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PATENT SPECIFICATION

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(54) PROCESS FOR PROCESSING RAW SQUID AND PRODUCTS OBTAINED THEREFROM

(71) We, MARUTO TOYOYAMA SHOKUHIN KABUSHIKI KAISHA, a Japanese company, of No. 6—5, Miyamae-Cho, Hakodate-Shi, Hokkaido, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a process for processing raw squids and the products obtained therefrom, and concerns a process for processing raw squids and semi-processed squid products and press-heated squid products obtained by the above process.

As typical squid products, whole press-heated squid products, and cut-up press-heated squid products are known. These products are conventionally produced in a series of steps from the dressing of the raw squids to press-heating. All conventional processes for producing these squid products comprise a step of dressing (pulling out legs and intestinal parts or opening the body), skinning and boiling and a step of seasoning, drying and press-heating.

The skinning treatment is the so-called autodigestion method in which raw squids are placed in an appropriate skin-removing machine and at the same time warm water at 55° to 65°C is poured thereinto followed by stirring. However, this skinning treatment with warm water and the subsequent boiling treatment are disadvantageous in that an extract of squids is drained off and that the tissue protein of squids is heat-coagulated and various enzymes contained in the flesh are destroyed resulting in stopping a further increase in flavour or tasty substances due to the subsequent autodigestion, and thus greatly reducing the flavour inherent in squids. Further, the growth of mould cannot be sufficiently prevented because of the water generated throughout the subsequent treating steps and, therefore, storage of products for a long period of time cannot be always secured. In addition, the warm water used for skinning becomes contaminated water having a biochemical oxygen demand of 10,000 to 30,000 ppm due to the dissolution of the skin itself and the escape of pigments present in the skin (epidermis). This contaminated water gives rise to environmental problems if discharged as such.

Further, according to the conventional processes, various nutrients and tasty substances contained in the skin cannot be retained in the final products because they are necessarily drained off as a waste water from the skinning treatment.

The object of this invention, is therefore, to provide a process for treating raw squids to produce semi-processed or finally press-heated squid products which can eliminate the above-described disadvantages by omitting the treatment of skinning with warm water and the subsequent boiling treatment. Raw squids are dressed by removing the guts and opening the body and washed with clean water, and according to the invention treated by a process comprising seasoning a previously dressed and washed squid, drying at a temperature of 20 to 40°C to a water content of 35 to 50% by weight and preserving the dried squids at a temperature of 5 to 25°C for at least 24 hours to produce semiprocessed squid products. The resulting semi-processed squids can then be press-heated at a high temperature instantaneously to release the skin from the flesh, which is then removed by an appropriate means thereby giving final press-heated squid products.

Optionally, the thus press-heated squids can be cut up into pieces.

Accordingly, the present invention provides semi-processed or final press-heated squid products which retain the flavour inherent to squids and are storable for a prolonged period of time by treating the squids at a low temperature. That is, the squids are preserved at 5 to 25°C for more

than 24 hours before the press-heating treatment to activate enzymes inherent to the tissue protein,. which enzymes are retained in the raw squids without being destroyed, thereby promoting the autodigestion to increase tasty substances such as nucleic acids and amino acids. Further, by this treatment at a low temperature, nutrients and tasty substances contained in the skin are allowed to move into the flesh of the squids. By employing the above-described treatment at a low temperature, which has never been used in the conventional processes, the disadvantages of reduction in flavour and difficulty in storage for a long time which are associated with the conventional processes can be eliminated.

The differences between the conventional processes comprising dressing, washing, skinning in warm water and boiling followed by seasoning and the process of the present invention comprising dressing, washing and then seasoning are now illustrated hereinafter in greater detail.

1) In the convention processes, the tissure protein of squids is heat-coagulated and the fibrous tissue thereof is hardened thereby slowing down the permeability of a seasoning liquid into the flesh of the squids. Complete absorption of the seasoning liquid into the flesh takes time, as long as more than 4 hours. This may cause the promotion of acidification of the products resulting in an extreme deterioration in the quality of products. Therefore, the conventional processes must relay upon preservatives in order to avoid the acidification.

