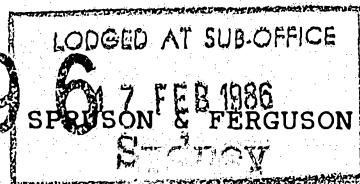


53641/86

APPLICATION ACCEPTED AND AMENDMENTS  
ALLOWED 24-5-90

599896



COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

CONVENTION APPLICATION FOR A STANDARD PATENT  
OR A PATENT OF ADDITION

We, CPC INTERNATIONAL INC., of International Plaza, Englewood Cliffs, New Jersey 07632, United States of America hereby apply for the grant of a standard patent for an invention entitled:

"A DRY FOOD PRODUCT RECONSTITUTABLE WITH COLD  
OR HOT AQUEOUS LIQUID AND A PROCESS FOR MAKING SAME"  
which is described in the accompanying complete specification.

DETAILS OF BASIC APPLICATION

Number of Basic Application:-  
P 3 506 513.3

Name of Convention Country in which Basic Application was filed:-  
Federal Republic of Germany

Date of Basic application:-  
23 February, 1985

Our address for service is:-

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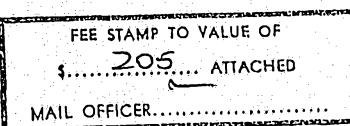
DATED this FOURTEENTH day of FEBRUARY 1986

CPC INTERNATIONAL INC.

By:

Registered Patent Attorney.

TO: THE COMMISSIONER OF PATENTS  
AUSTRALIA



3351 AUSTRALIA

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA  
PATENTS ACT 1952

DECLARATION IN SUPPORT OF A  
CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application made for a patent for an invention entitled:

"A DRY FOOD PRODUCT RECONSTITUTABLE WITH COLD OR HOT  
AQUEOUS LIQUID AND A PROCESS FOR MAKING SAME"

I,  
X/XXXX, .....  
..... ELLEN P. TREVORS  
[full name of declarant(s)]

of ..... INTERNATIONAL PLAZA, ENGLEWOOD CLIFFS, NEW JERSEY 07632  
..... [full address of declarant(s) - not post office box]  
United States of America

do solemnly and sincerely declare as follows:-

1. I am/X/XXXX authorised by CPC INTERNATIONAL INC., the applicant for the patent to make this declaration on its behalf.
2. The basic application as defined by Section 141 of the Act was made in Federal Republic of Germany on 23 February 1985 by Maizena Gesellschaft mbH
3. DETLEV GLITTENBERG of Friedhofstr. 13/2, D 7102 Weinsberg and ROLF STUTE of Bisseckerweg 7, D 7101 Flein, both in Federal Republic of Germany [respectively], are the actual inventors of the invention and the facts upon which the applicant is entitled to make the application is as follows:

The Applicant is the assignee of Maizena Gesellschaft mbH which is the assignee of the invention from the actual inventors.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at Englewood Cliffs this 5 day of February 1986

FOR AND ON BEHALF OF CPC INTERNATIONAL INC.

.....  
Signature of Declarant  
ELLEN P. TREVORS

TO: THE COMMISSIONER OF PATENTS Assistant Secretary  
AUSTRALIA

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**(12) PATENT ABRIDGMENT (11) Document No. AU-B-53641/86**  
**(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 599896**

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(54) Title  
**RECONSTITUTABLE FOOD PRODUCT**

International Patent Classification(s)

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(56) Prior Art Documents

**US 4717578**

**US 3650770**

**US 3443964**

(57) Claim

1. A dry food product which is reconstitutable with cold or hot aqueous liquids to form a flavored, pulpy textured sauce, soup, juice, compote, cancassee, savory vegetable-containing soup or snack meal, comprising:

(a) added starch consisting at least partially of cold-swelling leguminous pre-gelatinized starch, and  
(b) at least one dried food flavor-imparting component selected from the group consisting of fruits and vegetables.

9. The product of any one of claims 1 to 8, characterized in that as leguminous pre-gelatinized starch it contains starch of *Phaseolus vulgaris*, *Phaseolus mungo* (*radiatus*, *Vigna radiata*), *Phaseolus crysanthus*, *Phaseolus aconitifolius*, *Phaseolus lunatus*, *Dolichos Lablab*, *Dolichos biflorus*, *Vicia faba* L., *Psophocarpus tetragonolobus*, *Cicer arietum*, *Cajanus cajan*, *Vigna unguiculata* (*sinensis*), *Pisum sativum* L., and/or *Lentil culinaris*.

