United States Patent Office 3,080,235 Patented Mar. 5, 1963

3,080,235

PROCESS FOR MAKING MILK POWDER

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No Drawing. Filed May 13, 1960, Ser. No. 28,840
11 Claims. (Cl. 99—56)

This invention relates to a fat containing milk powder and to a process for making same. In particular, it relates to a whole milk powder which dissolves readily even in cold water by stirring slightly with a spoon, after which it is ready for immediate use. The invention further relates to a process for making said cold water soluble whole milk powder.

Present dried fat containing milk powders, particularly dried whole milk powders tend to deteriorate upon storage, often becoming rancid or stale and getting a musty or fish-like flavor. Another objectionable characteristic of present whole milk powders is their tendency to cake and become insoluble when stored for an appreciable period.

Perhaps the biggest obstacle to widespread use of powdered whole milk is the difficulty encountered by the user when he or she attempts to redisperse the powder in water, particularly cold water. Ordinary spray dried whole milk powder tends to float on top of the water or else forms insoluble masses or "globs" in the liquid. In any event, the powder is difficultly soluble even with vigorous shaking or agitation in a closed container. While it is exceedingly difficult to redisperse present whole milk powder in warm or hot water, it is virtually impossible to redisperse present fat containing powders in cold water.

Present nonfat dry milk solids are rendered more soluble in cold water than older powdered milk by various well known instantizing processes, but whole milk has never been made into a completely satisfactory instant product.

It has been proposed to treat instant nonfat dry milk solids with the fat portion of the milk to make an instant whole milk. When this product is dispersed in warm water, the fat tends to separate, and it is necessary to homogenize the mixture to produce a stable product. Another approach has been to emulsify the fat before adding it to the instant nonfat dry milk solids, however it has been necessary to add a surface active agent to this product to overcome feathering when it is added to coffee.

In any event, all of the known present whole milk powders must be reconstituted in warm water. This is undesirable, because warm tap water has a well known undesirable taste and if cold tap water is used, it must be warmed before adding the whole milk powder. This is bothersome and time consuming for the user and, since most whole milk is used for drinking, the reconstituted product then must be cooled before it is used.

One of the principal objects of the present invention is to provide a fat containing milk product, particularly a whole milk powder, which is easily and simply produced, which can be made into a product which is instantly dispersible in cold water, and which does not develop objectionable flavors, tastes or cake upon aging. Another object is to provide a whole milk powder which does not separate upon standing when reconstituted in cold water. Another object is to provide a simple economical process for making instant whole milk powder using conventional instantizing equipment.

Still another object is to provide an instantly soluble whole milk powder which can be reconstituted in cold water by stirring with a spoon. Another object is to provide a cold water soluble milk powder which when reconstituted forms a whole milk product which can be stored without separating. Another object is to provide

a whole milk powder free of emulsifying agents, surfactants and other foreign materials.

These and other objects and advantages will become apparent hereinafter.

The present invention comprises a food product including a low melting fat containing milk powder which is easily soluble in cold water. The present invention comprises a process for making an instantly cold water soluble fat containing milk powder.

We have found that a new and improved whole milk powder which is instantly dispersible in cold water can be made by adding liquid butterfat or butter oil to condensed skim milk and homogenizing the mixture prior to spray drying and instantizing.

While the process and product described are applied to a milk product having a milk fat to milk solids ratio essentially the same as whole milk, the invention is not confined to instant whole milk, but is equally applicable to other fat containing milk products such as cream and low fat milk.

The butterfat portion of whole milk is composed of different components having different melting points. We have found that when the lower melting fractions of the butter oil are added to skim milk prior to drying and instantizing, the resultant dried whole milk powder is instantly soluble in water which is at a much colder temperature than heretofore possible for redispersing a whole milk powder.

Whole milk is accepted at a milk plant and separated into cream and skim milk as in the manufacture of normal nonfat dry milk. The skim is treated in the normal manner i.e., it is pasteurized or preheated to temperatures that kill the pathogenic organisms without affecting the spores and lactic acid bacteria, and the pasteurized skim is condensed in conventional vacuum pans to approximately 30% to 45% total solids.

The fresh cream contains approximately 40% butter oil which can be separated from the water by use of tergitol as described by Stein and Patton, J. Dairy Science 35: 655 (1952), or by any other convenient method.

The separated butter oil or fat portion is then separated into a high melting fraction and a low melting fraction. There are several suitable methods which give the desired results. The first method is fractional separation of the higher melting point components of the fat by controlled cooling and filtering. This method is used to remove undesirable fractions from mixed fats or mixed fatty acids in the preparation of oleo oil from internal fats and also in the preparation of winterized salad oils which do not cloud in the refrigerator, as well as in the preparation of other fats and oils.

The second method of separating the butter oil involves fractional crystallization of the higher melting point components of the fat from miscible solvents. A fractional crystallization process of this type is described in U.S. Patient No. 2,684,378.

The third method of obtaining a low melting fraction of butter oil involves molecular rearrangement of the fatty acids in the fat and substitution of short chain fatty acids to give a lower melting point fat. A molecular rearrangement process is described in U.S. Patent No. 2,684,377. This method offers the best possibility of reducing the melting point of the butter-fat without serious loss of material.

When regular whole milk containing unseparated butterfat is dried and the resulting whole milk powder is added to cold water below 100° F., the powder not only will not sink, but cannot even be stirred into solution with a spoon. It is necessary to separate the butterfat fraction having a cloud point below 85° F. to achieve a powder effectively dispersible in cold water. It is preferred that a butterfat fraction having a cloud point of about 60° F., or below be separated and made into