

Doctora

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SUPERINTENDENCIA DE INDUSTRIA Y CO

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



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Solicitud de Patente PCT Entrada en Fase Nacional

Titulada: "Formación de acrilamida reducida en alimentos procesados
térmicamente"

Solicitante: Frito-Lay North America, Inc.

MEMORIAL DE COMPLEMENTACIÓN

ÁLVARO CORREA ORDÓÑEZ, mayor de edad y vecino de Bogotá D.C., identificado según aparece al pie de mi firma, en mi condición de apoderado de la sociedad en referencia, según lo acredita el documento de poder presentado en esa División, me permito presentar:

Copia del Reporte de Examen Preliminar Internacional de Patentabilidad, expedido por la oficina Internacional de Patentes, Formas PCT/IPEA/416 y PCT/IPEA/409.

Atentamente,

ÁLVARO CORREA ORDÓÑEZ

C.C.No.79.143.366 de Usaquén

T.P.20.281

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
CHAD E. WALTER
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PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year)

03 MAY 2010

Applicant's or agent's file reference

CFLAY.00395PCT

IMPORTANT NOTIFICATION

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US08/51579

21 January 2008 (21.01.2008)

26 January 2007 (26.01.2007)

Applicant

FRITO-LAY NORTH AMERICA, INC

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference CFLAY.00395PCT	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/US08/51579	International filing date (day/month/year) 21 January 2008 (21.01.2008)	Priority date (day/month/year) 26 January 2007 (26.01.2007)	
International Patent Classification (IPC) or national classification and IPC IPC: A23L 1/01(2006.01),A23L 1/214 USPC: 426/243			
Applicant FRITO-LAY NORTH AMERICA, INC			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>8</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (sent to the applicant and to the International Bureau) a total of <u>1</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). 4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☐ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☐ Box No. VII Certain defects in the international application ☐ Box No. VIII Certain observations on the international application			
Date of submission of the demand 10 July 2009 (10.07.2009)		Date of completion of this report 25 July 2009 (25.07.2009)	
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer /Steve Weinstein/ Telephone No. (571)-272-1410	

Form PCT/IPEA/409 (cover sheet)(April 2007)

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International application No.

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished
- ☒ the description:
pages 1-18 as originally filed/furnished
pages* NONE received by this Authority on _____
pages* NONE received by this Authority on _____
- ☒ the claims:
pages 19-23 as originally filed/furnished
pages* NONE as amended (together with any statement) under Article 19
pages* 22 received by this Authority on 07 July 2008 (07.07.2008)
pages* NONE received by this Authority on _____
- ☐ the drawings:
pages NONE as originally filed/furnished
pages* NONE received by this Authority on _____
pages* NONE received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

5. ☐ This report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 70.2(e)).

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>6-12,14,17-27</u>	YES
	Claims <u>1-5,13,15,16</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-27</u>	NO
Industrial Applicability (IA)	Claims <u>1-27</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and Explanations (Rule 70.7)

Please See Continuation SheetClaims 1-27 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

V. 2. Citations and Explanations:

Claims 1-3,5,13,15,16 lack novelty under PCT Article 33(2) as being anticipated by Durance et al. (US 5972397).
Regarding claim 1, Durance et al. discloses cutting strips of potato products (abstract) which are subsequently dehydrated, rehydrated in a rehydrating solution and then fried in a conventional manner (column 4, lines 11-20). It is noted that by disclosing the claimed steps, Durance et al. inherently would have achieved the claimed result of the reduction of acrylamide. Regarding claim 13, it is noted that conventional frying uses hot oil. Regarding claims 2 and 3, it is noted that French fries are considered sliced potato products (abstract). Regarding claim 5, it is noted that Durance et al. discloses an oven (i.e. an enclosure with heated air used for dehydration) that employs a temperature of between 65-73°C to further dehydrate the potato pieces (column 5, lines 56-61).

Regarding claims 15 and 16, the potato is a plant-based food having a native asparagine concentration, which Durance et al. further discloses to be dehydrated, as discussed above, with respect to claim 1 and subsequently rehydrated in a rehydrating solution. It is noted that the rehydrating solution disclosed by Durance et al. is a calcium chloride solution (column 4, lines 13-15), which applicants indicate is also considered an acrylamide reducing agent, based on paragraph 0022 on page 9 of applicants' specification and based on paragraph 0083 of copending application 11/033364 which applicants' have incorporated by reference into the instant application. Regarding the reduction in the asparagine content, it is noted that since Durance et al. discloses the claimed method steps and also discloses employing an acrylamide reducing agent, that the particular result of the method, as claimed, would also have been inherent to the method disclosed by Durance et al.