(11) AU-B-53641/86  
(10) 599896

-2-

25. A process for producing a dry food product according to any one of claims 1 to 24 by mixing fruit substance with starch and, optionally, flavoring agents, filling agents and/or enhancers as well as, optionally, further thickening agents, characterized in that at least part of the added starch is leguminous starch which prior to, during or after mixing with one or several other product component(s) is at least partially converted into leguminous pre-gelatinized starch of a particle size of 0.1 to 10 mm by the known process of pre-gelatinizing under gentle conditions and drying, followed if necessary by size reduction.

599896

FORM 10

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

53641/86.

Class Int. Class

Complete Specification Lodged:

Accepted:

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Related Art:

This document contains the  
amendments made under  
Section 49 and is correct for  
printing.

Name of Applicant: CPC INTERNATIONAL INC.

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Complete Specification for the invention entitled:

"A DRY FOOD PRODUCT RECONSTITUTABLE WITH COLD  
OR HOT AQUEOUS LIQUID AND A PROCESS FOR MAKING SAME"

The following statement is a full description of this invention,  
including the best method of performing it known to us

ABSTRACT

A dry food product which is reconstitutable with cold or hot aqueous liquids to form a flavored, pulpy textured sauce, soup, juice, compote, cancassee, savory vegetable-containing soup or snack meal, comprising:

5 (a) added starch consisting at least partially of cold-swelling leguminous pre-gelatinized starch, and  
(b) at least one dried food flavor-imparting component selected from the group consisting of fruits and vegetables.



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A Dry Food Product Reconstitutable with Cold or Hot Aqueous Liquid and a Process for Making Same.

The invention relates to a dry food product reconstitutable with cold or hot aqueous liquid to yield a fruit sauce, fruit soup, fruit juice, compote, concassée, savoury vegetable containing soup or snack meal of a pulpy structure, which contains added starch and, optionally, further consistency- and/or structure-imparting components as well as at least one taste- and flavor-imparting dry vegetable and/or fruit substance component (fruit substance) and to a process for producing said product.

Dry products of the type herein described have been known for many decades and, so far as taste is concerned have for a fairly long time shown a quality which as a rule may be described as fully satisfactory and only insignificantly if at all different from that of corresponding drinks or foods or food components, prepared from fresh raw material by the housewife at home. However, preparations made from these well-known dry products are as a rule characterized by a smooth, homogeneous structure which is in fact frequently regarded as highly desirable considering that the housewife herself in preparing this kind of soup, sauce or the like from fresh raw materials in the kitchen expressly intends to obtain such a smooth, creamy consistency, which is essentially attributable to the starch added to the product.

Added starches used for this purpose include, apart from so-called native starches, i.e. starches which have simply been isolated from the plant and are present in pure form and which require a heating step to gelatinize, so-called pregelatinized and therefore cold-swelling starches which may be produced in different ways, the most commonly used method being the roll-drying process in which the starch is pregelatinized and dried simultaneously on the roll or pregelatinized in a separate step and then subjected to roll-drying.



In certain cases, however, as when preparing proper home-made tomato sauce, hot apple sauce and apple compote or "potages", the housewife intends to and does achieve a pulpy texture or structure, which is an essential organoleptic quality criterion lacking in the corresponding soups, sauces, etc. prepared from dry products today. Experts, having of course been aware of this deficiency for some time, have in many different ways tried to develop dry products which in combination with aqueous liquids yield juices, sauces, soups, etc. of a pulpy structure resembling that of more or less finely pureed vegetables or fruits of the type in question, e.g. "tomato concassée", but a solution which is satisfactory in every respect has not yet been found.

10 In particular, the attempt to solve the above problem by adding to the "non-starch components" of this type of dry product a gelatinized, cross-linked and/or high-amylose powdered starch product and heating this mixture to at least 72° C in order to cause the starch particles to swell (US Patents 3 443 964, 3 579 341 and 3 650 770) or the proposal to produce a dry product for "tomato drinks" by subjecting an aqueous mixture of tomato solids and gelatinizable starch materials whose starch to water ratio has been selected so as to allow only a limited or partial gelatinization of the starch grains, to a roll drying process (US Patent 4 031 266), have proved to be at most moderately successful.

