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WATER SOLUBLE PROTEIN CONCENTRATE AND METHOD OF PRODUCING THE SAME**Hermann Mohler, Zurich, and Robert Menzi, Geneva, Switzerland, assignors to Cyklus Limited, Arosa, Haus am Untersee, Switzerland****No Drawing. Filed Mar. 13, 1959, Ser. No. 799,111****Claims priority, application Switzerland Mar. 14, 1958****31 Claims. (Cl. 99—14)**

This invention relates to methods of manufacturing soluble food concentrates and to the products of such methods.

As is well known, water-soluble meat extracts are being used as food to an increasing extent. These have the taste of meat broth and are produced from fresh meat. Such extracts are produced according to the classical method from meat cut into small pieces, and water. The disadvantage of this known method is that only a very small part of the used meat can be made soluble. The yield is only 1% to 3.5% by weight so that the cost of production is high.

According to the present invention, a method of producing a soluble food concentrate, having the taste of meat broth, includes the steps of obtaining an aqueous extract from an animal or vegetable protein and either subjecting the residue to acid hydrolysis or subjecting a different quantum of protein to acid hydrolysis, adding the hydrolysate so obtained to the aqueous extract, and drying, or partially drying, the ingredients either before or after mixing so as to obtain a water-soluble concentrate. The protein from which the aqueous extract is obtained may be either animal or vegetable and the said hydrolysate may also be obtained either from an animal or vegetable protein. The production of the aqueous extract may be effected either with or without the addition of an enzyme, or the protein—such as chopped-up meat—may first be subjected to at least one water extraction, in the absence of an enzyme, in order to obtain a water extract, and the residue from this step may then be subjected to about a quarter of an hour to a water extraction in the presence of a proteolytic enzyme in order to obtain an enzymatic extract. The meat or other protein residue from this second extraction may be subjected to a series of acid hydrolyses for the complete dissolution of the meat, or other protein, to obtain acid hydrolysates, the duration of each of these hydrolyses being so selected that the ratio by weight of the total nitrogen content to the amino nitrogen content of the hydrolysis product is smaller than ten and greater than one. Both extractions and the acid hydrolysate are mixed and subjected to evaporative drying, so that a water-soluble concentrate is obtained. The evaporative drying may also be carried out prior to the last-mentioned mixing.

In order that the invention may be clearly understood and readily carried into effect, a presently-preferred exemplary embodiment thereof will now be described in detail:

In the example, 1 kilo of chopped-up meat is heated for about one hour with two liters of water to about 90° C. The mixture is hereupon filtered and the meat residue treated once more in the same way. The two extracts are combined. They contain about 3% by weight meat extract, referred to fresh meat, and represent the classical meat extract.

The meat residue obtained after the above treatment is mixed with 800 milliliters of water and is heated to

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40° C. after the pH value is adjusted to 7.5 by the addition of hydrochloric acid. 0.4 gram of a proteolytic enzyme, for example trypsin, which is dissolved in 50 milliliters of water is then added. After about a quarter of an hour the mixture is heated for about one hour to 90° C. in order to destroy the trypsin, and is then filtered. The enzymatic extract and a meat residue are thus obtained.

This meat residue is mixed with 800 milliliters of hydrochloric acid and heated for about 45 minutes to 100° C. Then it is filtered and the filtrate evaporated quickly to dryness. The same process is repeated with the meat residue from this first phase until the meat has completely dissolved. The products obtained from these successive processes are absorbed by 200 milliliters of water, decolorized by treatment three times with active carbon and adjusted by sodium hydroxide to pH 5. The acid hydrolysate is thus obtained.

The aqueous extract, the enzymatic extract and the acid hydrolysate are mixed, evaporated down to a content of 30% by weight soluble substances and dried by fine spraying atomization or by another method, so that a concentrate in powder form is obtained. In place of the drying step, the evaporation can be continued to a water content of 15% to 20% by weight, so that a liquid or paste-like concentrate is obtained.

As can be seen from the above example, the whole of the fresh meat is converted into a water-soluble concentrate. When it is dissolved in water, this concentrate gives a meat broth, which has the taste of a meat broth produced from fresh meat.

It has been found that by making use of a number of hydrolyses, whose duration is so selected that the ratio of the total nitrogen content to the amino nitrogen content of the hydrolysis products is smaller than ten and greater than one, thereby preventing a decomposition to the amino acid condition, an excellent quality taste is obtained.

Instead of with the trypsin, the enzymatic extraction can be carried out with an equivalent quantum of any other proteolytic enzyme of the exopeptidase type as well as of the endopeptidase type. Thus, for example, papain, pepsin, ficine, bromeline or rhozyme may be used. The same applies for the hydrolysis, for which any volatile mineral acid such as e.g. acetic acid, etc., may be used in the place of the hydrochloric acid.

The hydrolysis series can be carried out continuously. About every 45 minutes the solution may be filtered and the hydrochloric acid evaporated therefrom. The hydrochloric acid so withdrawn is constantly replaced by fresh hydrochloric acid. In this manner the hydrolysis remains uninterrupted, but controlled, and the result, required from the series of successive hydrolyses, that is the prevention of the decomposition of the already dissolved meat by a hydrolysis of too long duration, is achieved. A disadvantageous taste is thereby avoided.

In addition to the aforesaid known water-soluble meat extracts there are other known extracts, which are obtained by water extraction from protein-containing substances of vegetable origin, as for example from yeast, which taste like meat extract. With these also the small yields and high prices are disadvantageous.

In addition products are known, which are obtained by acid hydrolysis from protein-containing substances, of animal as well as vegetable origin. These products have the characteristic taste of protein hydrolysates, a taste, which is not very much liked and which causes a prejudice against such products.

The present invention eliminates these disadvantages. For example, a typical product according to the invention which is free from these disadvantages contains 10% to