Claims 1,2,4,5 and 13 lack novelty under PCT Article 33(2) as being anticipated by Stubbs et al. (US 5071661).
Regarding claim 1, Stubbs et al. discloses slices of potatoes that have been dehydrated (column 2, lines 39-40), rehydrated in a rehydrating solution (column 2, lines 50-51) and then thermally processed (column 2, lines 51-52 and column 17, line 30). It is noted that since Stubbs et al. discloses the claimed steps, that Stubbs et al. would inherently have achieved the result of reducing the level of acrylamide in the potato piece.

Regarding claim 2, Stubbs et al. discloses slicing potatoes and thus discloses potato slices (see column 2, lines 56-60).

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Regarding claim 4, Stubbs et al. disclose dehydration at 150°F using a conventional hot air dryer (column 5, lines 40-47). Stubbs et al. makes no reference to increased pressures employed for dehydrating and thus also inherently discloses ambient pressure for dehydrating. Regarding claim 5, it is noted that 150°F converts to 65°C and thus falls within the claimed range of temperatures of less than 74°C. It is noted that a belt conveyor dryer using a hot air stream of 150°F, for instance, would inherently also be considered an oven.

Claim 3 lacks an inventive step under PCT Article 33(3) as being obvious over Stubbs et al. in view of Katucki (US 3359123) and HarmonyHouseFoods.

Claim 3 differs from Stubbs et al. in reciting that the dehydrated potato piece at step a), comprises French fry like sticks. Katucki teaches dehydrated potato pieces that are suitable for French fries (column 4, lines 15-18). HarmonyHouseFoods teaches dehydrated potato slices that are subsequently cooked. Therefore the art taken as a whole thus teaches that it was conventional to dehydrate potato pieces of various shapes and sizes. To therefore modify Stubbs et al. and substitute one conventional shape for dehydrated potato products, for another conventional shape for dehydrated potato products would therefore have been an obvious matter of choice and/or design routinely determinable by experimentation, depending on the desired product to be cooked.

Claim 6 lacks an inventive step under PCT Article 33(3) as being obvious over Stubbs et al. (US 5071661) in view of Standing et al. (US 4073952), Katucki (US 3359123), Beck (US 5707671), Lewis (US 5441758) and Hilton et al. (US 4140801).

Regarding the particular moisture content of the potato piece after dehydrating, it is noted that Stubbs et al. teaches that the moisture content should be less than 10% (column 18, line 56). Stubbs et al. also teaches that the dehydration to a moisture below 10% results in a dehydrated food that can be packaged as a shelf-stable item and subsequently reconstituted (Column 2, lines 49-52).

Claim 6 differs from Stubbs et al. in reciting a moisture content of less than about 3% by weight. Katucki teaches slicing potatoes, which are then dried to reduce the moisture of the potato pieces to about 3% (column 8, lines 49-51). Beck also teaches this concept on column 1, lines 6-9 and column 3, lines 23-25). Even further, Lewis teaches that sliced potatoes that have been dehydrated to a moisture content of 9% or lower can be considered shelf-stable and may be held in storage for extended periods of time (Column 3, lines 59-61). Hilton et al. further supports the concept that dehydration, and thus reduced moisture facilitates storage stability (column 1, lines 40-57). In view of the art taken as a whole, to lower the moisture content of the dehydrated potato pieces to less than about 3% would therefore have been an obvious result effective variable, routinely determinable by experimentation, depending on the particular moisture content and storage stability desired for the potato pieces.

Claims 7 and 12 lack an inventive step under PCT Article 33(3) as being obvious over Stubbs et al. (US 5071661) in view of Durance et al. (US 5972397), Welch (US 5534280), Lewis (US 5441758) and Zyzak et al. (US 20040101607) and Zyzak et al. (US 20040058046).