20 The only genuinely satisfactory solution to this problem known so far is based on the proposal to use at least as part of the added starch a so-called "starch sponge" which is preferably charged with the fruit substance by impregnating or incorporating the latter in the starch matrix during production of the sponge (German Patent 2 938 596). Reconstituted with hot aqueous liquids, these known dry products do in fact yield sauces, soups, juices or compotes of an excellent pulpy structure and thus provide per se a perfect solution for the above problem. However, they do have the following disadvantages :

- a) The production of the starch sponge is time-consuming and comparatively expensive.
- b) The cooking stability of the starch sponge is limited in as much as after prolonged cooking it slowly changes back to a normal starch paste so that the initially distinctly pulpy texture gradually becomes weaker and eventually disappears.
- c) The reconstitution by cold aqueous liquids is frequently slow and incomplete.

10 It is an object of this invention, therefore, to provide dry food products of the above-mentioned type which avoid the disadvantages of the prior art and, in particular, are equivalent to the best of the known products i.e. those which contain added starch at least partially in the form of starch sponge. The soups, sauces, compotes, etc., prepared from the products of the invention show not only a pulpy structure or texture which even experts are hardly able to distinguish, without auxiliary means, from the structure or texture of foods prepared from fresh vegetables and/or fruits by the housewife at home, but also they are superior to the starch sponge-containing product in respect of cooking stability of the structure and the speed of reconstitution in cold aqueous liquids. Furthermore, the invention provides a process for producing such dry food products which is less costly than the production of corresponding products based on starch sponge.

20 This object of the invention is accomplished on the basis of the surprising discovery that leguminous pre-gelatinized starches, as they are obtained by drying a leguminous starch gelatinized under "gentle" conditions, e.g. by roll-drying a suspension of a native leguminous starch, rehydrate in aqueous liquids not to a smooth starch sol or gel, but to a pulpily textured paste of a concassée-like structure. A further discovery is that, while reconstitution in cold, aqueous liquids is distinctly faster and more complete, compared to starch sponges, the structure still remains much stabler during cooking than that of starch sponges.

Accordingly, the invention comprises a dry food product which is reconstitutable with cold or hot aqueous liquids to form a flavored, pulpy textured sauce, soup, juice, compote, cancassee, savory vegetable-containing soup or snack meal, comprising:

5 (a) added starch consisting at least partially of cold-swelling leguminous pre-gelatinized starch, and  
(b) at least one dried food flavor-imparting component selected from the group consisting of fruits and vegetables.

10 Gelatinization "under gentle conditions", as mentioned above, is meant to denote conditions which resemble those commonly present in roll-drying, in which, as is generally known, highly concentrated aqueous starch dispersions are gelatinized essentially under thermal conditions, i.e. without being exposed to any major shearing forces, at temperature which during the gelatinizing step do not substantially exceed 100°C and are then 15 dried on steam-heated rolls.

20 The leguminous pre-gelatinized starches which in accordance with the invention are used - at least partially - as added starch rehydrate readily in aqueous media and in the presence of finely dispersed fruit substance even at room temperature yielding a product which, in terms of organoleptic properties and in particular texture, closely resembles a concassée of corresponding fruit pulp and do not lose such properties and texture even after prolonged cooking. Present in comparatively small amounts, such starches impart to the finished product the pulpy texture characteristic of the invention.

25 Thus, in the simplest of cases it is sufficient to replace part of the added starch normally present in known dry products as thickening agent by leguminous pre-gelatinized starch. For this purpose it is possible either to add previously prepared leguminous pre-gelatinized starch to the remaining product components or, preferably, to convert leguminous starch 30 "in situ" to leguminous pre-gelatinized starch. The fineness and extent



of texturing may be selectively varied within wide limits by an appropriate choice of the grain size and amount of leguminous starch component used, the fineness of texture being proportional to the grain size and the extent of texturing increasing as the grain size becomes larger while the amount of leguminous pre-gelatinized starch remains constant.

A certain texturing may also be achieved by adding as fruit substance a fruit pulp of appropriate grain size which has been dried by freeze-drying or similar structure-preserving process.

10 However, this product component which may optionally be used for the purposes of the invention is not only relatively expensive, but, even if all fruit substance is added in this form, does not by itself produce a texturing effect as pronounced as that of the leguminous pre-gelatinized starch proposed by the invention.

