

Pasta product and manufacture

The present invention relates to a pasta product
and to a process for the manufacture of a pasta product.

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US4076846 discloses an edible moulding composition mainly
comprising a starch, sodium caseinate, glycerol and an
emulsifier, which may be used for manufacturing
biodegradable packaging films or containers, by extrusion
or injection moulding.

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US4886440 discloses an injection moulding apparatus and
process for the manufacture of food or pet food products
having tridimensional shapes such as a bone shape for dogs
or fish shape for cats, from a mixture of meat meal and
wheat flour.

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A first object of the present invention is to provide a
tridimensional pasta product having good organoleptical
properties which may be compared with those of traditional
pasta products.

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A second object of the present invention is to provide a
process for manufacturing a tridimensional pasta product
having good organoleptical properties which may be compared
with those of traditional pasta products.

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The pasta product according to the present invention is an
injection moulded pasta product.

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The process for manufacturing a pasta product according to
the present invention comprises preparing a mixture of
cereal flour or semolina and water, kneading the mixture to
obtain a dough and injection moulding the dough.

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The present pasta product may be made of a starting raw material mixture which comprises a cereal flour or semolina, for example.

- 5 The cereal may be Durum or hard wheat, rice and/or corn, for example.

- 10 The pasta product may be made of a starting raw material mixture which further comprises additives consisting of wheat protein, especially gliadin enriched wheat protein, soft wheat flour, egg material, sodium chloride and/or spices, for example.

- 15 The pasta product may have a gelatinization degree of from 0 to 100%.

The pasta product may have a water content of from 4 to 32%, for example.

- 20 As stated above, the present process for manufacturing a pasta product according to the present invention comprises preparing a mixture of cereal flour or semolina and water, kneading the mixture to obtain a dough and injection moulding the dough.

- 25 **A mixture may be prepared which has a water content of from 10 to 35%, preferably of from 22 to 26% and more preferably of from 24 to 25%.**

- 30 The cereal may be Durum or hard wheat, for example.

The process may further comprise adding to the mixture wheat protein, soft wheat flour, egg material, sodium chloride and/or spices, for example.

- 35 Wheat protein, especially gliadin enriched wheat protein such as the product marketed under the name Lavor Pro by

the company Midwest grain products, inc. Atchison, Kansas, USA, may be used in an amount of from about 1 to 3% by weight of the mixture, in order to reduce stickiness and improve firmness of the cooked pasta, for example.

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Soft wheat flour may be added to the mixture in order to increase the elasticity of the pasta product, for example.

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Egg material in the form of whole egg powder, egg white powder or liquid whole egg may be added to the mixture in order to increase the firmness of the pasta product, for example.

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The steps of preparing the mixture and kneading the mixture to obtain a dough may be carried out with traditional bread or pasta making equipments such as baker's mixer and kneader, paddle mixer, mono- or twin screw kneader, or in the barrel of a traditional equipment for the injection moulding of plastics, for example.

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The step of injection moulding may be carried out with an equipment comprising adequate injection means and moulding means.

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Adequate injection means may comprise a piston and a nozzle, an extruder and a nozzle, a gear pump and a nozzle, or the barrel, screw and nozzle of a traditional equipment for the injection moulding of plastics, for example.

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Adequate moulding means may comprise a mould in two parts engageable with one another and leaving a space between them corresponding to the shape of the product to be manufactured, the space being connected to a conduit or dough inlet, and the two parts being held together by

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clamping means.

Preferably, the present invention is carried out with a traditional equipment for the injection moulding of plastics, in which the injection means comprise a screw enclosed in a jacketed barrel, the screw being rotatable and longitudinally translatable in the barrel, the barrel having a downstream end in form of a nozzle, and in which the moulding means comprise a mould in two parts engageable with one another and held together by clamping means.

The dough to be injected may be heated to a temperature of from 30 to 150°C, preferably of from 60 to 95°C and more preferably of from 80 to 85°C, the injection means being therefore heatable and temperature controllable.

The dough may be injected into the mould under a pressure of from 200 to 5000 bar, for example.

During moulding, the dough may be heated to a temperature of from 30 to 150°C, preferably of from 50 to 80°C and more preferably of from 55 to 65°C, the moulding means being therefore heatable and temperature controllable.

The injection moulded pasta product as released by opening the mould may have a water content of from about 8 to 32%, for example.

It may then be dried to a residual water content of from 4 to 13.5%, for example.

Surprisingly, it was possible in the present way to manufacture pasta products having attractive tridimensional shapes such as half hollow spheres or ellipsoids which could not be manufactured in the traditional way, namely by extruding raw dough through die openings, but which nevertheless had good organoleptical properties which could be compared with those of traditional pasta products.

The pasta product and the process according to the present invention are illustrated in the following Examples in which the percentages are by weight.

5 **Example 1**

10 A pasta product having a tridimensional shape was manufactured with the aid of a 22M type injection moulding equipment manufactured by the company BOY AG in Neustad (Germany).

