

1

PROCESS OF MAKING A BASE FOR PROTEIN BEVERAGES

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a process for increasing yields of polypeptides and preparing an acidified beverage containing nutritional polypeptide. In a particular aspect this invention relates to a process for the preparation of an acidified beverage rich in solubilized polypeptide.

2. Description of Prior Art

The need for an economical source of protein which is easily prepared and which readily appeals to human taste is well known. Because of this need, protein containing beverages have been formulated using economical protein sources such as, for example, soya protein, casein and the like. A "neutral" beverage (one having a pH approximating neutrality) has been prepared simply by dissolving finely divided protein containing material, typically soya protein, in water and adding a suitable flavoring material. While such a beverage can be high in nutritional value, its taste and its general consistency, especially as it relates to mouth feel, does not give it the acceptability of acidified beverages generally and in particular, does not give it the acceptability of carbonated beverages.

It would seem that a neutral beverage containing protein in solubilized form could be easily converted to an acidified beverage simply by addition of suitable acid. However, such addition in the case of a protein beverage causes precipitation of a substantial portion of the protein. The precipitated material not only causes the beverage to appear cloudy but imparts a gritty mouth feel to the product and a bitter taste. Such a product has very little appeal even to the most unsophisticated consumer. The precipitated protein, of course, can be removed from the beverage, such as, by filtration, but such removal deprives the drinker of a substantial portion of the nutritional protein. In addition, even with removal of precipitated protein, the gritty mouth feel, bitter taste and generally poor consistency of the product remain.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a process for increasing the yield of a nutritional polypeptide product useful for incorporation in a food product.

It is a further object of the present invention to provide a process for flavor optimization of a nutritional polypeptide-containing food product, e.g., a carbonated beverage.

It is a further object of the present invention to provide a process for the preparation of an acidified protein-type beverage rich in a nutritional polypeptide product.

Other objects and advantages of the present invention will be apparent from the specification and appended claims.

The present invention resides in the discovery that a nutritional polypeptide product, derived from edible protein, can be produced in increased yields and, in another aspect, that an acidified beverage which is not only rich in such protein-type nutrition and substantially free of insoluble protein but has acceptable taste,

2

mouth feel, and flavor optimizing qualities is obtained by subjecting an aqueous slurry of edible protein to a pre-hydrolysis, denaturation heat treatment, then to the hydrolytic action of a proteolytic enzyme to solubilize the protein, adjusting the pH of the thus treated aqueous dispersion to in the range of from about 2.5 to about 6.0, and subsequently formulating the solubilized protein into a beverage.

DETAILED DESCRIPTION

The process of the invention providing increased yields of polypeptides can use any suitable edible protein derived from oil seed. Such suitable protein materials include soya protein, for example, soya protein isolate, soya flour, soya grits, soya concentrate, and defatted soya meal; casein, cotton seed protein, corn seed protein, and their mixtures. Because of their low cost and ready adaptability to the process of the present invention, soya protein is generally used although defatted soya protein is preferred. It is also preferred that the protein material be ground, powdered, homogenized, comminuted or otherwise suitably converted to small particle size to permit easy and economical dispersion in water at the desired concentration of use.

In accordance with the process of the present invention, the pre-hydrolysis denaturation heat treatment is conducted by heating a slurry of edible protein, advantageously an aqueous slurry of defatted soya protein, under denaturation conditions including a temperature and residence time sufficient to substantially destroy vegetative cells but insufficient to substantially destroy spores. Generally, a temperature of at least about 150°F. for a time sufficient to increase the yield of a soluble, nutritional, polypeptide product, which is produced when the preheated product is subsequently subjected to enzymatic hydrolysis, can be used. The preheat is advantageously conducted in a heating zone under pressure conditions sufficient to maintain the integrity of the slurry, i.e., at a substantially constant volume.

The temperatures employed generally range from about 150°F. to 375°F., preferably from about 175° or 200° to 300°F., residence time employed can range from about 0.01 to 120 seconds, preferably from about 0.1 to 40 seconds; and pressure conditions depend upon the temperature employed and can range from atmospheric to super atmospheric conditions, e.g., from about 0 to 175 psig.

The concentration of the edible protein in the slurry is generally in amounts insufficient to deleteriously affect its processing since too high of a concentration will result in a viscous and difficult to handle slurry. Soya protein, for instance, has a tendency to absorb or tie-up water around its molecular structure and thus further thicken a slurry. Generally, when employing soya grits which normally contain about 50 wt. percent soya protein, the soya grits can be employed in the slurry in a concentration of up to about 16 wt. percent based upon the soya grits and water.

In a particularly advantageous aspect of the present invention, the pre-hydrolysis, denaturation heat treatment can be conducted using soya advantageously in flour or grit form containing between about 40 to 60 wt. percent protein under denaturation temperature and residence time conditions to provide a nutritional polypeptide product having optimized flavor characteristics as well as being produced in increased yields. In