As a rule a distinct texturing effect may be achieved by adding only part of the added starch in the form of leguminous pre-gelatinized starch. The rest may then be added in the form of "normal" pre-gelatinized starch, native starch and/or, preferably, starch sponge. It should be noted in this connection that the obviously superior rehydrating properties in cold aqueous liquids and the higher cooking stability of leguminous pre-gelatinized starches, compared to starch sponges originating from other starches, are characteristic also of leguminous starch sponges. So, for the purpose of the invention the leguminous pre-gelatinized starch may be wholly or partially in sponge form.

20 Leguminous starches having amylose contents of 50 or more per cent by weight, when used for the purposes of this invention, do not in themselves pose any problems, but they are neither necessary nor superior to leguminous starches with lower amylose contents, so that leguminous pre-gelatinized starches with amylose contents of at most 50 per cent by weight are preferred.

30 The proportion of leguminous swelling starch in the total content of added starch is appropriately at least 50, preferably at

least 70, and more preferably at least 85 w/w % leguminous pre-gelatinized starch, unless the remaining added starch consists of starch sponge which equally yields a pulpy texture and/or unless the dry product contains additionally other components which impart a pulpy texture.

10

The most economical and at the same time most reliable method of producing leguminous pre-gelatinized starches suitable for the purposes of the invention is that of roll-drying dispersions of preferably granular leguminous starches. Dry food products whose content of leguminous pre-gelatinized starch consists predominantly (preferably more than 70 and more preferably at least 85 w/w %) of pre-gelatinized starch obtained by roll-drying an aqueous dispersion of <sup>one or More</sup> granular leguminous starch are therefore preferred.

20

It should be noted that the reconstituting properties of the leguminous pre-gelatinized starches to be used for the purposes of the invention may be improved further by so-called conditioning, i.e. a heat treatment after drying, in which optimum conditions (time and temperature) depend of course on the circumstances of the particular case and can be empirically determined by experts without any difficulty. When producing leguminous pre-gelatinized starches by roll-drying, the conditioning step is preferably carried out immediately after drying on the rolls.

30

The total content of added starch present in the dry food products of the invention suitably lies in the range 2 to 98 w/w % based on total weight. Clearly, within this range there are preferences depending upon the nature of the product. For example for the tomato containing product the total content is preferably between 2 and 70, more preferably 3.5 and 50, and most preferably between 5 and 25 w/w %, based on total weight.

The texture-forming properties of the leguminous pre-gelatinized starches used in the dry food products of this invention depend, inter alia, on the <sup>particle</sup> size which is preferably selected so as to range between 0.1 and 10, more preferably between 0.15 and 8, and most preferably between 0.2 and 6 mm, i.e. the (usually



flaked) starch particles pass through a sieve having openings of the appropriate width ~~(upper value)~~ and are retained on such sieve ~~(lower value)~~ respectively.

While the fruit substance of dry food products according to the invention may, as already mentioned, be present wholly in the form of fruit powder, experience has shown that it is more advantageous to add at most part of it in this way and/or in the form of freeze-dried fruit pulp and, preferably, at least part of it sorptively bound and/or preferably incorporated in the starch matrix e.g. in the form of compound starch sponge (cf. German Patent 2 938 596).

Added starches suitable for the purposes of the invention may not only be starches in the literal sense of the word, but generally also starch material which are known to be equivalent to those starches when used in home-cooking, e.g. in particular flours high in starch.

According to experience gained to date, any type of leguminous starch may, in principle, be used for the purposes of the invention. Leguminous pre-gelatinized starches derived from *Phaseolus vulgaris*, *Phaseolus mungo* (*radiatus*, *Vigna radiata*), *Phaseolus <sup>crystanthus</sup> exsantus*, *Phaseolus aconitifolius*, *Phaseolus lunatus*, *Dolichos lablab*, *dolichos biflorus*, *Vicia faba* L, *Psophocarpus tetragonoglobus*, *Cicer arietum*, *Cajanus cajan*, *Vigna unguiculata (sinensis)*, *Pisum sativum* L. and/or *Lens culinaris* are particularly well suited for the purposes of the invention.

As already mentioned, it is sufficient simply to add to the dry product leguminous pre-gelatinized starch of the appropriate grain size. More often than not, however, it is of advantage to use so-called compound leguminous pre-gelatinized starches, i.e. leguminous pre-gelatinized starches into which one or several other recipe component(s), in particular the fruit substance(s), have been incorporated, e.g. by impregnating the leguminous pre-gelatinized starch with a solution or dispersion of the



component(s) in question or, preferably, by roll-drying an aqueous mixture of, optionally gently gelatinized, leguminous starch and the product component(s) to be incorporated into it. Preferable for the purposes of this invention are in particular dry food products which contain at least 5, preferably at least 20, and more preferably 50 w/w % of the fruit substance in the form of compound leguminous pre-gelatinized starch as well as, optionally, compound starch sponge.