15 In a paddle mixer a mixture of water and Durum wheat semolina added with 200 ppm cystein was prepared which had a water content of 21%.

20 The mixture was introduced into the barrel of the injection moulding equipment where it was kneaded to obtain a dough and the dough was heated up to a temperature of 100°C. The dough was injected into a screw shaped mould under a pressure of 1400 bar. The temperature of the mould was held at 40°C.

25 The pasta product thus obtained had a well defined screw shape, a water content of 18.5%, a gelatinization degree of 72% and organoleptical properties comparable with those of regular pasta such as Durum wheat *macaroni*, for example.

Examples 2 to 5

30 Pasta products having a tridimensional were manufactured with the aid of a 270M type injection moulding equipment manufactured by the company ARBURG AG in Lossburg (Germany).

In a paddle mixer different mixtures of water and Durum wheat semolina added with 200 ppm cystein were prepared which had water contents of 16% or 21%.

5 The mixtures were introduced into the barrel of the injection moulding equipment where they were kneaded to obtain different doughs and the doughs were heated up to temperatures of 60, 80 or 90°C. The doughs were injected into a plug shaped mould under pressures of 1400, 1800 or 10 2500 bar. The temperature of the mould was held at 30 or 40°C.

The pasta products thus obtained had a well defined plug shape, respective gelatinization degrees and water contents 15 as indicated in recapitulatory Table 1 hereafter and organoleptical properties comparable with those of regular pasta such as Durum wheat lasagne sheets, for example.

Table 1

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Example No		1	2	3	4	5
Dough water content	(%)	21	21	21	21	16
Mould shape		screw	plug	plug	plug	plug
Barrel temperature	(°C)	100	80	60	60	90
Injection pressure	bar	1400	1400	1800	2500	2500
Mould temperature	(°C)	40	30	30	40	40
Pasta water content	(%)	18.5	19.7	19.8	17.8	14.5

Pasta gelatinization degree	(%)	72	69	69	84	100
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Example 6

- 5 A pasta product having a *lasagne* sheet shape was manufactured with the aid of a 270M type injection moulding equipment manufactured by the company ARBURG AG in Lossburg (Germany).
- 10 In a paddle mixer a mixture of water and Durum wheat semolina added with 200 ppm cystein was prepared which had a water content of 27%.
- 15 The mixture was introduced into the barrel of the injection moulding equipment where it was kneaded to obtain a dough and the dough was heated up to a temperature of 65-70°C. The dough was injected into a *lasagne* sheet shaped mould under a pressure of 1500 bar. The temperature of the mould was held at 35°C.
- 20 The pasta product thus obtained had a well defined *lasagne* sheet shape, a water content of 24%, a gelatinization degree of between 0 and 20% and organoleptical properties comparable with those of regular *lasagne* Durum wheat pasta
- 25 sheets.

Example 7

A pasta product having a car or a boat shape was manufactured with the aid of a 320S-500-150 type injection moulding equipment manufactured by the company ARBURG AG in Lossburg (Germany).

In a paddle mixer a mixture of water and Durum wheat semolina added with 200 ppm cystein was prepared which had a water content of 24%.

The mixture was introduced into the barrel of the injection moulding equipment where it was kneaded to obtain a dough and the dough was heated up to a temperature of 85°C. The dough was injected into three car and three boat shaped moulds under a pressure of 1400-1600 bar. The temperature of the moulds was held at 65°C.

The pasta product thus obtained had well defined car or boat shapes. Each car or boat had a weight of from about 4.0 to 4.2 g.

The car and boats were cooked in salted water. After a cooking time of 10 min the car and boats had organoleptical properties comparable with those of regular Durum wheat "al dente" cooked pasta products.

Claims

1. A process for manufacturing a pasta product, which comprises preparing a mixture of cereal flour or semolina and water, kneading the mixture to obtain a dough and injection moulding the dough, wherein a mixture is prepared which has a water content of from 10 to 35%, the step of injection moulding is carried out with an equipment comprising injection means and moulding means, the dough is heated to an injection temperature of from 30 to 150°C in the injection means, the dough is injected into the moulding means under a pressure of from 200 to 5000 bar, and the dough is heated to a moulding temperature of from 30 to 150°C in the moulding means.

2. The process of claim 1, in which the cereal is Durum or hard wheat, rice and/or corn.

3. The process of claim 1, which further comprises adding to the mixture wheat protein, soft wheat flour, egg material, sodium chloride and/or spices.

4. The process of claim 1, in which the injection means comprise a screw enclosed in a jacketed barrel, the screw being rotatable and longitudinally translatable in the barrel and the barrel having a downstream end in form of a nozzle, and the moulding means comprise a mould in two parts engageable with one another and held together by clamping means.

5. The process of claim 1, in which, after having been released from the moulding means, the moulded pasta product is dried to a residual water content of from 4 to 13.5% and cooled.