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Rice product

5 The present invention relates to a rice product consisting of cooked or precooked whole grain rice having a long shelf life.

10 JP52122645 (DAINIPPON PRINTING) discloses the preparation of sterilised boiled rice, by filling a container with rice and 40 to 55% water in heat-resistant pouches or cans, sealing them tightly, and cooking and sterilising them simultaneously by heating with rotating.

15 FR2502907 (BUIIONI) discloses the production of precooked solid food, especially pasta products and rice, by precooking the food in acidulated water, cooling in acidulated water, draining off excess water, oiling, insertion into flexible containers and heat sterilising the sealed containers.

20 JP3087153 (ASAHI CHEM IND) discloses the preparation of processed rice in package with good preservability, by heating rice, controlling its acidity to within pH 3.5 to 6 and its moisture content to within 20 to 30%, and preventing grains from aggregation by light crushing.

25 A first object of the present invention is to provide a full moisture shelf stable whole grain rice of outstanding organoleptical quality which is not intended to be actually cooked at the consumer's end but, on the contrary, is
30 intended to be consumed after unpacking and simply heating up or very shortly cooking.

A second object of the present invention is to provide a process for manufacturing a full moisture shelf stable
35 whole grain rice of outstanding quality which is intended

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to be consumed after unpacking and simply heating up or very shortly cooking.

5 The full moisture shelf stable rice product according to the present invention has a pH of 3.5 to 4.5, preferably 3.8 to 4.3, and comprises a cooked or precooked whole grain rice having a dry matter content of from 30 to 55% by weight, an acid and an oil.

10 The process for manufacturing a full moisture shelf stable rice product according to the present invention comprises the steps of water soaking whole grain rice, portioning, blanching, water cooling, dipping into an acidified water, oiling, packaging and in pack pasteurising it.

15 In the present rice product, the whole grain rice may be of any commercially available rice kind or variety. It may especially be a short grain rice such as Italian Camolino rice, a parboiled white long grain rice, a Thai long grain
20 fragrant rice or a Basmati rice, for example.

The acid may be any food grade acid, especially lactic acid, phosphoric acid, citric acid or Glucono-delta-lactone, for example.

25 The oil may be a vegetable oil, in an amount of from 0.5 to 5% by weight of the cooked or precooked grain, for example. The oil may especially be peanut oil, rapeseed oil, sunflower oil, palm oil, corn oil, palm olein or mixtures
30 thereof, for example. About 0.5 to 2% of emulsifiers, in % by weight of the oil, especially a monoglyceride or mixtures of monoglycerides, may advantageously be added to the oil, for example.

35 To implement the present process, one can start with a raw material in the form of a commercially available whole

grain rice typically having a dry matter content of from 86 to 91%, for example.

5 This rice may be soaked at a rate of about one part of rice for one to four parts of water at 30 to 60°C for 30 min to 5 h, for example. The purpose of the soaking step is to minimize starch losses and to open up the structure of the grain in order to facilitate the heat transfer as well as the water uptake during the blanching step.

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During the soaking step, the water uptake may be such that the rice has then a dry matter content of from about 65 to 72%, for example.

15 The step of portioning, namely dividing or dosing the rice into portions which then will be individually packaged, may be carried out at any stage after the soaking step and before the packaging step.

20 The soaked rice may be blanched by steaming or by steaming and hot water-spraying, especially hot acid water-spraying, for example, the purpose of water-spraying during steaming being to minimise starch losses during blanching.

25 The blanching step may be carried out at 95-100°C for 1 to 10 min, while steaming with steam at 98-100°C and spraying water at 95-98°C, especially water having a pH of from 3.5 to 5.0, for example. Spraying acidified water during blanching permits to achieve a whiter colour of the rice.

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During the blanching step, the water uptake may be such that the rice has then a dry matter content of between 35 to 52%, for example.

35 After the blanching step, the rice may be advantageously showered with a hot water spray. In other words the rice

may be passed under a shower of hot water, especially of water having a temperature of from about 60 to 70°C, for example, in order to loosen the individual grains which can be slightly sticky after having been steamed.