10

Particularly suitable are compound leguminous pre-gelatinized starches which contain 10 to 95, preferably 25 to 80, and most preferably 35 to 65 w/w % of starch.

Regarding the type of fruit substances to be incorporated into the dry food products of this invention, it is noted that preference should be given to dry food products which contain as fruit substance tomato, apple, horseradish, orange, pear, apricot, raspberry, blackberry, red current, carrot, mushroom, celeriac, leek, cauliflower, or spinach.

20 In summary, the product according to the invention which comprises leguminous pre-gelatinized starch has the following advantages :

1. Leguminous swelling starches have a more or less neutral taste, which is of considerable importance especially when they are used in combination with fruit substances having a fine and easily suppressed taste.
2. The fat content of leguminous starches is very low which not only ensures good storage stability but also renders the addition of stabilizers, such as phosphates, during roll-drying unnecessary, which is indispensable when using high-lipid cereal starches or flours in order to prevent rancidity.

30

3. When using leguminous starches it is unnecessary to solve the problem of texturing, as in the known proposals, by selecting starches which are chemically cross-linked and thus limited in their swelling properties (US Patents 3 443 964 and 3 579 341), but also unnecessary to add other components eg. those declarable as additives under the provisions of food law, such as microcrystalline cellulose. It should be noted, however, that, if desired for specific applications, the use of such additives as well as of flours or other starches is possible and requires no major changes in the process nor the acceptance of disadvantages in the finished product.

4. Leguminous pre-gelatinized starches and, accordingly, the dry food products of this invention have genuine instant properties, i.e. they show remarkable swelling properties in cold aqueous liquids and so require no heating, as do, e.g., starch sponges, to rehydrate smoothly and rapidly. The leguminous pre-gelatinized starches forming the characterizing component of the dry food products of the invention thus show the same swelling behavior in cold water as "normal" pre-gelatinized starches.

5. The ability of the leguminous pre-gelatinized starches to develop a pulpy texture on rehydration may be increased by a commonly known conditioning step, i.e. heat treatment at an appropriately selected water content, which when using the roll-drying process, may advantageously be carried out subsequently to the roll-drying process proper, provided roll-drying is performed in such a manner that the water content in the starch when the film is taken off the roll is the same as that required for the conditioning step.

6. With leguminous starches it is possible to obtain products of a uniform appearance even if the proportions of added starches are very high, because unlike most of the known processes mentioned before, this invention not only allows

separate production of the starch system conferring the pulpy texture, but also the production of compound leguminous pre-gelatinized starches especially by roll-drying the starch jointly with other product components, in particular the fruit and vegetable portions.

7. To achieve a good pulpy structure it is by no means necessary for the leguminous pre-gelatinized starches to show amylose contents of more than 50 % (cf. US Patent 3 650 770). As illustrated in the examples, amylose contents of less than 40 % are sufficient.

10 Pulpily textured systems can be properly described only by sensorial judgment, and thus inherently subjective parameters (appearance, mouthfeel, etc.). The examples and comparison tests which follow however and which serve to illustrate the invention and its advantages specify in addition to the usual parameters such as particle size distribution (which should preferably range between 1 and 4 mm) and particle form (which should be largely uniformly three-dimensionaly) the following objective parameters intended to characterize pulpily textured products :

11 I. Cooking residue

12 At a given particle size distribution, the cooking residue provides a measure of stability under standardized cooking conditions and the pulpy texture of the reconstituted dry product. It is determined as follows :

13 15 g of the product to be examined are cooked in 500 ml water for a specific time (2 and 10 min. resp.), whereupon the sample is poured through a sieve having openings of a width of 500  $\mu$  and the sieve residue is weighed and shown as "cooking residue" in g.

### II. Sediment

The sediment provides a measure of the water-absorptive capacity or swelling properties of the system in question and is determined as follows :

10 20 g of the dry product to be examined are heated in 250 ml water, boiled and subsequently centrifuged for 3 minutes at an acceleration of 1,400-4,000 g, whereupon the clear phase is separated and the moist sediment weighed. The sediment is given in per cent (weight of sediment, based on total weight of sample).

