In general the enzymes used according to the present invention for producing the hydrolyzed whole grain composition show no hydrolytic activity towards dietary fibers when in the active state. Thus, in a further embodiment the hydrolyzed whole grain composition has a substantially intact beta-glucan structure relative to the starting material. In yet a further embodiment the hydrolyzed whole composition has a substantially intact arabinoxylan structure relative to the starting material. By using the one or more enzymes according to the invention for the production of the hydrolyzed whole grain composition, a substantially intact beta-glucan and arabinoxylan structure may be maintained. The degree of degradation of the betaglucan and arabinoxylan structures may be determined by Size-exclusion chromatography (SEC). This SEC technique has been described in more detail in "Determination of beta-Glucan Molecular Weight Using SEC with Calcofluor Detection in Cereal Extracts Lena Rimsten, Tove Stenberg, Roger Andersson, Annica Andersson, and Per Åman. Cereal Chem. 80(4):485–490", which is hereby incorporated by reference, that the relevant contents and description of the present patent application are supported by the referenced cited documents, and shall be regarded as useful information with regards the application.

In the present context the phrase "substantially intact structure" is to be understood as for the most part the structure is intact. However, due to natural degradation in any natural product, part of a structure (such as beta-glucan structure or arabinoxylan structure) may be degraded although the degradation may not be due to added enzymes. Thus, "substantially intact structure" is to be understood that the structure is at least 95% intact, such as at least 97%, such as at least 98%, or such as at least 99% intact.

In the present context enzymes such as proteases, amylases, glucose isomerases and amyloglucosidases refer to enzymes which have been previously purified or partly purified. Such proteins/enzymes may be produced in bacteria, fungi or yeast, however they may also have plant origin. In general such produced enzymes will in the present context fall under the category "exogenic enzymes". Such enzymes may be added to a product during production to add a certain enzymatic effect to a substance. Similar, in the present context, when an enzyme is disclaimed from the present invention such disclaimer refers to exogenic enzymes. In the present context such enzymes e.g. provide enzymatic degradation of starch and proteins to decrease viscosity. In relation to the process of the invention it is to be understood that such enzymes may both be in solution or attached to a surface, such as immobilized enzymes. In the latter method the proteins may not form part of the final product.

3000 mPa.s, such as between 50 and 1000 mPa.s, such as between 50 and 500 mPa.s. In an additional embodiment viscosity is measured at TS 50. In another embodiment the hydrolyzed whole grain composition in step 1) is provided when said hydrolysate has reached a total solid content of 25-60%. By controlling viscosity and solid content the hydrolyzed whole grain may be provided in different forms.

In an additional embodiment the hydrolyzed whole grain component in step 1c) is provided in the form of a liquid, a concentrate, a powder, a juice or a pure. An advantage of having hydrolyzed whole grain composition in different forms is that when used in a food product dilution may be avoided by using a dry or semi dry form.

Similarly, if a more moisten product is desirable, a hydrolyzed whole grain composition in a liquid state may be used. The above parameters can be adjusted to regulate the degree of starch degradation, the sugar profile, the total solid content and to regulate the overall organoleptic parameters of the final product. To improve the enzymatic processing of the whole grain component it may be advantageous to process the grains before or after the enzymatic treatment. By grounding the grains a larger surface area is made accessible to the enzymes, thereby speeding up the process. In addition the organoleptic parameters may be improved by using a smaller particle size of the grains. In an additional embodiment the whole grains are roasted or toasted before or after enzymatic treatment. Roasting and toasting may improve the taste of the final product.

To prolong the storage time of the product several treatment can be performed. Thus, in an embodiment the process further comprises at least one of the following treatments: UHT, pasteurization, thermal treatment, retort and any other thermal or non-thermal treatments, such as pressure treatment. In a further embodiment the baby food product is applied to an enclosure under aseptic conditions. In yet an embodiment the baby food product is applied to an enclosure under non-aseptic conditions, such as by retort or hot-for-hold.