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Water cooling may be carried out in a bath of water at ambient temperature, namely at a temperature of between about 18 to 35°C, for about 30 s to 2 min, for example.

10 After water cooling, excess water may be drained off for about 30 s to 2 min, for example.

During the water cooling step, the blanching step may be stopped completely and the water uptake may be such that
15 the rice has then a dry matter content of between about 30 to 55%.

After water cooling and possibly draining off excess water, the rice is dipped into an acidified water in order to be
20 acidified to a final pH of 3.5 to 4.5. To this end, the rice may be dipped into a water containing from 0.5 to 2.0% acid, especially lactic acid, phosphoric acid, citric acid or Glucono-delta-lactone, at ambient temperature, especially at a temperature of from 18 to 35°C, for from
25 50 to 250 s, for example.

After this acidifying step, excess acidified water may be drained off for about 30 s to 2 min, for example.

30 During the acidifying step, there is very little further water uptake. The acidification of the rice appears to be mainly a result of osmotic equilibration.

The oiling step may be carried out so that the surface of
35 the rice is coated with oil in an amount of from 0.5 to 5% by weight of the rice, for example. In order that the oil

is well distributed in very fine particle over the rice surface, about 0.5 to 2% of emulsifiers, in % by weight of the oil, may be added to the oil, for example.

- 5 The oiling step may be carried out either before or during the packaging step. Preferably, the rice is packaged in a flexible pouch with controlled volume of head space. To this end, the rice may be dosed into a vertical pouch after its bottom has been sealed and oil may be injected into the
10 pouch before its top is sealed, for example.

Eventually the packaged rice product is in pack pasteurised.

- 15 This in pack pasteurising step may be carried out in a steam medium, while having the temperature in the centre of the pouch reaching a temperature of from 80 to 100°C and holding it for from 1 to 80 min, for example.
- 20 The pouches may then be cooled either for 5 to 15 min in cold water containing a disinfectant, or for 30 to 60 min by chilled air, at 5 to 15°C, for example.

- The present process may be implemented by means of normal
25 equipment such as steeping unit, steam/water spraying blancher, water bath, shower and pasteurising unit from the pasta or noodle industry, for example.

- The present process surprisingly provides a rice product
30 having outstanding organoleptical properties, especially an outstanding texture, in view of the fact that it is not intended to be actually cooked again at the consumer's end but only heated up or very shortly cooked after unpacking.

- 35 Heating up or very shortly cooking the present rice product after unpacking may be carried out in a pan, in a microwave

oven, or by pouring hot or boiling water onto it, for example.

5 The rice product and the process according to the present invention are illustrated in the following Examples in which the percentages and parts are by weight unless otherwise stated.

Example 1

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A precooked rice product having a long shelf life was made from a commercially available long grain Thai fragrant rice having a dry matter content of 89.5%.

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The rice was soaked at a rate of one part of rice for three parts of soft water at 50°C for 1 h. The water uptake during soaking was such that the rice had then a dry matter content of from about 67.9%.

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The rice was portioned or dosed in 84 g portions.

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The rice was then blanched at about 98°C for 6 min along a tunnel blancher in which steam injection means injected steam at 99°C and water spraying means sprayed acidified water having a pH of 4.0-4.5 and a temperature of 96-97°C.

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During the blanching step, the water uptake was such that the rice had then a dry matter content of 51.9%.

After the blanching step, the rice was water cooled in a bath of water at 20°C for 45 s.

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During the water cooling step, the water uptake was such that the rice had then a dry matter content of 43.3%.

After water cooling, excess water was drained off for 60 s.

The rice was then dipped into a water containing 0.8% lactic acid and having a temperature of 30°C, for 105 s.

- 5 During the acidifying step, the water uptake was such that the rice had then a dry matter content of 42.0%.

After the acidifying step, excess acidified water was drained off for 60 s.

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After the acidifying step the rice had a pH of 3.9.

- The rice portions then weighing about 140 g were dosed into vertical pouches after their bottoms had been sealed, and
15 1.5 g palm olein were injected into each pouch before their tops were sealed.

