

PROCESS FOR PRODUCING AN INSTANT COOKING MATERIAL

The present invention relates to a process for producing an instant raw material for cooking, which is usable simply by heating, as a body-material or a thick sauce for use, for example in, croquette, gratin, and doria, after defrosting or warming.

The thick ingredients which are mainly composed of roux and other sauce material added thereto such as milk, butter, stock, spices, minced meat, are used widely such as for croquette.

The preparation of the thick ingredients by the prior art requires tremendous manual extending procedure such as adding milk, stock or water to roux gradually under heat or adding roux to milk or stock water gradually under heat with caution to avoid forming lumps of the ingredient. While such commercial products of bechamel sauce as in the form of canned, retort packed or frozen products are known in the market, in order to use such sauce as a body of a croquette, boiling down such sauce to a thickened state is required with care to prevent scorching, because approx 80 percent of moisture is contained.

Accordingly such materials are preferably requested to be supplied in a state of moisture and viscosity as low as possible in order to improve a workability and a productivity for commercial use and/or for other consumers of large quantities. But there are problems associated with heating those products with a low moisture state because of an increase in viscosity caused by starch gelatinization, which makes continuous sterilization using a scraped gaseous exchanger and filling into a container more difficult and makes initial products hard to achieve. In addition, the products, which

were once gelatinized, have various problems on distribution and storage because their physical characteristics like a viscosity etc. are remarkably altered in accordance with temperature variation.

5 Considering the foregoing problems of the prior art, the object of the present invention is to propose a process for producing an instant cooking material which is good for distribution and usable only by defrosting, warming or heating as a body-material or a
10 thick sauce for croquette, gratin, and doria, etc.

In order to solve the above mentioned problem, the present invention provides a process for producing an instant cooking material which comprises the steps of

15 heating wheat flour and/or roasted wheat flour with edible oil and/or fat uniformly at a temperature of from 110 to 130°C for 0.5 to 3 hours to form a roux, the amount of the wheat flour and/or roasted wheat flour to be formulated being in the range of from 5 to 30% by weight based on the total weight of the end product, the
20 amount of the fat and/or oil to be formulated being in the range of from 2 to 30% by weight based on the total weight of the end product, the weight ratio of the total wheat flour and/or roasted wheat flour to the total oil and/or fat upon preparation of the roux being 1 : 0.4 to
25 3 and the total moisture content of raw materials for the roux being not more than 15 % by weight, cooling the mixture, mixing and homogenizing other pasteurized sauce materials therewith at a temperature not higher than 60°C to avoid wheat starch gelatinizing, to obtain a
30 homogenized mixture having a moisture content of 40 to 93% by weight based on the end product, and packing the homogenized mixture into a container in an aseptic condition and kept in a chilled or frozen condition. We hereafter describe each factor which comprises this
35 invention.

Wheat Flour

The kinds of wheat flour to be used in this invention are not limited to a specific type. For example, strong flour, medium flour, or soft flour may be used in this invention because the amount of the gluten contained therein is not restricted to a specific level. The flour may be those roasted by dry heating or wet heating. However the excess heating of the flour, which changes the colour to brown, should be avoided in the case of the production of the white sauce product such as bechamel. Sauce. For providing desired physical

properties, in general, wheat flour is formulated in an amount of 5 to 30% by weight, preferably 10 to 25% by weight based on the total weight of the end product.

The Heat Treatment of Wheat Flour with Oil or Fat

5 Any edible animal or vegetable oil and/or fat, such as rape seed oil, sesame seed oil, soybean oil, peanut oil, safflower oil, coconut oil, palm kernel oil, beef tallow, lard, or milk fat, or fractionated, interesterfied, hydrogenated, or any other processed oil
10 or fat thereof can be used. The oil and fat are formulated in an amount of 2 to 30% by weight, preferably 5 to 25% by weight based on the total weight of the end product. When the amount of the oil and fat is too small, the desired roux is not formed and, on the
15 other hand, when the amount of the oil and fat is too large, separation of oil is caused. In addition, in order to obtain the desired properties, the weight ratio of wheat flour to the fat and/or oil upon preparation of the roux is 1 : 0.4 to 3, preferably 1 : 0.5 to 2.

20 For obtaining the desired roux, the total moisture content of raw materials of roux is 15% by weight or less, more preferably 10% by weight or less.

The heating of the wheat flour or roasted wheat flour stirring in the aforementioned oil and/or fat,
25 forms a roux, and enhances the favoured aroma and flavour as a food material, which is a harmonious mixed aroma and flavour of heated fat and/or oil and roasted wheat flour. The mixture is suitably heated for 30 minutes to 3 hours in the temperature range from 110°C
30 to 130°C.

The heating can be performed by a suitable apparatus, which is not limited specifically, and may

be, for example, a gas heated kettle or a kneader plant using high pressure steam. The heating also sterilizes molds, the spores of the rod shaped bacteria in wheat flour.