### III Cold residue

The cold residue reflects the water-absorptive capacity after 5 minutes of hydrating with tap water or the cold swelling behavior and is determined as follows :

15 g of the dry product to be examined are left to swell in 500 ml of cold (room temperature) water for 5 minutes, whereupon the sample is poured through a sieve having openings of a width of 500  $\mu$ , and the sieve residue is weighed and shown as "cold residue" in g.

#### QO Example 1

An aqueous slurry of 1,65 kg starch derived from smooth peas (amylose content approximately 34 w/w %) in 3.35 kg water was dried with the aid of a paired roll dryer at a heating steam pressure of 2 - 5 bars and a speed of rotation of 1 - 3 rpm (corresponding to a film residence time of 10 - 30 sec.).

The dried film was crushed and pressed through a sieve having openings of a width of 4 mm. The resulting leguminous pre-gelatinized starch was present in the form of "flakes".

A mixture of these "leguminous pre-gelatinized starch flakes" and tomato powder at a ratio of 1 : 1 prepared in the cold or hot state (e.g. 20 g in 200 ml water) gave a ready-to-eat product (tomato sauce) of a good pulpy texture.

Even after reconstituting under sterilizing conditions (45 min. at 121° C) a preparation obtained in this manner (80 g per liter) still showed a highly viscous pulpy structure.

Example 2

10. A mixture of 1.5 kg starch of smooth peas, 4.1 kg tomato pulp (36° Bx corresponding to 1.467 kg D.S.), 2.2 kg water and 50 g citric acid was roll-dried and crushed under the conditions described in Example 1.

By reconstituting 20 g of the resulting dry product with 200 ml of boiling water, a ready-to-eat product of good pulpy texture was obtained which, compared to a dry product (mixture) reconstituted in the same manner as described in Example 1, showed a much more homogenous appearance.

20. To check whether the excellent properties of this product of the invention were in fact mainly attributable to the use of pea starch, dry products were prepared in an analogous manner using potato starch. To improve their properties, these "control products", were at the end of the roll-drying step subjected to a conditioning treatment (re-drying) of different intensity. The sensorial properties and cooking residue values of the dry products of the invention and of the control products are shown in Table I below :

Table I

Dry product	Cooking residue (g) after 10 min. cooking time	Organoleptic evaluation
<u>Example 2</u> (invention)	100	good pulpy texture resembling "concassée"
<u>Control</u> (flakes analogous, but made with potato starch instead of smooth peas)	1 to max. 55*	even at max. cooking residue at most paplike structure

\* The maximum value is obtainable only by optimized conditioning at the end of the roll-drying step, which is not required when using the starch of smooth peas.

As is evident not only from the sensorial judgment but also from the measured values of Table I, the product made from leguminous starch in accordance with the invention was clearly superior to the control products made from potato starch in terms of pulpy texture.

Example 3

Example 2 was repeated using a roll-drying operating on the applicator roll principle instead of the pond principle. In this manner a thicker "flake" was obtained, which had a positive effect on the mechanical stability of the flakes and the pulpy texture of the reconstituted product.

Comparison test 1

A "tomato sponge" was made from potato starch as described in Example 1 of German Patent No. 2 938 596. This "tomato sponge" and the product of Example 2 were each cooked in water for 2 min. in a concentration of 15 g/500 ml each.

As may be seen from Table II, both products after a cooking time of 2 min. showed a comparable pulpy texture which corresponded to the visual impression.

Table II

Product	Cooking residue (g) after 2 min. cooking time	Sediment %	Organoleptic evaluation
<u>Comparison test 1:</u> state of the art according to German Patent 2 938 596	120	62	very good pulpy texture resembling "concassée"
<u>Example 2</u> (invention)	120	56	comparable pulpy texture

The two dry products were similar also in terms of water-absorptive capacity which is determined via the sediment.

Differences between the two compared products became evident, however, upon prolonged cooking, whereby the known product of Comparison Test 1 lost its coarsely pulpy texture more rapidly than that prepared from the dry product of this invention as described in Example 2.

Significant differences were also noted in the cold-swelling properties, as may be seen from Table III.

Table III

Product	Cold residue (g)	Organoleptic evaluation
<u>Comparison Test 1</u> (state of the art)	70	deposition of partially hydrated discrete particles
<u>Example 2</u> (invention)	136	homogeneous pulpy product

10 The dry product of the invention thus showed a much better rehydration behavior in cold water than the compound starch sponge known from German Patent No. 2 938 596.