Claim 7 differs from Stubbs et al. in reciting that the rehydrating solution comprises asparaginase. It is noted that Durance et al. has been relied on to teach the generic concept of providing a rehydration solution that also incorporates other additives for providing an added functional effect to the potato product when rehydrating. For instance, Durance et al. teach applying calcium chloride to the hydration water for the purpose of improving the strength characteristics of the French fry product when frying (column 4, lines 11-20). Welch also teaches a rehydrating solution that includes a variety of additives, such as sulfites and anti-oxidants (column 8, lines 41-45). Lewis teaches achieving the desired hydration as a result of hydrating the dehydrated potato products using salted water solution (column 5, lines 46-48). Lewis also teaches that the incorporation of the salt in the hydrating solution results in the rehydrated potato slice having 2% salt (column 5, line 48). Therefore, the art taken as a whole, teaches that it was conventional to combine additives into a rehydrating solution, for the purpose of providing imparting the properties of the additives to the product upon rehydration.

Regarding employing asparaginase, once it was recognized to impart an effect onto the dehydrated product using an additive during the rehydration process, the particular additive employed would have been an obvious matter of choice for its art recognized purpose. Therefore, Zyzak et al. '607 has been relied on to teach that the formation of acrylamide is not desired when frying potato pieces and further teaches contacting potato products, such as potato slices (paragraph 0064, 0069) with a solution comprising an enzyme, such as asparaginase, to reduce the formation of acrylamide when the product is cooked (paragraph 0046-0049, 0056, 0058). Zyzak '046 also teaches employing asparaginase in a solution into which potato slices can be placed, for the purpose of reducing the formation of acrylamide (paragraph 0034, 0038, 0052 and 0056). It is further noted that on paragraph 0071 of Zyzak et al. '607 and paragraph 0034 of Zyzak '046 both teach that the extraction of asparagine can be performed before the potato products are dried but can also occur, such as before cooking (and thus after dehydrating taught by Stubbs et al.). To therefore employ asparaginase into the rehydrating solution would have been obvious to one having ordinary skill in the art, for the purpose of reducing the formation of acrylamide when frying the rehydrated potato products.

Regarding claim 12, it is noted that Zyzak et al. '607 teaches that when employing an enzyme such as asparaginase to reduce the formation of acrylamide when thermally processing the potato product, that the temperature of the solution to which the food product has been exposed can be between 10 to 60°C (paragraph 0041) and should be at a temperature that would not adversely affect the food product. Obviously the temperature should also not affect the enzyme as well. Zyzak '046 teaches that the particular temperatures and pH would have been an obvious result effective variable routinely determinable by experimentation for the purpose of ensuring that the enzyme activity is not affected (paragraph 0041). It is noted that Stubbs et al. teaches that the potato products can be rehydrated using either a cold water or hot water rehydration (column 6, lines 1-12). Therefore, to employ a particular temperature for rehydration such as a cold water solution, would have been an obvious result effective variable, routinely determinable by experimentation, depending on the particular temperatures that affect the acrylamide reducing agents, as well as those which would result in the desired hydration of the potato pieces in the desired amount of time.

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Claim 12 lacks an inventive step under PCT Article 33(3) as being obvious over Stubbs et al. in view of Yueh et al. (US 4084008) and Beck (US 5292542).

Claim 12 differs from Stubbs et al. in the specific temperature for the rehydration solution (between 7°C and about 18°C).

Nevertheless, it is noted that Stubbs et al. already teaches that the potato slices can be rehydrated in cold water (column 6, lines 1-12). Yueh et al. teaches hydration of potato pieces in both hot and cold water. The cold water is 70°F (21.1°C). Nevertheless, Yueh et al. teaches that both hot water and cold water extraction resulted in acceptable rehydrated potatoes with the only difference being the particular time for rehydration (column 3, lines 44-56). Beck also teaches the concept of using cold water to rehydrate potato pieces, with the temperature being between 35°F to 70°F (1.6°C to 21.1°C). Therefore, the art taken as a whole teaches rehydrating dehydrated potato pieces using water that encompasses the claimed temperature range and also teaches that the particular length of time for rehydration varies with the temperature of the rehydrating solution. Since Stubbs et al. already teaches cold water solutions as a means for rehydrating potato slices, and since Yueh et al. and Beck teaches cold and hot water hydration, the particular temperature for rehydration would have been an obvious result effective variable, routinely determinable by experimentation for the purpose of achieving the desired moisture content within the desired hydration period.

Claims 8-11, 15-18, 20-24 and 26 lack an inventive step under PCT Article 33(3) as being obvious over the references as applied to claims 7 and 12, above, and in further view of Lindsay (US 20040224066).

Claim 8 recites that the rehydration solution comprises one or more amino acids selected from cysteine, lysine, glycine, histidine, alanine, methionine, glutamic acid, aspartic acid, proline, phenylalanine, valine and arginine.

