



159159

1

200103106-1
23 MAY 2001

TRANS FREE HARD STRUCTURAL FAT FOR
MARGARINE BLEND AND SPREADS

Description:

5

We hereby declare the invention for which we pray that a patent be granted for the product and the process by which it is performed which is particularly described by the following statements:-

10 The present invention is concerned with a Trans free hard structural fat suitable for the manufacture of low SAFA (Saturated Fatty Acid) poly/mono unsaturated margarine and spreads and fat blends for margarine/spreads using the above mentioned structural fat. This structural fat is made from selectively fractionated non-hydrogenated palm oil
15 fraction, which is interesterified with dry fractionated non-hydrogenated palm kernel fraction to obtain hard structural fat with high yield ratios that can be economically and commercially used as structural fat for the manufacture of Trans free low SAFA, poly unsaturated/mono unsaturated margarine/spreads.

20

Historically emulsified fat system in margarine/spreads has been designed to satisfy customer requirements such as significant cooling impact, a rapid sharp melt sensation, and no coated or waxy feel on the tongue. In addition, it should impart temperature cycling stability (heat stability) as
25 well as spreadability when taken out frequently from the refrigerators are the prominent features.

To achieve these objectives, margarine fat blend is being formulated using hard stocks derived by hydrogenation of liquid oils.

30

However, with the adverse effect of Trans fatty acids being published, consumers are looking for margarine / spreads with practically no Trans fatty acids.

35 This can be achieved by using fully hydrogenated fats as structural fat, which usually does not contain Trans fatty acid or very negligible amount.



G00002

Hydrogenation process is generally viewed as the main reason for the development of Trans fatty acids in oils and fats. Hence, there is a strong consumer perception against usage of and hydrogenated oil/fat in the food products including margarine / spreads.

5

Hence research work is being carried out for developing margarine/spreads using no hydrogenated oils in their hard stock at the same time looking at the possibility of reducing the saturated fatty acid levels (SAFA) in the products

10

Theoretical Considerations

The hard stock contributes triglycerides especially of the trisaturated type. A certain minimum quantity of these is essential to provide the "structural fat" and to prevent oiling out of the liquid oil. From the patent literature and general experience, this minimum quantity is around 6%. More is acceptable and desirable if the amount of H_3 tri-glycerides, and especially tristearin, is not greater than 2% otherwise poor mouth feel will result. Hence content of H_2M triglycerides is valuable, to give the structuring effect, hence the need for a lauric oil.

20

When the hard stock components are interesterified, the amounts of trisaturated triglycerides in the interesterified product are determined entirely by the content of saturated fatty acids in the blend. This relationship is very critical as shown by the results:

25

	% Saturated FA in the Oil blend	% Trisaturated Triglycerides After Interesterification
30	50	13
	60	22
	70	34
	80	51
	90	73

Taking sunflower oil as the PUFA oil to be used in the blend, at a level of 80% (SAFA 10.3%) then the hard stock should not contribute more than 11.76% SAFA to the final blend considering that the SAFA content of polyunsaturated margarine should not exceed 20%. If 20% of the hard stock were used for the margarine blend along with Sunflower oil as above (a high usage level) - and if we also want a minimum of 6% trisaturated Tgs in the final blend, it can be seen from the above table that the SAFA content of the hard stock must be about 67% so that interesterified hard stock has 30% trisaturated triglyceride. Assuming only 15% hard stock is used then the SAFA content of the hard stock must be about 74%, so that it has 40% trisaturated triglyceride after interesterification. These are minimum requirements and a higher amount of trisaturated Tgs would be desirable.

15

The usage of hard structural fat in the blend can be 5 to 25% and the liquid oil or its blends can be 95 - 75%.

Claims: -

1. A margarine blend and spread consisting of 60 - 95% of a liquid oil such as sunflower oil, Canola oil, soy oil, pea nut oil, rice bran oil, olive oil, safflower oil, corn oil or marine oil or the blend of any of the above liquid to be blended with a Trans free hard structural fat at 5 - 40% level whereby the said hard structural fat is made from selectively fractionated non-hydrogenated palm oil fraction, which is interesterified with lauric fat such as dry fractionated non-hydrogenated palm kernel fraction without using hydrogenation process and without using organic solvent or detergent for fractionation.
2. A margarine/spread fat blend according to claim 1, where the liquid oil blend has high poly/mono unsaturated level such that in the total fat blend the poly/mono unsaturation level exceeds 40% so that health claim such as high poly/mono unsaturated, low saturated fatty acid (SAFA) margarine/spreads can be made.
3. A hard structural fat according to claim 1 is produced without using hydrogenation process so that Trans fatty acid residue produced during the hydrogenation is eliminated.
4. A hard palm fraction according to claim 1 has a C16 carbon chain residue greater than 70% preferably greater than 80% and most preferably greater than 84%.
5. A hard palm fraction according to claim 1 has a melting point higher than 57 Deg C, preferably greater than 60 Deg C and can be flaked for easy handling because of its high melting point in spite of not being required to undergo hydrogenation and has a solid fat content of > 75% at 40 Deg C preferably > 80% solids at 40 Deg C.
6. A process according to claim 1 wherein palm fat/ palm oil or its stearin fraction is selectively dry fractionated by melt crystallization process to harvest the hard palm fraction with C16 level of > 75%, preferably > 83% with a total unsaturation level of < 15% preferably less than 10%.

7. A process according to claim 6 wherein palm fat/ oil is dry fractionated using two steps melt crystallization process, the first step is being performed between 20-25 Deg C, preferably between 22-24 Deg C, to obtain a medium hard palm fraction and the medium hard palm fraction is then once again dry fractionated between 45-55 Deg C, more preferably 49-52 Deg C depending of the iodine number of the first dry fraction, to harvest very hard palm fraction rich in C 16 fatty acids.
8. A process according to claim 6 in which the palm fraction in the second fraction step is separated in high pressure membrane type filter wherein a pressure of 10-35 bar is used, preferably > 20 bar, most preferably > 30 bar is used to inflate the membrane so as to remove the liquid fraction occluded in the hard fat, thus eliminating the requirement of solvent fraction method. This does not exclude use of high pressure hydraulic pressing of the cooled slab of palm oil fraction to obtain the same desired hard palm fat suitable for the manufacture of hard structural fat (a labor intensive process).
9. A margarine fat blend according to claim 1 wherein the hard structural fat is produced by interesterification reaction of hard palm fraction with hard palm kernel fraction, the resultant hard fat is not further fractionated but used as such as a hard structural fat, thus eliminating a further processing which in turn result in high yield of the structural fat at a lower cost.
10. A margarine fat blend according to claim 1 wherein the hard structural fat is produced by interesterification reaction of hard palm fraction with hard palm kernel fraction without having to further undergo fractionation process, thus eliminating the disposal problems of by-product fractions associated with such processing to obtain hard structural fat.
11. A margarine fat blend according to claim 1 where in the hard structural fat is produced by interesterification reaction of hard palm fraction with hard palm kernel fraction such a way that the hard structural fat has a trisaturated triglyceride of H_3 type of C 16 and above is less than 25% preferably less than 20%.