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DRY CREAMING POWDER

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This application is a continuation-in-part of my application Serial No. 352,593, filed May 1, 1953, entitled "Dry Creaming Powder."

The present invention relates to a powdered milk product for creaming liquids, such as coffee, tea and similar beverages, soups and other edible liquid food products.

The requirements of a dried creaming powder for use in coffee and other hot beverages and liquid food products are very severe, because of the high acidity of both brewed and instant coffee being somewhere in the pH range of 4.8 to 6.30 and at the same time served at hot temperatures in the range of 120° F. to 190° F. Both these conditions require that creaming agents be suitably prepared so when added to this coffee the product will disperse without feathering, oiling, scumming, floating, curdling or showing lack of homogeneity. These properties are difficult to secure in a product derived from milk in part or in whole or from analogous materials by reason of the instability of the constituents of the milk. They are particularly difficult to secure in a dried powdered product intended to be used in the same manner as the so-called "instant soluble" coffees and coffee substitutes; that is, by placing a roughly measured amount of the powder on the surface of the hot beverage or liquid, allowing the powder to wet and sink through the surface, and dispersing throughout the liquid by stirring. In such products, rapid solubility is only one of the required properties. The necessary requirements for a satisfactory creaming powder are, among others, the following.

(1) On adding the powder to a hot beverage or liquid, say at 180° F., the powder should dissolve very rapidly when added to a hot beverage or liquid, say at 180° F., this action taking place within a few seconds.

(2) A desirable product should leave no floating material or undispersed material after brief stirring with a spoon. A product of the most desirable type will sink immediately to the bottom of the cup or vessel containing the liquid, without leaving floating particles, and will, as indicated above, promptly disperse and produce a creaming effect on very brief stirring.

(3) The product must produce a whitening or coloring effect equivalent to that of coffee cream, to the extent desired by the user, when employed at temperatures ranging as high as 180° F. to 190° F.

(4) The fat content of the powder should be stable under these temperature conditions, so that oil droplets do not form and rise to the surface of the liquid.

(5) The protein content of the powder should also be stable under the temperature conditions referred to above, so that no formation of curd particles or "feathering" takes place in liquids having a pH in the acid range of 4.8 to 6.3.

(6) The product should not impart a material sweetening effect, or a heated, evaporated or cooked flavor when used in coffee, tea or other beverages or food products; nor should it take away or cover up the true flavor of the beverage or liquid in which it is used.

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None of the powder products commercially introduced heretofore has been able to satisfy all of the requirements set forth above. A commercially available spray dried or vacuum dried product comprising 25% to 45% skim milk solids, 15% to 40% fat and 35% to 60% lactose is taught to be useful as infant food. This food composition is stated to be readily soluble and dispersible in water. This product disperses in hot coffee in tests identical to those shown in the examples hereinafter set forth in about 10 to 17 minutes. In addition to slow dispersing, the product shows strong feathering. This product fails to meet the requirements 1, 2 and 5 enumerated hereinbefore.

Another powdered cream product, which has been available commercially, is prepared from skim milk which has been subjected to ion exchange treatment in order to remove calcium ions and alter the calcium to phosphorus ratios normally associated with skim milk. The product is prepared by combining butterfat with ion exchange treated skim milk, homogenize the mixture and spray drying the homogenizing mixture. This product when it has a calcium to phosphorus ratio in the range of 0.25 to about 0.55 is directly dispersible in hot coffee, i.e., can be added to coffee in the powdered form. Products having a calcium to phosphorus ratio of 0.55 to 0.9 are not directly dispersible in hot coffee. These latter cream products must be reconstituted into a liquid form before they can be dispersed in hot coffee without feathering and/or oiling.

The powder prepared in accordance with the present invention fully satisfies the enumerated requirements and has other desirable properties, as will be brought out hereinafter. As prepared in accordance with the present invention, the powder is a dried material, with a fat content, preferably butterfat, ranging from about 15% to about 42% and preferably in the order of 20% to 30%. The product includes milk solids resulting from the ion exchange treatment of fluid milk, either whole milk or skim milk, from which 55% to 85% of the calcium has been removed in the ion exchange treatment and in which the calcium to phosphorus ratio is in the range from 0.15 to 0.85. Such ion exchange treated fluid milk may be prepared, for example, by procedures of the character described in the patent to Louis H. Chrysler and Emory F. Almy, No. 2,503,866, granted April 11, 1950, and assigned to the assignee of the instant invention. As pointed out below, the milk solids with the low calcium to phosphorus ratio employed in the present invention may be secured in other ways, for example, by the use in whole or in part of commercial alkali metal caseinate, such as sodium or potassium caseinate, preferably of low salt content. In such case, the calcium to phosphorus ratio in the solids in the final product is still further reduced and may approach zero.

The product prepared in accordance with the present invention also includes added lactose, the amount of added lactose being in the range from 15% to 65% and preferably 30% to 65% of the total solids in the final powder. The total lactose in the final product may be in the range from about 30% to about 72%, and preferably is in the range from about 35% to about 65%. This added lactose changes the character of the condense so that solids content of 50% to 60% may be attained whereas the normal maximum concentration is about 40%. This increase in concentration not only helps efficiency of drying but permits production of dry particles of larger size, i.e. coarse particles of good melting character.

This addition of lactose is made in quantities more than just compensating for losses of lactose, for example,