- The rice was in pack pasteurised in steam at 97°C, the temperature in the centre of the pouch reaching a
20 temperature of 85°C after 20 min and this temperature being hold for 10 min.

- The pouches were then cooled for 10 min in water having a temperature of 10°C and containing a disinfectant. The
25 pouches were subsequently stored at 25°C.

The rice product could be prepared for consumption by unpacking and heating up.

- 30 The rice did not stick together. It had outstanding organoleptical properties, especially a texture similar to the texture of freshly cooked Thai fragrant rice.

Example 2

A precooked rice product having a long shelf life was made from a commercially available short grain Italian Camolino rice having a dry matter content of 86.7%.

The rice was soaked at a rate of one part of rice for three parts of soft water at 50°C for 1 h. The water uptake during soaking was such that the rice had then a dry matter content of from about 66.4%.

The rice was portioned or dosed in 89 g portions.

The rice was then blanched at about 98°C for 6 min along a tunnel blancher in which steam injection means injected steam at 99°C and water spraying means sprayed acidified water having a pH of 4.0-4.5 and a temperature of 96-97°C.

During the blanching step, the water uptake was such that the rice had then a dry matter content of 43.4%.

After the blanching step, the rice was water cooled in a bath of water at 20°C for 45 s.

During the water cooling step, the water uptake was such that the rice had then a dry matter content of 41.4%.

After water cooling, excess water was drained off for 60 s.

The rice was then dipped into a water containing 0.8% lactic acid and having a temperature of 30°C, for 105 s.

During the acidifying step, the water uptake was such that the rice had then a dry matter content of 41.2%.

After the acidifying step, excess acidified water was drained off for 60 s.

After the acidifying step the rice had a pH of 4.0.

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The rice portions then weighing about 150 g were dosed into vertical pouches after their bottoms had been sealed, and 1.5 g palm olein were injected into each pouch before their tops were sealed.

10

The rice was in pack pasteurised in steam at 97°C, the temperature in the centre of the pouch reaching a temperature of 85°C after 20 min and this temperature being hold for 10 min.

15

The pouches were then cooled for 10 min in water having a temperature of 10°C and containing a disinfectant. The pouches were subsequently stored at 25°C.

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The rice product could be prepared for consumption by unpacking and heating up.

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The rice did not stick together. It had outstanding organoleptical properties, especially a texture similar to the texture of freshly cooked Camolino rice.

Claims

1. Full moisture shelf stable rice product, which has a pH of 3.5 to 4.5, preferably 3.8 to 4.3, and which comprises a cooked or precooked whole grain rice having a dry matter content of from 30 to 55% by weight, an acid and an oil.
2. A rice product according to claim 1, in which the acid is a food grade acid, especially lactic acid, phosphoric acid, citric acid or Glucono-delta-lactone.
3. A rice product according to claim 1, which comprises 0.5 to 5% oil, in % by weight of the cooked or precooked grain.
4. A rice product according to claim 1, in which the oil is vegetable oil, especially peanut oil, rapeseed oil, sunflower oil, palm oil, corn oil, palm olein or mixtures thereof.
5. A process for manufacturing a full moisture shelf stable rice product, which comprises the steps of water soaking whole grain rice, portioning, blanching, water cooling, dipping into an acidified water, oiling, packaging and in pack pasteurising it.
6. A process according to claim 5, in which the rice is soaked at a rate of about one part of rice for one to four parts of water at 30 to 60°C for 30 min to 5 h.
7. A process according to claim 5, in which the blanching step is carried out at 95-100°C for 1 to 10 min, while steaming with steam at 98-100°C and spraying water at 95-98°C, especially water having a pH of from 3.5 to 5.0.
8. A process according to claim 5, in which the rice is dipped into an acidified water containing from 0.5 to 2.0%



acid, especially lactic acid, phosphoric acid, citric acid or Glucono-delta-lactone, at ambient temperature, especially at a temperature of from 18 to 35°C, for from 50 to 250 s.

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