Comparison test 2

To reveal the differences between the invention and the state of the art known from US Patent No. 3 650 770, Example 2 was repeated using amylo-corn instead of smooth pea starch. For this purpose a mixture of 1.5 kg amylo-corn starch (50% amylose), 4.1 kg tomato pulp (36° Bx corresponding to 1.476 kg D.S.), 50 g citric acid and 2.2. kg water was roll-dried and crushed as described in Example 1.

20 The resulting dry product was prepared by cooking (20 g/500 ml). The preparation thus obtained (flakes in almost clear fluid) looked more like protein coagulates. Due to its lack of water retention this comparison product also showed a lower sediment than that made with starch of smooth peas (cf. Table IV).

Table IV

Dry food product	Cooking residue (g) after 2 min. cooking time	Sediment (%)
Comparison Test 2	80	27
Example 2 (invention)	120	56

The measured values listed in Table IV thus clearly show that the amylo-corn starch proposed in US Patent 3 650 770 for the manufacture of pulpy products, i.e. a starch featuring an amylose content of more than 50 %, does not yield dry products capable of accomplishing the object of the invention.

Comparison test 3

Example 2 was repeated using a mixture of 1.2 kg amylo-corn starch (50 % amylose) and 0.3 kg potato starch instead of starch of smooth peas and 1.5 kg water in order to check whether the dry products known from US Patent 3 650 770 could by reducing the high amylose content proposed therein, be improved to a value corresponding to that of the smooth pea starch used in the examples, or, in other words, whether the superior properties of the product of Example 2, compared to that of Comparison Test 2 were due to the type of starch used (smooth pea starch) or simply to the lower amylose content.

The evaluation of the product prepared in this manner by comparison with that obtained according to Example 2 (cf. Table V) shows that even a total amylose content which by the addition of potato starch was reduced to abt. 40 % did not improve the

amylo-corn starch proposed in US Patent 3 650 770 in terms of its suitability for accomplishing the object of the present invention, but that the desired product properties can only be obtained by the leguminous starches to be used according to the invention.

Table V

Dry product	Cooking residue (g) after 2 min. cooking time	Sediment (%)
<u>Comparison Test 3</u>	85	33
10. <u>Example 2</u> (invention)	120	56

Example 4:

1 kg fresh mushrooms were mashed, mixed with 1.6 kg pea starch and then roll-dried under the conditions described in Example 1.

Upon rehydration of 20 g of the resulting flakes by addition of 200 ml hot water a pulpy product having the characteristic mushroom flavor was obtained.

Example 5 :

9 kg of leek was precooked for about 10 minutes, then mashed and mixed with 3.6 kg pea starch. The roll-drying of the resulting mass was performed under the conditions described in Example 1.

Upon rehydration of 20 g of the product by addition of 200 g hot water a pulpy product having a characteristic leek flavor was obtained.

Example 6 :

10 kg frozen spinach was thawed, then 1 kg of pea starch and 600g of a commercial bouillon mass were admixed and the whole roll-dried under the conditions described in Example 1.

Upon addition of 20 g of the resulting flakes to 200 ml water and short heating a product having a consistency and appearance resembling that of freshly cooked spinach and a good flavor was obtained.

Example 7 :

10 kg frozen, strained raspberry mash was thawed. After 1.1 kg of pea starch had been admixed the whole was roll-dried under the conditions described in Example 1. 20 g of the resulting flakes were rehydrated with 200 ml water containing 20 g sugar.

Upon addition of boiling water to the flakes a pulpy homogeneous and well-tasting fruit sauce was obtained. Further boiling was not necessary. When boiled the pulpiness of the product was gradually reduced. The water can be replaced by milk, which results in a product resembling that of a porridge prepared from oat flakes.

The claims defining the invention are as follows:

1. A dry food product which is reconstitutable with cold or hot aqueous liquids to form a flavored, pulpy textured sauce, soup, juice, compote, cancassee, savory vegetable-containing soup or snack meal, comprising:

(a) added starch consisting at least partially of cold-swelling leguminous pre-gelatinized starch, and

(b) at least one dried food flavor-imparting component selected from the group consisting of fruits and vegetables.

2. The product of claim 1, characterized in that the leguminous pre-gelatinized starch has an amylose content of at most 50 w/w %.

3. The product of claim 1 or claim 2, characterized in that at least 50 w/w % of the added starch is a leguminous pre-gelatinized starch.

