 346
 347
 348
 349
 350
 351
 352
 353
 354
 355
 356
 357
 358
 359
 360
 361
 362
 363
 364
 365
 366
 367
 368
 369
 370
 371
 372
 373
 374
 375
 376
 377
 378
 379
 380
 381
 382
 383
 384
 385
 386
 387
 388
 389
 390
 391
 392
 393
 394
 395
 396
 397
 398
 399
 400
 401
 402
 403
 404
 405
 406
 407
 408
 409
 410
 411
 412
 413
 414
 415
 416
 417
 418
 419
 420
 421
 422
 423
 424
 425
 426
 427
 428
 429
 430
 431
 432
 433
 434
 435
 436
 437
 438
 439
 440
 441
 442
 443
 444
 445
 446
 447
 448
 449
 450
 451
 452
 453
 454
 455
 456
 457
 458
 459
 460
 461
 462
 463
 464
 465
 466
 467
 468
 469
 470
 471
 472
 473
 474
 475
 476
 477
 478
 479
 480
 481
 482
 483
 484
 485
 486
 487
 488
 489
 490
 491
 492
 493
 494
 495
 496
 497
 498
 499
 500
 501
 502
 503
 504
 505
 506
 507
 508
 509
 510
 511
 512
 513
 514
 515
 516
 517
 518
 519
 520
 521
 522
 523
 524
 525
 526
 527
 528
 529
 530
 531
 532

48

-

- Abstract**

-

10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100
 101
 102
 103
 104
 105
 106
 107
 108
 109
 110
 111
 112
 113
 114
 115
 116
 117
 118
 119
 120
 121
 122
 123
 124
 125
 126
 127
 128
 129
 130
 131
 132
 133
 134
 135
 136
 137
 138
 139
 140
 141
 142
 143
 144
 145
 146
 147
 148
 149
 150
 151
 152
 153
 154
 155
 156
 157
 158
 159
 160
 161
 162
 163
 164
 165
 166
 167
 168
 169
 170
 171
 172
 173
 174
 175
 176
 177
 178
 179
 180
 181
 182
 183
 184
 185
 186
 187
 188
 189
 190
 191
 192
 193
 194
 195
 196
 197
 198
 199
 200
 201
 202
 203
 204
 205
 206
 207
 208
 209
 210
 211
 212
 213
 214
 215
 216
 217
 218
 219
 220
 221
 222
 223
 224
 225
 226
 227
 228
 229
 230
 231
 232
 233
 234
 235
 236
 237
 238
 239
 240
 241
 242
 243
 244
 245
 246
 247
 248
 249
 250
 251
 252
 253
 254
 255
 256
 257
 258
 259
 260
 261
 262
 263
 264
 265
 266
 267
 268
 269
 270
 271
 272
 273
 274
 275
 276
 277
 278
 279
 280
 281
 282
 283
 284
 285
 286
 287
 288
 289
 290
 291
 292
 293
 294
 295
 296
 297
 298
 299
 300
 301
 302
 303
 304
 305
 306
 307
 308
 309
 310
 311
 312
 313
 314
 315
 316
 317
 318
 319
 320
 321
 322
 323
 324
 325
 326
 327
 328
 329
 330
 331
 332
 333
 334
 335
 336
 337
 338
 339
 340
 341
 342
 343
 344
 345
 346
 347
 348
 349
 350
 351
 352
 353
 354
 355
 356
 357
 358
 359
 360
 361
 362
 363
 364
 365
 366
 367
 368
 369
 370
 371
 372
 373
 374
 375
 376
 377
 378
 379
 380
 381
 382
 383
 384
 385
 386
 387
 388
 389
 390
 391
 392
 393
 394
 395
 396
 397
 398
 399
 400
 401
 402
 403
 404
 405
 406
 407
 408
 409
 410
 411
 412
 413
 414
 415
 416
 417
 418
 419
 420
 421
 422
 423
 424
 425
 426
 427
 428
 429
 430
 431
 432
 433
 434
 435
 436
 437
 438
 439
 440
 441
 442
 443
 444
 445
 446
 447
 448
 449
 450
 451
 452
 453
 454
 455
 456
 457
 458
 459
 460
 461
 462
 463
 464
 465
 466
 467
 468
 469
 470
 471
 472
 473
 474
 475
 476
 477
 478
 479
 480
 481
 482
 483
 484
 485
 486
 487
 488
 489
 490
 491
 492
 493
 494
 495
 496
 497
 498
 499
 500
 501
 502
 503
 504
 505
 506
 507
 508
 509
 510
 511
 512
 513
 514
 515
 516
 517
 518
 519
 520
 521
 522
 523
 524
 525
 526
 527
 528
 529
 530
 531
 532

