

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2022/022539

International filing date (day/month/year)
30.03.2022

Priority date (day/month/year)
31.03.2021

International Patent Classification (IPC) or both national classification and IPC
INV. A23L9/10 A21D13/30 A23L29/212 C08B30/14

Applicant
CORN PRODUCTS DEVELOPMENT, INC.

1. This opinion contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|--|
| ☒ | Box No. I | Basis of the opinion |
| ☐ | 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 Rule 43 <i>bis</i> .1(a)(i) with regard to novelty, inventive step and 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 |

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 *bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



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Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2022/022539

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-15</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-15</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-15</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Item 5

1 Reference is made to the following documents:

- D1 EP 1 102 547 A1 (COOEPERATIEVE VERKOOP EN [NL]) 30 May 2001 (2001-05-30)
- D2 US 6 221 420 B1 (THOMAS DAVID J [US] ET AL) 24 April 2001 (2001-04-24)
- D3 US 4 215 152 A (O'ROURKE JOSEPH D [US]) 29 July 1980 (1980-07-29)
- D4 WO 95/04082 A2 (NAT STARCH CHEM INVEST [US]; CHIU CHUNG WAI [US] ET AL.) 9 February 1995 (1995-02-09)cited in the application
- D5 US 6 010 574 A (JEFFCOAT ROGER [US] ET AL) 4 January 2000 (2000-01-04)cited in the application

(relevant passages as cited in the search report)

2 The present application relates to a bakery cream comprising a starch component wherein the starch component comprises (i) from about 50% to about 75% of a cold water swellable thermally inhibited waxy starch (weight % of the starch component) or from about 60% to about 70% and (ii) from about 25% to about 50% of a cold water swellable thermally inhibited non-waxy starch (weight % of the starch component) or from about 30% to about 40% and water wherein the bakery cream does not comprise a both chemically modified starch and an alginate and optionally does not comprise a gelling salt (claims 1-7). Further claims 8 - 12 relate to a a bakery cream powder mix comprising the starch components in the same ratios as given for claims 1-7. A bakery product comprising the bakery cream of any of the foregoing claims (claim 13). Additionally a starch mixture consisting of the starch mix as contained in the bakery cream mix product (claim 14). Further the starch mixture as well as the bakery powder mixture are defined in product by process formate (dependent claim 15).

The technical terms "waxy", "non-waxy", "cold water swellable" and "thermally inhibited" used in the claims are found in the description in par. 27 - 31, are in line with the technical meaning in the art and are as understood by the skilled person.

3 Novelty (Art. 33(2) PCT)

The subject-matter of claims 1-15 is not anticipated by the cited prior art. None of the documents discloses the claimed mixture of thermally inhibited cold water soluble waxy and non-waxy starched.

D1 relates to heat stable high-amylopectin starches for use in bakery fillings, preferred are amylopectin:amylose ratios of at least about 90:10 (par. 28). Preferred is the addition of a hydrocolloid such as alginate, pectin or gelatin because higher gel strengths can be achieved (par. 30 - 32, 37, examples, claims 1-9). Preferred are amylose free or amylopectin native starches (par. 34). Mixtures of the starches are not disclosed.

D2 discloses food compositions comprising thermally inhibited pregelatinized, ie cold water swellable, granular waxy maize starch in an instant chocolate pudding. The pudding mixture is free of alginate and chemically modified starches (example 29). D1 generally aims at providing thermally inhibited, pregelatinized starch containing food compositions (claims 19-26). The starch can be a waxy starch or non-waxy starch (claims 25 and 26). Mixtures of the two starch types as claimed are not disclosed.

D3 discloses instant puddings utilizing non-chemically modified starches such as tapioca starch. A clean taste and minimal flavour-masking effect is noted. The pregelatinized starch most closely mimics chemically modified starch (col. 1, l. 49 - 68). The starch can be used in combination with an emulsifier. Mixtures of the two starch types as claimed are not disclosed.

D4 and D5 were cited in the application and disclose preparation methods for the starches of the present application. D4 discloses a process for the preparation of heat treated and gelatinized starch which is a functional equivalent to chemically cross-linked or modified starches (see in particular claims 1-3). The starches can be used in food products which are heat treated and will be submitted to freeze-thaw cycles (p. 12, l. 13 - p. 13, l. 13). D5 equally relates to thermally inhibited starches having high viscosities. Pregelatinized

starches can be used. The starches may be inhibited individually or in mixture as well as in the presence of other materials (col. 7, l. 52 - 57). Waxy starches are preferred over non-waxy starches (claims 1- 10).

4 Inventive step (Art. 33(3) PCT)

The invention aims at providing a bakery cream, a bakery cream instant mix or starches mixtures which retain the textural and organoleptic properties of alginate containing bakery creams but use a mixture of waxy and non-waxy cold water swellable thermally inhibited starches instead.

The applicant has shown that the combination of the waxy and non-waxy starches in the claimed ranges provides the best taste and heat-stability effects (examples 1 - 3) over creams comprising chemically modified starches and alginates. From examples 1 and 2 using either waxy or non-waxy starches can be concluded in comparison with example 3 that the specific combination of wax and non-waxy starches and thus a required ratio of amylopectin and amylose will result in superior effects.

Closest prior art is D1. Said document aims at the same purpose, providing bakery cream applications which uses high amylopectin starches in order to improve baking stability. Starches having said characteristics can be used, including also chemically modified starches. The addition of a hydrocolloid is preferred.

Starting from D1 would thus require to select the specifically treated combination of starches and to exclude the presence of a chemically modified starch or a hydrocolloid.

No pointer to do so can be derived from any of the other cited documents. The need to replace chemically modified starches is referred to in D2 to D4. The production method of the claimed starches is known (D4 or D5). However, there is no pointer to derive the claimed combination in order to obtain the demonstrated effect. The subject-matter of claims 1-15 is considered to involve an inventive step.

5 Industrial applicability (Art. 33(4) PCT)

The subject-matter of claims 1-15 can be applied in industry.