5 The obtained roux is cooled to a temperature wherein the wheat starch does not gelatinize (if in an aqueous condition). Generally starch in an aqueous medium begins to gelatinize partially at a temperature of about 55°C and rapidly gelatinizes
10 at a temperature of about 64 or 65 degrees, while the wheat flour which was heat treated in the hydrophobic media (oil and fat), is mostly not gelatinized and the thickening by gelatinization does not occur.

 However the heat treated wheat with oil and fat
15 homogeneously has good dispersibility in an aqueous media, so the heated mixture should be cooled below the gelatinizing temperature by a heat exchanger as rapidly as possible.

Sauce Materials

20 Emulsified aqueous milk product is suitable as a sauce material other than roux, for example defatted milk powder, whole milk powder, butter, milk cream, filled cream, cheese, cheese-like food, butter oil, butter milk, and various kinds of stock (which
25 are mainly hot water extracts from meat, fish shell fish, vegetables, or mushrooms) or even plain water may also be used as a sauce material other than roux. When a hydrophobic material is contained in the sauce raw material, such hydrophobic material is
30 preferably contained in an O/W emulsion.

 As an emulsifying apparatus, propeller mixer, homogenizer are emulsified.

 The sauce material fully emulsified especially by homogenizer is stable and has hardly apprehension
35 of separation of phases even after production of an instant cooking material according to the invention.

The mixing ratio of this sauce material and the above mentioned roux is determined in a range whereby the consistency of the mixture is between liquid and fluid.

Usually the moisture content of the mixture ranges
5 from 40 to 93% by weight, preferably 50 to 93% by weight, more preferably 60 to 90% by weight, and even more preferably 50 to 75% by weight based on the end product. The instant cooking material of this invention is not gelatinized in such moisture range characterized
10 by low viscosity.

Sterilization and Filling

The above mentioned sauce material other than roux should also be sterilized for long time preservation during distribution and storing because it is often
15 contaminated with various kind of bacteria.

In case of the products being distributed and kept in a chilled or frozen condition, UHTS (Ultra High Temperature Sterilization) method under atmospheric pressure can be used. The sterilization temperature is
20 normally in the range of 85 to 100°C (preferably 90 to 95°C). But in case of the products being distributed and kept in a chilled condition, Direct Steam Injection Type, which sterilizes instantaneously under the high temperature of 120-160°C X 30-1 second (preferably 130-
25 150°C X 7-1 second), can be suitably applied.

Accordingly such a method can denature Enzymes and destruct bacteria completely without so much deterioration of original flavour and taste.

Thus sterilized sauce material is mixed with the
30 separately prepared roux in an aseptic condition and packed into a suitable container such as retort-pack, can, or bottle and stored in a chilled or frozen state.

In case of commercial chilled products of bechamel sauce, starch is normally gelatinized and the quality is much effected by heat exchange records which occurred at freezing and defreezing and cooling speed at freezing.

But starch contained in the cooking materials of this invention, is dispersed in non-gelatinized condition and does not cause a quality deterioration and is beneficial to consumers and superior on production.

Use and Application of The Product

The cooking material according to the invention is characterized by low viscosity up to around 60°C of the product temperature after defreezing, when product moisture shall be adjusted by adding water as necessary.

When the product temperature exceeds 65°C by heating, the viscosity of the product increases remarkably due to the gelatinization, that instantly forms a suitable body for a cream croquette etc., when other optional ingredients, such as onion, mushroom, and/or chicken meat, can be mixed to get more tasty ingredients for a cream croquette. Moisture content for cooking materials of a cream croquette shall be 60 to 70%.

On the other hand, water can be added to the cooking material according to the invention or the cooking material can be adjusted as a higher moisture contents material initially, the material is gelatinized by heating and does not lose its liquidity even after mixing optional ingredients like carrot, laurel, thyme, nutmeg, pepper, meat, bacon, tomato puree and can be used as soup, or dressing body of gratin or doria.

For soup use, the moisture contents of the cooking material shall be preferably adjusted to 80

to 90%.

The cooking material of this invention is basically aseptic and suitable at distribution and storage. Furthermore the material is a liquid state
5 of a low viscosity, which increases however exceeding 65°C by heating and forms ingredients for a cream croquette and or dressing body of gratin or doria, that largely saves laborious procedures of preparing roux and processes thereafter by the prior art.

10 Accordingly the cooking material is convenient to be used for not only for large scale service but also for household cooking.

The present invention is described hereinafter by the following non-limiting example:

15 Example

Roux is obtained by heat treating of the mixture of 10 kg of soft flour (13.5% moisture content) and 10 kg of salad oil (refined palm oil, melting point 20°C) in a gas heated kettle for 2
20 hours and cooling to 60°C by scraped surface exchanger.

Another sauce material is prepared as follows; melting 5 kg of butter by adding 65 kg of water at 40°C thereto, adding 5 kg of whole mild powder
25 thereto, emulsifying the mixture by "Homomixer" (Tokkushu-Kikai-Kogyo K.K.) for 10 minutes, sterilizing the emulsified mixture by heating at 90°C for 20 seconds by using a plate-heater and cooling down to 40°C by using plate-cooler.