On the other hand, in the present invention, the tissue protein and the fibrous tissue of squids do not undergo any denaturation and, therefore, complete permeation of the seasoning liquid into the flesh can proceed very rapidly by a capillary action in only about half the time required in the conventional processes. Since there is no danger of acidification and, owing to the decrease of water activity, products of high quality can be obtained.

2) In the conventional processes, the heat-coagulation of the protein is inevitably accompanied with discharge of water contained in the flesh thereby reducing the water content to 60 to 65% by weight before the stage of the seasoning treatment. According to the present invention, the water content of raw squids in the natural state, that is, 80 to 85% by weight can be retained until the stage of seasoning treatment.

The rate of absorption of the seasoning liquid up to the saturation point depends upon the interchangeability between the water content and the seasoning liquid. Since the water content obtained by the present invention is higher than that obtained in the conventional processes by about 20% by weight, the ability to impart taste to the products is much increased to obtain products of high quality.

3) In the conventional processes, the naturally contained bound water and extract from the squid flesh is removed and a treating water used for skinning and boiling is then permeated into the flesh. Also, the tissue protein becomes entirely different from that in a natural state due to heating. This increases the water activity whereby mould tends to grow. However, the naturally contained bound water may be retained within the flesh according to the present invention. Therefore, the water activity is lower than that exhibited in the conventional processes when based on the same amount of water. The decreased water activity makes it possible to prevent the growth of mould and to store the products for a long time without using any preservative.

4) The skinning treatment with warm water and the subsequent boiling treatment of the conventional processes unavoidably drain off the flesh extract and destroy various enzymes contained in the flesh of squids. The destruction of enzymes will stop the increase of tasty substances and greatly reduce the characteristic taste of the squids. In the present invention, however, the flesh extract and tasty substances of squids can be retained without draining off since such a boiling treatment is not employed, and also such a heating treatment that would destroy enzymes before press-heating is not employed. Further, the seasoning after dressing and washing can be carried out in a relatively short period of time, and drying is effected at a low temperature (20 to 40°C) to control the water content to be 35 to 50% by weight. By these treatments, the activity of each enzyme contained in the tissue protein can be maintained and nutrients and tasty substances in the tissue protein can be permeated into the flesh. Therefore, the present invention makes it possible to efficiently make use of the naturally contained nutrients and tasty substances of squids thereby obtaining products rich in taste.

5) In the conventional processes involving the skinning treatment with warm water and the boiling treatment, 1500 litres of warm water and hot water and 17 litres of a heavy oil fuel per 1000 Kg of raw squids are required. This will increase the cost incurred, and also about 5000 litres of contaminated water including cooling water is discharged thus giving rise to

serious environmental problems. On the other hand, since the process of the present invention does not employ such skinning and boiling treatments as used in the conventional processes, the cost can be reduced and there is no need to discharge contaminated water.

6) In the conventional processes, various ingredients contained in the skin of the squid are drained off. On the contrary, according to the present invention, these ingredients can be permeated into the flesh and retained as nutrients and tasty substances.

7) In the present process, collagen tissues contained in the fourth layer which consitutes the lowest layer of the squid skin are decomposed and digested by the enzymatic activity during the period of preservation at a low temperature. Therefore, the skin of squids can easily be released from the flesh by press-heating at a high temperature and then effectively removed therefrom by an appropriate means such as rollers.

8) The present invention improves the yield of products over the conventional processes by more than 12% because yields obtained by the convention processes are lowered due to the drain off of the water-soluble protein and the extract during the skinning treatment with warm water and the boiling treatment.

Accordingly, the present invention can preclude such a possibility that any skin remaining in the semi-process products or final press-heated products may reduce the commerical value of the products.

A process according to the invention will now be illustrated in greater detail by reference to the following example, but this example is not to be construed as limiting the scope of the invention.

EXAMPLE

Dressing and Washing

Legs and intestinal parts of raw squids were removed by pulling them from the body, and the body was opened and spread out. The body was the washed with clean water while stirring to remove any dirt attached to the inner surface of the body followed by draining off.

