

HYPALLERGENIC MILK PRODUCTS AND PROCESS OF MAKING

This is a continuation of copending application Ser. No. 07/562,777, filed on Aug. 3, 1990, now U.S. Pat. No. 5,064,674 which is a continuation in part of application Ser. No. 297,451, filed Jan. 13, 1989, and now U.S. Pat. No. 4,954,361.

FIELD OF THE INVENTION

A hypoallergenic milk made from the permeate of mammalian milk (i.e. the protein and fat-free component of cow's milk) is disclosed herein. The hypoallergenic milk has the flavor and smell of whole natural milk, but lacks the component which causes allergic reactions. The hypoallergenic milk has the favorable features of mother's milk, but lacks foreign animal protein, and therefore may thus be regarded as "humanized" cow's milk.

BACKGROUND OF THE INVENTION

Many persons suffer from various allergies, many of which are caused by ingesting food containing allergens.

Although the biochemistry of allergic reactions is not precisely understood, it is believed that the allergens cause, upon ingestion or other contact with the body, a specific reagin (or skin sensitizing antibody) to be formed in the bloodstream. The ability to produce reagins, chemically identified as IgE, in response to a given allergen is thought to be an inherited characteristic that differentiates an allergic person from a non-allergic person. The specificity of the allergen-reagin reaction and its dependence on molecular configuration of the allergen and reagin is similar to the antigen-antibody reaction. The degree of sensitization is dependent upon the extent of exposure to or ingestion of the allergen. In this respect, the allergen molecule, which is often a protein, may be regarded as a "key" which exactly fits the corresponding structural shape of the reagin molecule which may be likened to a "lock". When the key is inserted into the lock, an allergic reaction results.

Different materials contain different allergens. Not all persons may have the reagin with which a particular allergen can react. Therefore, some persons are not allergic to particular materials. However, when a particular reagin reacts with a specific allergen, an allergic reaction results in any number or type of symptoms. Allergic reactions range from very mild symptoms to death. For example, symptoms, both mild and severe, include skin rashes (allergic eczema and urticaria), dermal symptoms, respiratory symptoms (including allergic rhinitis and bronchial asthma), gastrointestinal symptoms, and migraine. Violent illnesses have been known to include shock-like reactions, vascular collapse and allergic anaphylaxis.

Many allergists have recognized that milk contains proteins which are allergens. The allergens of cow's milk frequently cause the formation of reagins (IgE) in many persons. Thus, many persons, including both adults and children, are allergic to cow's milk.

Milk is very frequently used in popular food products. It is used not only in cooking and baking, but it is included in hidden ways as well. For example, casein, caseinate milk solids, whey, whey solids, and lactalbumin are milk products which are components of cookies, cheeses, chocolate (in the form of milk chocolate),

ice cream, butter and may be used as flavoring for other food products, such as breakfast cereals, hot and cold beverages, and desserts. These products can also be found in gravies, breadings, whole, dry or evaporated milk, yogurt, sherbet, breads, waffles, creamed vegetables, mashed potatoes, pudding, creamer or any diverse products such as hot dogs or spaghetti.

Milk products, which are marketed today as hypoallergenic milk, are neither uniformly hypoallergenic to all patients, nor made from cow's milk. For example, heat processed milk, in which albumin is denatured, is of modest benefit to only a limited number of patients. A hypoallergenic vegetable soybean milk formulation devised in China has an objectionable smell and after taste. Hypoallergenic milk produced by the acid process which imitates the stomach's digestive process by utilizing hydrochloric acid to break up proteins, e.g. casein, has an objectionable smell and taste.

Accordingly, there is a need for a hypoallergenic milk which also has the taste and smell of cow's milk.

U.S. Pat. No. 4,293,571 discloses a process for the purification of purified protein hydrolysate. In this process, an aqueous solution of protein is subjected to hydrolysis, then is heat treated to denature the protein. The heat-treated material is then ultrafiltered to eliminate protein.

U.S. Pat. No. 4,402,938 discloses a food and method for making the same from colostrum and milk. In this process, the udder of an ungulate is stimulated with an antigen-like material so that the food factor of the whey is enhanced. The enhanced milk is subsequently ultrafiltered. The retentate is discarded and the permeate is saved. Preservatives are added to the milk/colostrum prior to ultrafiltration.

SUMMARY OF THE INVENTION

A hypoallergenic milk product is provided comprising a permeate substantially free of hyperallergenic protein prepared by filtration of milk or whey through a filtration membrane which will only allow molecules having a molecular weight of less than or equal to about 5 kDa to pass therethrough, the permeate having been prepared without chemical treatment to denature or hydrolyze the protein contained therein prior to filtration. The milk product further includes an added hypoallergenic protein component which may advantageously comprise hypoallergenic protein per se, amino acids, polypeptides having a molecular weight of not more than about 1.5 kDa, or a combination thereof.

The hypoallergenic milk product is prepared by the steps of filtering milk or whey through a filtration membrane. The filtration membrane will only allow molecules with a molecular weight of less than or equal to about 5 kDa to pass therethrough. The permeate is thereafter collected from the filtration step and supplemented with the above-described added hypoallergenic protein component. The permeate may be optionally supplemented with hypoallergenic fat, vitamins and minerals.

It is an object of this invention to produce a new and useful hypoallergenic food product from mammalian milk or whey, and from cow's milk in particular.

It is another object of this invention to obtain the good taste of natural whole or skim milk.

It is an object of the invention to provide a hypoallergenic milk product which retains the nutritional content of natural milk.