Claim 9 recites wherein the rehydration solution comprises one or more free thiols selected from cysteine, N-acetyl-L-cysteine, N-acetyl-cysteamine, glutathione reduced, dithiothreitol and casein.

It is noted however, that Lindsay teaches employing a free thiol compound, such as cysteine, which is also an amino acid or lysine (paragraph 0023) by contacting the potato products, such as potato slices and French fries, in a solution comprising these acrylamide reducing agents (paragraph 0026). Lindsay even teaches that the treating solution could comprise sodium chloride for facilitating entry of the acrylamide reducing agents into the cellular structure of the potato products (paragraph 0026). To therefore modify the previous combination of references and employ another acrylamide reducing agents would therefore have been an obvious matter of choice and/or design, routinely determinable by experimentation, for the purpose of achieving the desired reduction in acrylamide when thermally processing the potato product. Regarding claim 10, it is noted that the combination of references teaches that the rehydration solution comprises a reducing agent.

Regarding claim 11, it is noted that Lindsay teaches that the pH of the solution should be between 1.8 to 6.8 (paragraph 0028) and more preferably from 2.75 to 5.5. It is further noted that Durance already teaches adding calcium chloride to the rehydrating solution, as discussed above with respect to claim 7, for the purpose of improving the strength of the cooked product. Applicants also indicate that calcium chloride is a salt that would lower the pKa of the solution. To therefore modify the combination and lower the pH of the solution, as taught by Lindsay et al. to below 6 (such as between 2.75 and 5.5) would have been obvious to one having ordinary skill in the art. To employ calcium chloride would also have been obvious since Lindsay teaches employing calcium in the form of its chloride salt (paragraph 0019) as does Durance, for the purpose of reducing the formation of acrylamide as well as improving the characteristics of the cooked potato product.

Regarding claims 15 and 16, it is noted that Stubbs et al. already teaches a potato, which is a plant-based food having a native asparagine concentration, dehydrating the potato and subsequently rehydrating. The claim differs in including an acrylamide reducing agent in the rehydrating solution, however, the references to Durance et al., Welch, Lewis, Zyzak '607 and Zyzak 046 as well as Lindsay teach that it was a conventional concept to employ to incorporate other additives into a rehydrating solution for providing an added functional effect to the potato product when rehydrating the potato. To therefore employ an acrylamide reducing agent into the rehydrating solution would have been obvious, in view of Durance et al., Welch, Lewis, Zyzak '607 and Zyzak 046, for the purpose of reducing the formation of acrylamide as well as for imparting particular properties to the potato product during rehydration. It is further noted that claim 15 does not require the potato product to be unmashed and therefore, any potato product can be rehydrated in a solution comprising an acrylamide reducing agent.

Claims 17 and 18 are rejected for the reasons given with respect to claims 4 and 5 by the Stubbs reference.

Regarding claim 20, which recites that the rehydration solution comprises asparaginase, the references to Zyzak already teach employing asparaginase as a means for reducing the formation of acrylamide in potato products. To therefore employ asparaginase in the rehydration solution would have been an obvious matter of choice and/or design to one having ordinary skill in the art, since Durance et al., Welch and Lewis teach employing additives in the rehydrating solution which would impart a particular property or effect to the potato during rehydration.

Claims 21-24 are rejected for the reasons given above with respect to claims 8-11.

Claim 26 is rejected for the reasons given with respect to claim 13 by the Stubbs reference.

Claim 14 lacks an inventive step under PCT Article 33(3) as being obvious over Stubbs et al. (US 5071661) in view of Katucki (US 3359123), Zyzak et al. (US 20040101607) and Durance et al. (US 5972397).

Claim 14 recites the particular temperature for thermal processing the rehydrated potato piece, of between 120°C and 205°C.

It is noted that Stubbs et al. already teaches frying slices of potato pieces. Katucki also teaches the concept of slices of potato pieces that can also be French fries or hash browns (column 5, lines 15-17), which are subsequently fried after rehydrating. Katucki further teaches that after rehydration in cold water, the deep fried at 390°F (~199°C) to produce French fries (column 9, lines 28-32). Zyzak et al. has been relied on as further evidence that it has been a conventional thermal processing step to fry potato products in oil at temperatures of 375°F (190°C) (see table below paragraph 0379). Durance et al. also discloses cutting strips of potato products

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(abstract) which are subsequently dehydrated, rehydrated in a rehydrating solution and then fried in a conventional manner (column 4, lines 11-20).

