

Process For Producing A Base Product For
Thickened Sauces And Soups Which Disperses
In Hot Water Without Forming Lumps

The invention relates to a process for producing a dehydrated base product for thickened sauces and soups which disperses in hot water without forming lumps.

Hot water-dispersible products intended for use in sauces and soups bound with starch-based thickeners as well as processes for making them are known. There is a large number of known varieties. Attempts have long been made to improve the hot water-dispersibility of the starch-based binders by agglomerating, by coating with fat or hydrophilic substances and/or by using so-called heat/moisture-treated tuber or root starches, the last-mentioned method having per se produced very remarkable results.

Sensorially, however, these known dehydrated base products fail to show the desired properties of a well made roux prepared by the housewife in the classic manner from butter and flour, which involves in fact a relatively laborious procedure, requires a great deal of care and ability and even when made by skilled cooks does not always turn out as it should. Another point is that, for a number of reasons, including that of a rather short storage life, they do not lend themselves to large-volume production for stock, much less to production on an industrial scale. There has never been a lack of attempts, therefore,

to develop processes for the industrial manufacture of such products (Japanese patents 28-26234 and 45-9217, US patent 4.126.710 and German OS 14 17 553), but none of them has so far led to a fully satisfactory result and so has failed to be generally accepted for industrial practice.

It has, therefore, been the object of this invention to provide an improved process of the above-mentioned kind which, while being easy to practice on an industrial scale, yields dehydrated base products of a high thickening power which can be stored over long periods of time, permit easy handling and are, in particular, flowable and dispersible in hot water without forming lumps and will give thickened sauces and soups of a quality which, in terms of sensorial properties in particular, are smooth, velvety-creamy, have short texture and a round taste, and are equal to white or brown sauces and soups bound with roux that has been prepared by the housewife in the classical manner.

Accordingly, the invention is a process for the preparation of a dehydrated base product for making thickened sauces and soups which disperses in hot water without forming lumps, which comprises premixing a starch material with an, optionally liquified, edible fat as essential components and heat treating this premix at an elevated temperature characterised in that

- (a) in a first step an essentially homogeneous premix is prepared from the starch material and the edible fat and

(b) (I) 0.5 to 15 w/w % water are added to the premix followed by the premix being heated at an elevated temperature in the range of 90° to 150°C, optionally under elevated pressure, or

5 (II) the premix is heated at an elevated temperature in the range of 90° to 150°C without the addition of further water to the premix but under elevated pressure.

10 The final product of the process is preferably commuted to a free-flowing material.

By the expression "essentially homogeneous premix" is meant a premix which is not perfectly homogeneous in the strict meaning of the word but one that is homogeneous by the standards of the relevant
15 art.

The temperature required for the heat treatment i.e. the final temperature to which the mixture is exposed in the course of the heat treatment and which in most cases, especially if the process is
20 carried out under normal or reduced pressure, is reached only gradually, may, be selected within the broad range between 90 and 150°C, but experience has shown that it is better to work within a range of 105 to 150°C, preferably 110 to 135°C and more preferably
25 115 to 125°C in order to avoid insufficient treatment effects and/or excessively long treatment times at relatively low temperatures on the one hand and excessively fast and/or intense browning at relatively high temperatures on the other.

The duration of the heat treatment, including the heating-up phase, may vary between wide limits depending upon the desired effect, the composition of the batch, the rate of heating-up and the temperature chosen for the heat treatment itself, but may range between 0.2 and 5, preferably 0.3 and 3.5, more preferably between 0.4 and 2.5 and in particular, between 0.5 and 1.5 hours, it being possible to keep treatment times relatively short by applying high treatment temperatures, by heating up quickly and/or when making white products.

The heat treatment has the aim of bringing the water content of the composition down to at least 7.5 w/w %, based on the total weight of the product. While this may in a number of cases be sufficient, experience has shown that, as a rule, a further reduction of the water content to at most 6, preferably no more than 5 and more preferably less than 4 w/w % is recommended.

Adjusting the moisture content of the batch by means of added water is critical, in fact indispensable, for the process of the invention unless the heat treatment is carried out under elevated pressure in particular under the autogenous pressure generated when the batch is heated under initially sealed conditions. Once this pressure is reached and initially maintained, steam is released from the system and the pressure allowed to fall. The optimum amount of added water always depends on the circumstances of the case, in particular on the type, amount and moisture content of the remaining components of the batch, the conditions of treatment and/or the result desired, but may be empirically ascertained by anyone skilled

in the art within the range described in the claim(s) and, as a matter of experience, has been found to be frequently between 1.5 and 10, more frequently between 2 and 7 and most frequently between 2.8 and 4 w/w %, based on the total weight of the batch. Preferably, the water added to the essentially homogeneous premix is added at a temperature of at most 80°C.