4. The product of claim 3 wherein at least 70 w/w % of the added starch is a leguminous pre-gelatinized starch.

5. The product of claim 4 wherein at least 85 w/w % of the added starch is a leguminous pre-gelatinized starch.

6. The product of any one of claims 1 to 5, characterized in that the leguminous pre-gelatinized starch comprises preponderantly pre-gelatinized starch obtainable by roll-drying an aqueous dispersion of one or more granular leguminous starch.

7. The product of claim 6 wherein pre-gelatinized starch comprises more than 70 w/w % obtained by said roll-drying.

8. The product of claim 7 wherein pre-gelatinized starch comprises more than 85 w/w % obtained by said roll-drying.

9. The product of any one of claims 1 to 8, characterized in that as leguminous pre-gelatinized starch it contains starch of *Phaseolus vulgaris*, *Phaseolus mungo* (*radiatus*, *Vigna radiata*), *Phaseolus crysanthus*, *Phaseolus aconitifolius*, *Phaseolus lunatus*, *Dolichos Lablab*, *Dolichos biflorus*, *Vicia faba* L., *Psophocarpus tetragonolobus*, *Cicer arietum*, *Cajanus cajan*, *Vigna unguiculata* (*sinensis*), *Pisum sativum* L., and/or *Lens culinaris*.

10. The product of any one of claims 1 to 9, characterized in that it contains, based on total weight, 2 to 98% added starch.

11. The product of any one of claims 1 to 10, characterized in that the leguminous pre-gelatinized starch has a particle size of 0.1 to 10 mm.



12. The product of claim 11 wherein the particle size is 0.15 to 8 mm.
13. The product of claim 12 wherein the particle size is 0.12 to 6 mm.
14. The product of any one of claims 1 to 13, characterized in that at least part of the leguminous pre-gelatinized starch comprises at least one further product component which is sorptively bound.
15. The product of claim 14 wherein the further component is a fruit substance.
16. The product of claim 14 or claim 15 wherein the further component is in addition or alternatively incorporated in the starch matrix (compound leguminous pre-gelatinized starch).
17. The product of claim 15 or claim 16, characterized in that at least 5 w/w % of the fruit substance is present in the form of compound leguminous pre-gelatinized starch.
18. The product of claim 15 or claim 16, characterized in that at least 20 w/w % of the said fruit substance is present in the form of compound leguminous pre-gelatinized starch.
19. The product of claim 15 or claim 16, characterized in that at least 50 w/w % of the said fruit substance is present in the form of compound leguminous pre-gelatinized starch.
20. The product of any one of claims 15 to 18, characterized in that the compound leguminous pre-gelatinized starch contains 10 to 95 w/w % starch.
21. The product of any one of claims 15 to 18, characterized in that the compound leguminous pre-gelatinized starch contains 25 to 80 w/w % starch.
22. The product of any one of claims 15 to 18, characterized in that the compound leguminous pre-gelatinized starch contains 35 to 65 w/w % starch.
23. The product of any one of claims 1 to 22, characterized in that the fruit substance contained therein is present at least partially in the form of fruit powder, freeze-dried fruit pulp and/or compound starch sponge.
24. The product of any one of claims 1 to 23, characterized in that as fruit substance it contains dry substance of tomato, apple, orange, pear, apricot, raspberry, blackberry, red current, carrot, horseradish, mushroom, celeriac, leek, cauliflower or spinach.



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25. A process for producing a dry food product according to any one of claims 1 to 24 by mixing fruit substance with starch and, optionally, flavoring agents, filling agents and/or enhancers as well as, optionally, further thickening agents, characterized in that at least part of the added starch is leguminous starch which prior to, during or after mixing with one or several other product component(s) is at least partially converted into leguminous pre-gelatinized starch of a particle size of 0.1 to 10 mm by the known process of pre-gelatinizing under gentle conditions and drying, followed if necessary by size reduction.

26. The process of claim 25 in which the pre-gelatinization is carried out by roll-drying.

27. The process of claim 25 or claim 26 characterized in that the leguminous pre-gelatinized starch is subjected to a heat treatment after drying.

28. A dry food product which is reconstitutable with cold or hot aqueous liquids, substantially as hereinbefore described with reference to any one of the Examples, but excluding the comparison tests.

29. A process for producing a dry food product which is reconstitutable with cold or hot aqueous liquids, substantially as hereinbefore described with reference to any one of the Examples, but excluding the comparison tests.

DATED this FIFTEENTH day of MAY 1990

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