To therefore perform a conventional thermal processing step, such as frying the sliced potato products taught by Stubbs et al. in oil at temperatures of ~199°C would therefore have been an obvious matter of choice and/or design, for the purpose of achieving the desired cooked product.

Claim 19 lacks an inventive step under PCT Article 33(3) as being obvious over the references as applied to claims 8-11, 15-18, 20-24, 26 above, and in further view of Standing et al. (US 4073952), Katucki (US 3359123), Beck (US 5707671), Lewis (US 5441758) and Hilton et al. (US 4140801). Claim 19 recites that the dehydrated food comprises a moisture content of less than about 3%. This claim is rejected for the reasons given above with respect to claim 6, above.

Claim 25 lacks an inventive step under PCT Article 33(3) as being obvious over the references as applied to claims 8-11, 15-18, 20-24, 26, above and in further view of Yueh et al. (US 4084008) and Beck (US 5292542).

Claim 25 differs from Stubbs et al. in the specific temperature for the rehydration solution (between 1°C and about 18°C).

It is noted that Zyzak et al. '607 teaches that when employing an enzyme such as asparaginase to reduce the formation of acrylamide when thermally processing the potato product, that the temperature of the solution to which the food product has been exposed can be between 10 to 60°C (paragraph 0041) and should be at a temperature that would not adversely affect the food product. Obviously the temperature should also not affect the enzyme as well. Zyzak '046 teaches that the particular temperatures and pH would have been an obvious result effective variable routinely determinable by experimentation for the purpose of ensuring that the enzyme activity is not affected (paragraph 0041). It is noted that Stubbs et al. teaches that the potato products can be rehydrated using either a cold water or hot water rehydration (column 6, lines 1-12). Therefore, to employ a particular temperature for rehydration such as a cold water solution, would have been an obvious result effective variable, routinely determinable by experimentation, depending on the particular temperatures that affect the acrylamide reducing agents, as well as those which would result in the desired hydration of the potato pieces in the desired amount of time.

In addition, it is noted that Stubbs et al. already teaches that the potato slices can be rehydrated in cold water (column 6, lines 1-12). Yueh et al. teaches hydration of potato pieces in both hot and cold water. The cold water is 70°F (21.1°C). Nevertheless, Yueh et al. teaches that both hot water and cold water extraction resulted in acceptable rehydrated potatoes with the only difference being the particular time for rehydration (column 3, lines 44-56). Beck also teaches the concept of using cold water to rehydrate potato pieces, with the temperature being between 35°F to 70°F (1.6°C to 21.1°C). Therefore, the art taken as a whole teaches rehydrating dehydrated potato pieces using water that falls within the claimed temperature range and also teaches that the particular length of time for rehydration varies with the temperature of the rehydrating solution. Since Stubbs et al. already teaches cold water solutions as a means for rehydrating potato slices, and since Yueh et al. and Beck teaches cold and hot water hydration, the particular temperature for rehydration would have been an obvious result effective variable, routinely determinable by experimentation for the purpose of achieving the desired hydration/moisture content within the desired amount of time.

Claim 27 lacks an inventive step under PCT Article 33(3) as being obvious over the references as applied to claims 8-11, 15-18, 20-24, 26, above and in further view of Katucki (US 3359123).

Claim 27 recites the particular temperature for thermal processing the rehydrated potato piece, of between 120°C and 205°C.

It is noted that Stubbs et al. already teaches frying slices of potato pieces. Katucki also teaches the concept of slices of potato pieces that can also be French fries or hash browns (column 5, lines 15-17), which are subsequently fried after rehydrating. Katucki further teaches that after rehydration in cold water, the deep fried at 390°F (~199°C) to produce French fries (column 9, lines 28-32). Zyzak et al. '607 has been relied on as further evidence that it has been a conventional thermal processing step to fry potato products in oil at temperatures of 375°F (190°C) (see table below paragraph 0379). Durance et al. also discloses cutting strips of potato products (abstract) which are subsequently dehydrated, rehydrated in a rehydrating solution and then fried in a conventional manner (column 4, lines 11-20).

To therefore perform a conventional thermal processing step, such as frying the sliced potato products taught by Stubbs et al. in oil at temperatures of ~199°C would therefore have been an obvious matter of choice and/or design, for the purpose of achieving the desired cooked product.

RESPONSE TO AMENDMENT/ARGUMENTS

Regarding the amendment to claim 15 which recites that the plant based food is unmashed and that the dehydrated plant based food is unmashed, it is noted that the references relied on teach dehydrating and rehydrating potato pieces that are not mashed.