It has been found that to obtain optimum product properties, it is surprisingly extremely favorable to add seemingly negligible amounts of milk protein which, for the purposes of the invention, are best incorporated in the mixture in the form of dispersions in added water. The amount of milk protein added which, as is emphasized here, may be dispensed with in certain cases (cf. Example 1), commonly ranges between 0.02 and 1 w/w %. Very good results have been obtained with additions of between 0.03 and 0.35, preferably between 0.05 and 0.2, and more preferably between 0.07 and 0.15 w/w %, based on the weight of the batch. Suitable milk proteins are, in particular, casein(ates) and/or whey protein which may for the purposes of the invention be used, optionally, in a mixture with lactose and, in particular, in the form of whey powder and/or skim milk powder. The added water with milk protein dispersed in it may, therefore, also be cream, whole milk or skim milk.

The starch material suitable for the purposes of the invention includes chiefly flours, in particular wheat, rice and/or rye flour, but it is also possible to use starches, preferably granular, i.e. nongelatinized starches, of which tuber and root starches have proved to be particularly well suited.

The amount of starch material generally ranges between about 20 to 75 w/w % and is more preferably selected within a range of 40 to 70, particularly between 50 to 65 w/w %, the preferred starch materials being those featuring a customary moisture content.

Fat components eligible for the purposes of the invention are all edible fats of animal and vegetable origin, but it is recommended as a rule to use relatively hard, high-melting edible fats, especially those featuring a melting point of at least 44°C, which have been found to yield products with good storage and flowing properties. For the purposes of the invention preference is, therefore, given to edible fats featuring a content of polyunsaturated fatty acids of at most 30, preferably no more than 15 and more preferably less than 2.5% and/or a content of medium- and/or short-chain fatty acids of less than 20, preferably at most 5 and more preferably below 0.2%. The amount of fat used may vary over wide limits and is preferably selected within the range of 80 to 25 and preferably 60 to 30 and particularly 33 to 45 w/w %.

Apart from the essential components it is generally possible to optionally use, for the purposes of the invention, customary amounts of other components commonly employed in dehydrated sauce and soup products such as coloring matters and/or flavours, which may be added to the dehydrated base products generally at any point of the process before, during and/or after the heat treatment. It is possible, e.g. to add to the premix of starch material and edible fat, water in the form of bouillon, condiment, fruit juices and/or vegetable juices as well as

(18)

- 7 -

optionally, even pureed fish or meat.

In a preferred embodiment of the invention finely chopped or pureed vegetables, in particular onions, carrots, leek, parsley roots and/or celery may be added to the premix in amounts of up to 18 w/w %.

The examples and comparisons tests below illustrate the invention and its advantages over the prior art.

Comparison Test 1

3.0 kg of melted hardened vegetable fat featuring a melting point of 45°C and 0.3 l of water at 60°C were placed in a kneader which had been preheated to 60°C. To this, 4.5 kg of wheat flour was added and kneaded into the mixture of fat and water. Then the temperature was raised to 120°C and the mixture held at this temperature for 20 minutes. In the course of this heat treatment most of the added water and a major part of the water originally contained in the flour evaporated.

Subsequently, the product was cooled down to room temperature and grated on a grater. The ultimate water content of the product was 3.6 w/w %.

The grated product was found to have good flowing properties and a pleasant taste, but when stirred into boiling water, formed very many lumps which did not dissolve even after prolonged boiling and stirring.

./.

Example 1

In this example, the procedure was the same as in Comparison Test 1 except that the melted vegetable fat was placed in the kneader first and the flour added subsequently and that, after these two components had been homogeneously mixed, the water was stirred in. The ultimate water content of the product was 3.2 w/w %. The grated product showed good flowing properties and when stirred into boiling water formed no lumps. It was found to be a sauce or soup base of pleasant taste and a very smooth and tender structure which developed a certain gel structure, however, when getting cool.

Comparison Tests 1a and 1b

These comparison tests were run analogously to Example 1 except that no water was added (Comparison Test 1a) and instead of the customary flour having a water content of approx. 14 w/w % a dried flour featuring a water content of 6 w/w % (Comparison test 1b) was used respectively. The end products when stirred into boiling water showed a pronounced to extremely pronounced gel structure and so were unsuitable for the purposes of the invention.

