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PHOSPHATIDE PREPARATIONS

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The present invention relates to novel phosphatide preparations and it particularly relates to novel lecithin preparations.

Although not limited thereto, the present invention will be described in its application to vegetable lecithin, and particularly lecithin derived from soya beans and corn. The lecithin may either be oil-free lecithin or commercial lecithin, which latter is a waxy and oily substance comprising about 60 to 65% of soya phosphatides and 35 to 40% of soya oil. Commercial soya lecithin or phosphatides are a combination of the phosphatides, lecithin, cephalin and inositol. In the trade, however, this combination is referred to as commercial lecithin or merely as lecithin. In other words, commercial lecithin whether derived from soya beans or corn is a mixture of phosphatides.

It is among the objects of the present invention to provide novel phosphatide compounds and particularly novel soya lecithin combinations which are soluble in water and may be used as detergent and foaming agents, as frothing agents, as dispersing and emulsifying agents, and in various industries, such as the textile, leather, cosmetic, pharmaceutical and metal-working industries.

Another object is to prepare novel water soluble lecithin combinations which may be readily handled and mixed with detergents, pharmaceuticals and other technical products.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

It has now been found that sulfonated glyceride compounds may be combined with phosphatides or lecithin to form water soluble compounds. Apparently the phosphatide or lecithin may combine with these compounds through a sulfur linkage or through the sulfo groupings.

These compounds are most valuable when the sulfo compound includes a high molecular weight aliphatic chain or ethylene oxide condensate chain.

The most desirable compounds are formed by combinations of sulfonated glyceride oils and the phosphatide.

These compounds are obtained by heating the sulfo compounds with the phosphatide or lecithin,

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preferably in the presence of a glyceride or vegetable oil for one to six hours at 50° to 150° C.

Among the sulfo compounds that may be used are the sulphonated derivatives of waxes, glyceride oils, fatty alcohols, fatty acids and other fatty compounds containing aliphatic chains of 12 to 32 carbon atoms, and preferably 14 to 18 carbon atoms.

The most effective combinations are formed when the fatty chain has one or more double bonds and one or more hydroxyl groups.

These combinations cannot be obtained merely by mixing lecithin and a sulfonated fatty compound.

For example, if the sulfonated oils or other sulfonated compounds are mixed with soya lecithin or other phosphatides, mixtures are obtained which separate into milky or cloudy emulsions if diluted or mixed with water. Such mixtures show the characteristic reactions of the components contained therein and it is apparent that no compounds are formed.

However, upon heating for several hours to 70 to 100° C. the resulting compounds are completely soluble in water and do not form emulsions as such, but may be used as emulsifiers in combination with oils or fats. These products are excellent wetting and foaming agents.

Although equal amounts of lecithin and sulfonated compounds might be used or even excess of lecithin, it has been found in practice that an excess of sulfonated compounds by weight in proportion to the lecithin is desirable. If not enough sulfonated or sulfurated oils are used the resulting liquid may be cloudy but may be clarified by adding a small amount of a polyhydroxy-alcohol such as glycerol or propylene glycol, or their derivatives, or alkali metal phosphates, such as sodium hexametaphosphate, pyrosodium phosphate, sodium metaphosphate, and so forth.

The completion of the reaction is determined by dissolving a small amount of the combination in water to give a clear solution. The lecithin which is acetone insoluble will not be precipitated from such combination by acetone.

This shows that more than a physical or mechanical mixture results. Moreover the resulting product has much more effective detergent, foaming and frothing properties than would be expected from the additive properties of lecithin and sulfonated oils.

The resulting compound is an excellent detergent and foaming agent. It has been found useful as a foaming agent in soapless shampoos, as a frothing agent in ore flotation and as a dis-

persing, wetting, emulsifying and surface active agent in many fields.

Generally the sulfonated oil used may consist of the mono- or di-sulfo-derivatives of fatty acids, oils, waxes and fats containing 12 to 32 carbon atoms in the fatty chain. Sulfonated castor oil and soya oil are preferred.

Cottonseed oil, sperm oil, fish oils, fish liver oils, olive oil, Japan wax, lanolin, coconut oil, sesame oil, tea seed oil, corn oil, stearic acid, tallow, peanut oil or fatty acids derived therefrom or even corresponding mono- or di-fatty acid glyceride derivatives may also be used in sulfonated condition.

Sulfonated fatty alcohols may also be employed, such as sulfonated lauryl, myristyl, oleyl, stearyl and palmityl alcohols.

Example I

50 parts of oil free phosphatides are heated with an equal amount of sulfonated castor oil in a steam jacketed kettle and maintained at a temperature of 90° C. for several hours. The phosphatides slowly are dissolved in the oil and a clear homogeneous combination is obtained. The reaction is terminated when upon testing it is found that the mixture dissolves clearly in water. If the resulting product is allowed to stand it jells. After diluting with the same amount of water, a stable product is obtained which has excellent foaming and frothing properties.

Example II

30 parts of commercial soya lecithin are treated with 60 parts of sulfonated cod oil and are heated for six hours until the resulting combination gives a slightly hazy solution in water. The reaction is then terminated. The same amount of water is added and the slightly cloudy solution is cleared by the addition of 1% propylene glycol.