Applicants arguments with respect to the Elder reference not teaching dehydrating potato pieces and then rehydrating potato pieces has been considered and is moot in view of the new references relied upon.

Regarding the use of asparaginase, as recited in claim 7, Zyzak '607 and Zyzak et al. '046 have been relied on, as discussed above.

Regarding applicants' arguments with respect to using a pH of less than 6, it is noted that Lindsay and Durance have been relied on to teach that a pH of less than 6 would have been obvious, for the reasons given above.

Applicants further urge that Zyzak teaches away from "unmashed plantbased food." In the rejections above, however, it is noted that both Zyzak references have only been relied on to teach the use of asparaginase solutions for reducing the formation of

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Supplemental Box

acrylamide when frying potato products. It is noted that Welch, Lewis and Durance et al. teach the concept of combining additives into a rehydrating solution for the purpose of imparting the properties of the additives to the product, upon rehydration.

----- NEW CITATIONS -----

US 5,534,280 A (WELCH), 9 July 1996 (column 22, lines 9, 14, and 17-18, 22)
US 5,071,661 A (STUBBS et al.) 10 December 1991, column 2, lines 39-40, 51-52, 56-60; column 5, lines 40-47; column 17, line 30
US 5,972,397 A (DURANCE et al.) 26 October 1999, abstract; Column 4, lines 11-20; column 5, lines 56-61
US 3,359,123 A (KATUCKI) 19 December 1967, (column 4, lines 15-18)
US 4,073,952 A (STANDING et al.) 14 February 1978, column 5, lines 6-10
US 5,707,671 A (BECK et al.) 13, January 1998, column 1, lines 6-9; column 3, lines 23-25)
US 5,441,758 A (LEWIS et al.) 15 August 1995, column 3, lines 59-61
US 4,140,801 A (HILTON et al.) 20 February 1979, column 1, lines 40-57
US 2004/0058046 A (ZYZAK et al.) 25 March 2004, paragraph 0041
US 4,084,008 A (YUEH et al.) 11 April 1978, column 3, lines 44-56
US 5,292,542 A (BECK et al.) 8 March 1994, see entire document
US 2004/0224066 A (LINDSAY et al.) 11 November 2004, paragraph 0019, 0023, 0026, 0028)
HarmonyHouseFoods, <http://web.archive.org/web/20050425210612/www.harmonyhousefoods.com/slicedpotato.html>, April, 2005

15. A method for the reduction of acrylamide in thermally processed foods comprising the steps of:

a) providing an unmashed plant-based food having a native asparagine concentration;

5 b) dehydrating said unmashed plant-based food to make a dehydrated food such that a reduced asparagine concentration after step c) comprises at least 50% less than said native asparagine concentration; and

c) rehydrating said dehydrated food in a rehydration solution to make a rehydrated food wherein said rehydration solution comprises at least one acrylamide
10 reducing agent.

16. The method of claim 15 wherein the plant-based food at step a) comprises potato.

17. The method of claim 15 wherein said dehydrating at step b) occurs under low heat conditions at ambient pressure.

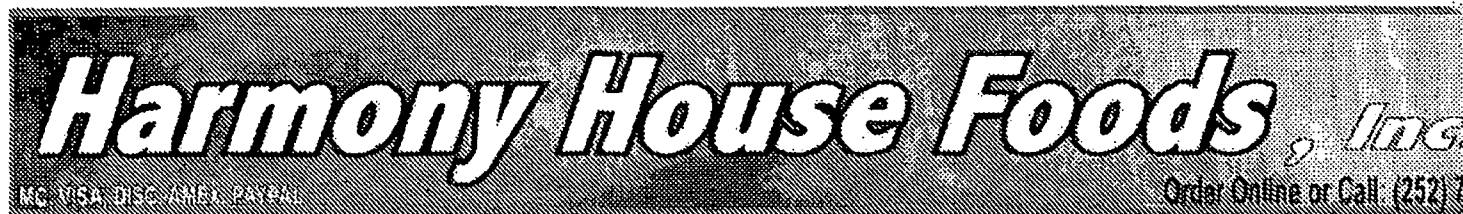
18. The method of claim 15 wherein said dehydrating at step b) occurs at a food temperature at less than about 74°C.

19. The method of claim 15 wherein said dehydrated food at step b) comprises a moisture content of less than about 3% by weight.

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