- Page 6**

b7C0317/d

REIVINDICACIONES

1. Un método de hacer un agente opacificante particulado para un preparado de bebida seco, incluyendo:

(a) someter dióxido de titanio particulado y agua a mezcla a cizalladura alta para formar una primera mezcla acuosa;

(b) añadir un agente separador y un agente de suspensión a dicha primera mezcla acuosa y someter la mezcla a mezcla a cizalladura alta para formar una mezcla acuosa adicional; y

(c) secar la mezcla acuosa adicional para formar un agente opacificante particulado.

2. El método según la reivindicación 1, donde el paso (b) incluye añadir secuencialmente dicho agente separador y dicho agente de suspensión y someter la mezcla a dicha mezcla a cizalladura alta después de la adición de dicho agente separador y después de la adición de dicho agente de suspensión.

3. El método según la reivindicación 1, donde dicho agente separador y dicho agente de suspensión se añaden simultáneamente.

4. El método según la reivindicación 1, donde la cantidad total de TiO_2 , agente separador y agente de suspensión en dicha mezcla acuosa adicional es de 20 a 45% en peso, en base al peso de dicha mezcla acuosa adicional.

5. Los métodos según la reivindicación 1, donde la mezcla acuosa adicional se seca por pulverización.

50 3A
22

6. El método según la reivindicación 4, donde la cantidad total de TiO_2 , agente separador y agente de suspensión en base al peso en seco incluye:

de 21 a 30% en peso de TiO_2 ,

de 50 a 60% en peso de agente separador, y

de 10 a 30% en peso de agente de suspensión.

7. El método según la reivindicación 1, incluyendo además incorporar un agente de control de flujo en dicho agente opacificante particulado.

8. El método según la reivindicación 1, donde cada paso de mezcla a cizalladura alta se efectúa durante un período de tiempo de 10 a 30 minutos.

9. El método según la reivindicación 1, donde dicho agente separador es al menos un elemento seleccionado del grupo que consta de:

maltodextrina, hidrolizados de almidón o azúcares.

10. El método según la reivindicación 8, donde dicho agente de suspensión es una goma hidrocoloide.

11. El agente opacificante de bebida de preparado seco particulado producido mediante el proceso de la reivindicación 1.

12. En un agente opacificante de bebida de preparado seco particulado que incluye TiO_2 , agente separador y agente de suspensión, la mejora donde el contenido de TiO_2 es de 21 a 30% en peso en base al peso total del TiO_2 , agente separador y agente de suspensión, en base al peso en seco.

13. Un agente opacificante según la reivindicación 11, donde dicho agente separador está presente en una cantidad de desde 50 a 60% en peso y dicho agente de suspensión está presente en una cantidad de desde 10 a 30% en peso en base al peso total del TiO_2 , agente separador y agente de suspensión, en base al peso en seco.

33-55
51

14. Un agente opacificante según la reivindicación 12, incluyendo además de 1 a 3% en peso de un agente de control de flujo en base al peso del agente opacificante.

15. Un agente opacificante según la reivindicación 12, donde dicho agente separador es una maltodextrina y donde dicho agente de suspensión es goma arábica.