Seasoning and Drying

50 Kg of the above treated squids were placed in a mixer together with powdered or liquid seasoning agents comprising 3000 g of sodium chloride, 1450 g of Glytimin (trade mark) manufactured by Maruzen Kasei Kabushiki Kaisha, Japan, 50 g of glycine, 30 g of succinic acid, 300 g of sodium glutamate, 120 g of Sansugen S_2 (trade mark) manufactured by San-ei Kagaku Kogyo Kabushiki Kaisha, Japan, 50 g of citric acid and 1000 g of sorbit liquid (a 70% D-sorbit liquid available from Tokai Kogyo Kabushiki Kiasha, Japan). The mixer was rotated for 5 to 10 minutes until the powdered seasoning agents were dissolved and uniformly blended. Thereafter, the resulting raw material comprising the squids and the seasoning agents was transferred to an appropriate container and allowed to stand for about 2 hours to permeate the seasoning agents into the flesh of squids. The raw material was then dried for about 4 hours using an indirect warm-air drier set at 20°C to 40°C, to a water content of 35 to 50% by weight. The drying may be effected by exposure to sunlight.

Preservation at Low Temperature (Aging)

The raw material having a water content of 35 to 50% by weight was placed in an appropriate container and preserved at 5 to 25°C for more than 24 hours, during which time the water content was spread uniformly throughout the flesh and enzymes inherent to squid tissue protein were activated to increase the nucleic and amino acids content which are tasty substances.

The treatment (aging) also makes the subsequent separation of the skin from the flesh easier and the resulting products softer due to the enzymatic activity. By this treatment, semi-processed products according to the present invention can be obtained.

Press-Heating (and Finishing)

Each of the above obtained semi-processed squids was spread between upper and lower heat plates heated at 150 to 200°C and pressed under a pressure of about 30 Kg/cm^2 for about 3 minutes. The flesh of the squid was thus baked flatly and uniformly. This press-heating also released the skin from the fibrous protein by instantaneous shrinkage thereof. The press-heated squid was then placed on metal rollers of a known type to destroy fibrous tissue as well as to peel off the skin therefrom, which was the removed. If necessary, the resulting squid can be cut up into pieces having a width of 2 to 3 mm using a conventional cutter and additionally seasoned controlling the water content to 25 to 30% by weight to obtain final products.

In the above example, the dressing can also be effected by first opening and spreading out the body of squids and then taking out intestines.

WHAT WE CLAIM IS:—

1. A process for treating raw squids comprising seasoning a previously dressed and washed squid, drying at a temperature

serious environmental problems. On the other hand, since the process of the present invention does not employ such skinning and boiling treatments as used in the conventional processes, the cost can be reduced and there is no need to discharge contaminated water.

6) In the conventional processes, various ingredients contained in the skin of the squid are drained off. On the contrary, according to the present invention, these ingredients can be permeated into the flesh and retained as nutrients and tasty substances.

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WHAT WE CLAIM IS:—

1. A process for treating raw squids comprising seasoning a previously dressed and washed squid, drying at a temperature

of 20 to 40°C to a water content of 35 to 50% by weight and preserving the dried squids at a temperature of 5 to 25°C for at least 24 hours to produce semi-processed squid products.

2. A process as claimed in Claim 1, wherein said process further comprises press-heating said semi-processed squid products thereby releasing the skin of the squid from the fibrous tissue protein of the squid followed by removing the skin therefrom, thus to produce final press-heated squid products.

3. A process according to Claim 2, wherein the squid products are press-heated by pressing between plates heated to 150°C to 200°C under a pressure of about 30 Kg/cm² for about 3 minutes.

4. A process as claimed in Claim 2 or 3, further comprising cutting up the press-heated squids, having previously removed the skin therefrom, into pieces of width 2 to 3 mm.

5. A process for treating raw squids according to Claim 1, substantially as hereinbefore described.

6. A process for treating raw squids substantially as hereinbefore described with reference to the Example.

7. Squid products obtained by any one of the processes as claimed in any one of the preceding claims.

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