Example 2

In another test following the procedure of Example 1 the added water contained 0.5% of skim milk powder (based on the total batch).

The properties of the resulting product were analogous to those of the product obtained in Example 1. Its structure, however, was even more smooth and tender, its color warmer and more covering, and the gel structure mentioned in Example 1 had disappeared in the product obtained here.

Example 3

3.0 kg of melted hardened vegetable fat and 4.5 kg of wheat flour were homogeneously mixed in a heatable mixer which had been heated to 60°C. Then, 0.9 kg of a mixture of mechanically chopped vegetables consisting of 0.4 kg onions, 0.2 kg carrots, 0.1 kg leak, 0.1 kg celery roots and 0.1 kg tomato pulp (twice concentrated) was stirred in, homogeneously mixed and subjected to the heat treatment with subsequent cooling and grating as described in example 1. The ultimate water content of the product was 4.6%.

The end product which showed good flowing properties and a light brown colour was stirred into boiling water without forming lumps. It had a smooth and creamy structure. After reheating the mixture was found to have an intensive taste of vegetables/roast meat.

Example 3a

Example 3 was repeated except that during the heating step a low vacuum (0.1 - 0.3 bar) was applied for better removal of the steam.

By this measure the duration of the heat treatment, which is largely determined by the rate of water evaporation, was distinctively reduced without causing any change in the quality of the final product.

Example 4

Another test was run following the procedure of Comparison Test 1, the only difference being that heating-up and the heat treatment itself took place in a closed kneader. The superatmospheric pressure in the kneader was approx. 1.2 bar at a treatment temperature of 120°C. When the product had reached the temperature of 120°C, steam was let off to an extent that the above-mentioned superatmospheric pressure was initially retained. After a few minutes of holding at a superatmospheric pressure of 1.2 bar, the superatmospheric pressure was continuously lowered down to atmospheric pressure while a temperature of 120°C was maintained in the product. 20 minutes after reaching the maximum temperature of 120°C the composition was cooled down and subsequently grated. The ultimate water content was 3.6%.

By application of superatmospheric pressure, the relatively long treatment time as applied in Examples 1-3 was drastically reduced to half. The resulting flowable product of a brownish color dispersed in boiling water without forming lumps and showed the smooth, tender and creamy structure already described above.

Example 4a

As the browning of the final product as described in Example 4 may sometimes be undesired, another test was run with 4.5 kg of wheat flour having a customary water content (14%) and 4.5 kg of hardened vegetable fat under the same process conditions as those described in Example 4 but without added water and milk protein. The ultimate water content was 3.5%.

The grated white product when stirred into boiling water formed no lumps and no gel structure was found to develop in the hot state or during cooling.

This example thus showed that boiling the product in water surprisingly resulted in the same smooth, tender and creamy structure that was obtainable by heat treatment under reduced or normal pressure only by adding milk protein and water.



- 12 -

CLAIMS

1. A process for the preparation of a dehydrated base product for making thickened sauces and soups dispersible in hot water without forming lumps, which comprises premixing a starch material with an, optionally liquified, edible fat as essential components and heat treating this premix at an elevated temperature characterised in that
 - (a) in a first step an essentially homogeneous premix is prepared from the starch material and the edible fat and
 - (b) (I) 0.5 to 15 w/w % water are added to the premix followed by the premix being heated at an elevated temperature in the range of 90° to 150°C, optionally under elevated pressure, or
 - (II) the premix is heated at an elevated temperature in the range of 90° to 150°C without the addition of further water to the premix but under elevated pressure.
2. A process according to claim 1 characterised in that the premix is heated at an elevated temperature in the range 110° to 135°C.
3. A process according to either claim 1 or claim 2, characterised in that the premix is heated at the elevated temperature for a period of 0.2 to 5 hours.
4. A process according to any one of the preceding claims characterised in that 2 to 7 w/w % water is added to the essentially homogeneous premix.



5. A process according to any one of the preceding claims characterised in that the water added to the essentially homogeneous premix is added at a temperature of at most 80°C.
 6. A process according to any one of the preceding claims characterised in that the water added to the essentially homogeneous premix contains milk protein so as to provide the milk protein in an amount of from 0.02 to 1 w/w % based on the total weight of the composition.
 7. A process according to claim 6 characterised in that the milk protein used is casein and/or whey protein optionally in a mixture with lactose.
 8. A process according to any one of the preceding claims characterised in that there is added to the essentially homogeneous premix finely divided vegetables in an amount up to 18 w/w % based on the total weight.
-