30 Thus obtained roux and sterilized emulsified sauce material is mixed in an aseptic closed system and homogenized under the homogenizing pressure of 100 kg/cm² and cooled down to 10°C by using a plate cooler and packed into 1 l brick-type
35 containers and finally frozen at -25°C in a freezer and -45°C in a shock freezer.

Comparative Example

On the other hand, make a cooking material for an cream croquette in usual manner, using the above mentioned same roux and emulsified liquid. In other words, put 20 kg of roux in a gas heated kettle, and heat stirring, adding gradually 60 kg of emulsified liquid heated up to 80°C.

Stop heating when starch is fully gelatinized, adjust the moisture as much as the moisture in the Example, and fill in the anti heating container and cool down in cold water. When the product temperature comes down to 30°C, wipe away the moisture on the surface of the container, and freeze at -25°C in a freezer and -45°C in a shock freezer.

Keep the cooking material to be obtained by the above mentioned Example and the Comparative Example, heat for 30 minutes in 40°C of hot water and defrost, put each cooking material in each caldron. Each material state before freezing and after defrosting and at heating is summarized in the table.

25

30

35

Table 1

Example		Comparative Example		
Viscosity before freezing 60 °C *1		80	210,000	
Condition to be packed	Liquid state and good workability at packing	High viscosity and troublesome at packing		
Frozen Condition	0.4°C/min *2	0.01°C/min *3	0.4°C/min *2	0.01°C/min *3
Viscosity after defrosting in a hot water 40 °C *1	75	70	157000	94000
State after defrozen	Homogeneous liquid structure	Lumps occur and ununiform structure	More lumps occur and ununiform structure (A little water separation)	
State at heating	Increase viscosity exceeding 65 °C of the product temperature	Lumps remain in the structure after heating and not suitable for an ingredient	More lumps remain and not suitable	

- *1 Measured by BH type viscosity gauge; unit CP
- *2 Cooling speed in a shock freezer (-45 °C)
- *3 Cooling speed in a freezer (-25 °C)

11

As shown in the Table 1, the instant cooking material of the Example is low on viscosity before freezing and has good workability for packing.

Regardless with the freezing speed, the state
5 of the cooking material after defrosting is of low viscosity liquid state and when heated in a hot water, the material viscosity is rapidly increased exceeding 65°C and soft ingredients for a cream
10 croquette are obtained. Accordingly the material can be easily produced automatically, using a scraped gaseous heat exchanger, and dividing into a suitable scale of lumps as a croquette and packed by Pillow Packing Machine.

Comparing with this inventive cooking material,
15 usual cooking material, which is heated in hot water and gelatinized in high density of starch as shown in the Comparative Example, and deteriorated quality at defrosting in accordance with freezing speed, fast or slow, and whose structure is mostly not uniform, and
20 is not suitable for an ingredient for a cream croquette. Furthermore the viscosity before freezing is very high, that will be a big obstacle to produce automatically as well.

As above described, the new cooking material,
25 which can be used for an ingredient and a cooking material of a cream croquette, a gratin and/or a doria, in another words low on viscosity in spite of high density of starch and good for long preservation, increase viscosity simply by heating
30 after defreezing and warming to prepare for instant cooking material for a cream croquette etc. instantly, that contribute a food industry rationalization and labor saving for cooking.



CLAIMS

1. A process for producing an instant cooking material which comprises the steps of heating wheat flour and/or roasted wheat flour with edible oil and/or fat uniformly at a temperature of from 110 to 130°C for 0.5 to 3 hours to form a roux, the amount of the wheat flour and/or roasted wheat flour to be formulated being in the range of from 5 to 30% by weight based on the total weight of the end product, the amount of the fat and/or oil to be formulated being in the range of from 2 to 30% by weight based on the total weight of the end product, the weight ratio of the total wheat flour and/or roasted wheat flour to the total oil and/or fat upon preparation of the roux being 1 : 0.4 to 3 and the total moisture content of raw materials for the roux being not more than 15% by weight, cooling the mixture, mixing and homogenizing other pasteurized sauce materials therewith at a temperature not higher than 60°C to avoid wheat starch gelatinizing obtain a homogenized mixture having a moisture content of 40 to 93% by weight based on the end product, and packing the homogenized mixture into a container in an aseptic condition and kept in a chilled or frozen condition.

2. A process according to claim 1 wherein the weight ratio of wheat flour to the oil and fat upon preparation of the roux is 1 : 0.5 to 2.

3. A process according to 1 wherein the total moisture content of raw materials for the roux is not more than 10% by weight.

4. A process according to any one of claims 1 to 3 wherein the mixing and homogenization of the roux and other sauce materials are carried out at 40 to 50°C.

5. A process according to any one of claims 1 to 4 wherein the other sauce materials include skimmed milk



13

powder, whole milk powder, butter, fresh milk cream filled cream, cheese, filled cheese, butter oil or butter milk.

5 6. A process according to any one of claims 1 to 5 wherein the other sauce materials include stock.

7. An instant cooking material which is produced by the process of any one of claims 1 to 6.

8. An instant cooking material substantially as described herein with reference to the example.

10 9. A process for producing an instant cooking material substantially as described herein with reference to the example.