The sulfonated or sulfated di- or mono-glycerides or mono-glycol esters (partial glycol esters) of fatty acids, such as stearic, oleic, ricinoleic, or other fatty acids may also be used.

To give several examples using sulfo or sulfur containing anionic surface active compounds:

Example III

50 parts of corn oil lecithin are treated with 150 parts of sulfonated castor oil in the same way as described above. A water soluble product of the same general properties as above described results.

Example IV

50 parts of soya lecithin are mixed with 150 parts of the sulfated mixed fatty acid monoglycerides and treated in the same way as described above. A water soluble product of the same properties as described above results.

If it is desired to make an anhydrous product, the water may be removed under vacuum. With all water removed, the compound has jelly-like consistency.

Upon addition of water, the dehydrated jelly will immediately go into clear solution.

The temperature of dehydration should preferably be below 100° C. but over 70° C.

The combination appears to be a chemical compound of the lecithin and the sulfonated oil with the sulfo-groups serving to link the phosphatide residue and fatty chain or a new compound resulting through reesterification.

The exact configuration or character of the chemical compound produced is not known but

it is obtained by heating together commercial lecithin from corn or soya beans, which is actually a mixture of pure lecithin, cephalin, inositol, carbohydrates and other organic materials together with glyceride oil with a sulfonated glyceride, such as sulfonated castor oil or sulfonated cod oil at temperatures which may vary from 50 to 150° C. and for times which may vary from 1 to 6 hours.

In Example I the proportions are equal amounts of the phosphatides of sulfo compounds with a temperature of 90° C. for several hours.

In Example II there are 30 parts of the commercial mixture and 60 parts of the sulfonated oil, a one to two proportion by weight.

In Example III there are 50 parts of the phosphatide mixture obtained from corn and 150 parts of the sulfonated oil, a one to three proportion.

In Example IV there are 50 parts of the commercial mixture obtained from soya beans and 150 parts of the glycerides, again a one to three mixture.

It is clear, therefore, that the applicant uses between 1 to 3 parts of the sulfonated oil for each part of the commercial lecithin, which is not pure lecithin but which is a mixture of lecithin, cephalin and inositol.

The embodiment of the invention shown and described herein is to be considered merely as illustrative, as the invention is susceptible to variation, modification and change within the spirit and scope of the appended claims.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A method of making a phosphatide-sulfonated castor oil which comprises heating a phosphatide and a sulfonated castor oil for one to six hours at 50° to 150° C. there being about 1 to 3 parts by weight of sulfonated oil for each one part of phosphatide.

2. A compound composed of about 50 parts by weight of oil-free phosphatides and about 50 parts by weight of sulfonated fatty oil which has been heated at a temperature of 90° C. for several hours and which upon standing will gel and may be readily diluted with water to form a stable product having excellent foaming and frothing properties.

3. A phosphatide-sulfonated fatty oil compound prepared by heating a mixture of phosphatide and sulfonated fatty oil for one to six hours at 50° to 150° C. there being about 1 to 3 parts by weight of sulfonated oil for each one part of phosphatide.

4. A phosphatide-sulfonated fatty glyceride compound prepared by heating a sulfonated fatty glyceride with a phosphatide at 70 to 100° C. for several hours, 50 to 150 parts by weight of the sulfonated fatty glyceride being used for each 50 parts of the phosphatides.

5. A method of preparing a phosphatide-sulfonated fatty glyceride compound which comprises heating a mixture of a phosphatide and a sulfonated fatty glyceride until a clear homogeneous combination is obtained, said compound being prepared by heating at 70 to 100° C. for several hours, 50 to 150 parts by weight of the sulfonated fatty glyceride being used for each 50 parts of the phosphatides.

6. A commercial lecithin-sulfonated fatty glyceride compound prepared by heating equal proportions of lecithin and a sulfonated fatty glyceride

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eride for one to six hours at 50° to 150° C., said commercial lecithin containing about 60% to 65% of phosphatides and about 35% to 40% of soya oil.

7. A process of making a phosphatide-sulfonated fatty glyceride compound which comprises heating commercial lecithin containing about 60% to 65% of phosphatides and about 35% to 40% of soya oil with a sulfonated fatty glyceride, said compound being prepared by heating at 70 to 100° C. for several hours, 50 to 150 parts by weight of the sulfonated fatty glyceride being used for each 50 parts of the phosphatides.

8. A process of forming a phosphatide-sulfonated fatty glyceride compound which comprises heating a mixture of the phosphatides and sulfonated fatty glyceride until the resultant combination gives a slightly hazy solution in water and then diluting with water, said compound being prepared by heating at 70 to 100° C. for several hours, 50 to 150 parts by weight of the sulfonated fatty glyceride being used for each 50 parts of the phosphatides.

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9. A process of forming a phosphatide-sulfonated fatty glyceride compound which comprises heating a mixture of the phosphatides and sulfonated fatty glyceride until the resultant combination gives a slightly hazy solution in water and then diluting with water and finally clearing the solution by addition of a small amount of a glycol, said compound being prepared by heating at 70 to 100° C. for several hours, 50 to 150 parts by weight of the sulfonated fatty glyceride being used for each 50 parts of the phosphatides.

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