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3,695,889

**EMULSIFIER SYSTEM FOR SUBSTITUTE DAIRY PRODUCTS**

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No Drawing. Filed June 5, 1970, Ser. No. 43,966

Int. Cl. A23c 11/00

U.S. Cl. 99-63

8 Claims

**ABSTRACT OF THE DISCLOSURE**

An emulsifier system useful in non-whipping type substitute food and dairy products which contain a higher ratio of polyunsaturated fats to saturates. The system comprises in combination polysorbate 60, propylene glycol monostearate, and a fatty acid lactylate alkali metal salt.

The present invention relates to an emulsifier system to be employed primarily in substitute food and dairy products containing polyunsaturated fats. More specifically, the invention relates to an emulsifier system which permits for a higher ratio of polyunsaturates to saturates in substitute food and dairy products than has been previously possible.

It has been demonstrated in the prior art that the addition of vegetable oils and fish oils containing a high percentage of unsaturated fatty acids to the diet causes a decrease in plasma cholesterol levels. When saturated fractions such as lard, butter and meats were added to the diet, the serum cholesterol rose. These elevated serum cholesterol levels are associated with atherosclerosis. The cholesterol esters of normal plasma are approximately 85% unsaturated while the cholesterol esters found in atherosclerotic plaque are largely saturated. The administration of unsaturated fatty acids changes the esterification of cholesterol toward the normal type of esters which are then less suitable for deposition on the aortic walls and are more easily metabolized and more soluble in the blood.

For these reasons and upon the recommendation on the American Heart Association, food and dairy companies involved in the so-called saturated fat market, i.e., hydrogenated cooking fat, lard, margarine, are expanding research for means to modify their present products so as to increase the safety and acceptance of such foods. The main objective of this research has been to produce substitute food and dairy products such as, for example, non-dairy creamers, filled milk and milk shakes, having a higher ratio of polyunsaturates to saturates than are presently available. In the case of commercially available substituted dairy products, the fat equivalent of butter is generally replaced by hydrogenated vegetable fats such as present in coconut and palm kernel oils. These oils are composed of mostly saturated higher fatty acids and are therefore still unsatisfactory. The reason for using vegetable oils containing the saturated fatty acids is because these acids are stable and the oils remain bland and edible for several years under ordinary storage conditions. This high level of saturation has also been necessary in order to protect the flavor of these substitute products during processing which involves the application of relatively high temperatures.

Attempts have therefore been made, particularly in

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the dairy industry, to incorporate higher levels of polyunsaturated fats into formulations which contain relatively high levels of total fat, i.e., to increase the ratio of polyunsaturates to saturates. These attempts have most often failed because emulsion systems which contain the relatively unstable polyunsaturated acids experience oxidated flavor changes when exposed to high temperatures or upon standing over a period of time. The temperature employed during the processing of the substitute dairy products is sufficiently high to bring about such flavor changes. This particular instability is the main reason that manufacturers have not been successful in substituting polyunsaturated fats for saturated fats in preparing non-dairy or substitute food products on a practical commercial basis.

It is therefore the object of this invention to provide an emulsifier system which will stabilize and maintain the flavor of polyunsaturated fats during processing.

It is a further object of this invention to provide substitute food and non-dairy products having a higher percentage of polyunsaturates than presently available products and which will maintain flavor and general stability over a prolonged period of time.

The non-dairy products of this invention are generally of the non-whipping type such as, for example, filled milk, non-dairy creamer cereal blends, and milk shakes. Their consistency is fluid rather than stiff or self-supporting.

The novel emulsifier system of this invention comprises a combination of three ingredients—polysorbate 60, propylene glycol monostearate and a fatty acid lactylate salt. It has been unexpectedly discovered that the combination of these compounds provides for a palatable and stable preparation containing a high degree of polyunsaturates. This combination of ingredients was found to stabilize polyunsaturated fats present in substitute food and non-dairy products when they were subjected to high temperatures such as required during processing and manufacture. Further, this emulsifier system permits substitute dairy products to maintain the bland flavor of the unsaturated fats over an extended period of time.

A further advantage of employing the emulsifier system of this invention is that it fully and uniformly incorporates a liquid fat in an oil and water emulsion. This results in an emulsion system which when homogenized will prevent fat creaming.

It has also been discovered that all three additives must be present in combination in order to achieve the advantages of stability and palatability noted above. If only one or two of the additives are employed, it results in a loss of emulsion stability. For example, a loss of the unsaturated fat flavor present in the oils resulted upon heating. Further, the flavor of the emulsifiers came through and a fat creaming was evident. Only when the additives are used in combination does the suspension result in the described stable preparation.

Preferably, the compounds will be present in the oil-water emulsion in an approximate 1:2:1 ratio of polysorbate 60 to propylene glycol monostearate to the fatty acid lactylate salt. The total concentration of these ingredients will be in an amount of from about 2% to about 20% of the total oil present. Most advantageously, the total concentration of the above emulsifiers will be