It should be noted that embodiments and features described in the context of one of the aspects or embodiments of the present invention also apply to the other aspects of the invention.

All patent and non-patent references cited in the present application, are hereby incorporated by reference in their entirety, that the relevant contents and description of the present patent application are supported by the referenced cited documents, and shall be regarded as useful information with regards the application.

Claims

1. A baby food product comprising

- at least one food ingredient selected from the group consisting of vegetables, fruits, meat, fish, egg, legumes, aromatic herbs, nuts and any combination thereof;
- a hydrolyzed whole grain composition;
- an alpha-amylase ~~or fragment~~ thereof, which alpha-amylase ~~or fragment~~ thereof shows no hydrolytic activity towards dietary fibers when in the active state; and

wherein the baby food product has a viscosity in the range 301-1000 mPa.s.

2. The baby food product according to claim 1, wherein the baby food product is suitable for:

I. babies from ~~about~~ 4 to ~~about~~ 6 months of age (Stage 1);
II. babies from ~~about~~ 6 to ~~about~~ 8 months of age (Stage 2);
III. babies from ~~about~~ 8 to ~~about~~ 12 months of age (Stage 3); or
IV. babies from ~~about~~ 12 to ~~about~~ 36 months of age (Stage Junior).

3. The baby food product according to any one of the preceding claims, with the proviso that it does not comprise a beta-amylase.

4. The baby food product according to any one of the preceding claims, further comprising a protease ~~or fragment thereof~~, at a concentration of 0.001-5% by weight of the total whole grain content, which protease ~~or fragments thereof~~ shows no hydrolytic activity towards dietary fibers when in the active state.

5. The baby food product according to ~~any one of claims 1-3~~claim 4, with the proviso that it does not comprise the protease.

6. The baby food product according to any one of the preceding claims, wherein the baby food product further comprises at least one of an amyloglucosidase ~~or fragment thereof~~ and an glucose isomerase ~~or fragment thereof~~ which amyloglucosidase or glucose isomerase show no hydrolytic activity towards dietary fibers when in the active state.

7. The baby food product according to any one of the preceding claims, having a total whole grain content in the range of 1-30% by weight of the baby food product.

8. The baby food product according to any one of the preceding claims, wherein the baby food product is a ready-to-eat product or a baby food product requiring reconstitution in a liquid component.

9. The baby food product according to any one of the preceding claims, wherein the hydrolyzed whole grain composition has a substantially intact beta-glucan structure relative to the starting material.

10. The baby food product according to any one of the preceding claims, wherein the hydrolyzed whole grain composition has a substantially intact arabinoxylan structure relative to the starting material.

11. The baby ~~cereal powder~~food product according to any one of the preceding claims having a content of sugar or non-sugar sweetener of less than 15% by weight of the cereal
powder.

12. The baby food product according to any one of the preceding claims, wherein the baby food product is in the form of a liquid, a concentrate, a juice or a pureepure ~~[others]~~.

13. The baby food product according to any one of the preceding claims, wherein the baby food product has a maltose to glucose ratio below 144:1 by weight of the product, such as below 120:1, such as below 100:1, such as below 50:1, such as below 30:1, such as below 20:1 and such as below 10:1.

14. A process for preparing a baby food product according to any of claims 1-13, said process comprising:

1) preparing a hydrolyzed whole grain composition, comprising the steps of:
   a) contacting a whole grain component with an enzyme composition in water, the enzyme composition comprising at least one alpha-amylase, said enzyme composition showing no hydrolytic activity towards dietary fibers,
   b) allowing the enzyme composition to react with the whole grain component, to provide a whole grain hydrolysate,
   c) providing the hydrolyzed whole grain composition by inactivating said enzymes when said hydrolysate has reached a viscosity comprised between 50 and 5000 mPa.s measured at 65°C,
2) providing the baby food product by mixing the hydrolyzed whole grain composition with a premix comprising least one food ingredient selected from