Claims:

1. A process for the transesterification/esterification of a fatty acid source with an alcohol, to form fatty acid alkyl esters, comprising reacting a fatty acid source and an alcohol or an alcohol donor in the presence of an immobilized lipase preparation, wherein the immobilized lipase preparation comprises at least one lipase immobilized on a hydrophobic porous support and the reaction medium contains an aqueous alkaline buffer solution at more than 2 % wt. of the fatty acid source, wherein said transesterification/ esterification are carried out simultaneously or sequentially.

2. The process of claim 1, wherein said aqueous alkaline buffer solution is a mild aqueous alkaline buffer solution.

3. The process of claim 1 or claim 2, wherein said aqueous alkaline buffer solution is contained at a quantity of up to any one of 30% wt. of the fatty acid source, up to 25% wt., 20% wt., 15% wt., 10% wt. or 5%wt. of the fatty acid source.

4. The process of any one of claims 1 to 3, wherein the aqueous buffer solution has a pH in the range of greater than 7 to about 11.

5. A process for the transesterification/esterification of a fatty acid source with an alcohol, to form fatty acid alkyl esters, comprising reacting a fatty acid source and an alcohol in the presence of an immobilized lipase preparation, wherein the immobilized lipase preparation comprises at least one lipase immobilized on a hydrophobic porous support and the reaction medium contains water at more than 2 % wt. of the fatty acid source, wherein said transesterification/esterification are carried out simultaneously or sequentially.

6. The process of claim 5, wherein the water is in the form of a water solution of dissolved salts with a pH of from 5 to 9 in the reaction medium.

7. The process of claim 5 or claim 6, wherein the reaction medium contains the water or water solution of dissolved salts at up to any one of 30% wt., 25% wt., 20% wt., 15% wt., 10% wt. or 5%wt. of the fatty acid source.

8. The process of any one of the preceding claims, wherein said alcohol is a short-chain alcohol or said alcohol donor is a mono-alkyl ester or a di-alkyl carbonate.

9. The process of any one of the preceding claims, wherein said at least one lipase is a lipase derived from any one *Rhizomucor miehei, Pseudomonas sp., Rhizopus niveus, Mucor javanicus, Rhizopus oryzae, Aspergillus niger, Penicillium camembertii, Alcaligenes sp., Acromobacter sp., Burkholderia sp., Thermomyces lanuginosus, Chromobacterium viscosum, Candida antarctica B, Candida rugosa, Candida antarctica* A, papaya seeds and pancreatin.

10. The process of any one of the preceding claims, wherein said immobilized lipase catalyzes the esterification of free fatty acids to yield fatty acid alkyl esters and water, and the transesterification of triglycerides and partial glycerides to yield fatty acid alkyl esters and glycerol.

11. The process of any one of the preceding claims, wherein said lipase preparation comprises at least two lipases, each separately immobilized on a hydrophobic support or both co-immobilized on the same hydrophobic support, and wherein said lipases possess identical or different regio-specificity.

12. The process of any one of the preceding claims, wherein said support is any one of hydrophobic aliphatic polymer-based support and hydrophobic aromatic polymer-based support, or said support is an inorganic support, which may be coated with hydrophobic organic material.

13. The process of any one of claims 1 to 5 and 8 to 12, wherein said aqueous alkaline buffer solution is a solution of an inorganic alkaline salt, optionally wherein said alkaline buffer solution is a solution of any one of an alkaline metal hydroxide, carbonate, bicarbonate, phosphate, sulfate, acetate, fatty acid carboxylates and citrate, a primary, secondary and tertiary amine, and any mixture thereof, or said aqueous alkaline buffer solution is an organic base, optionally a weak base selected from sodium or potassium bicarbonates and carbonates.

14. The process of any one of claims 1 to 4 and 8 to 13, wherein said alkaline buffer solution is added to said fatty acid source in a premixing stage or directly to the reaction medium; or wherein the fatty acid source is first mixed with said alkaline buffer solution, the mixture is then treated with said immobilized lipase preparation, followed by adding said alcohol and allowing the reaction to proceed under suitable conditions until said fatty acid source is converted to fatty acid esters.

15. The process of any one of the preceding claims wherein said fatty acid source is any one of plant oil, animal fat, algal oil, fish oil, waste oil and any mixtures thereof.

16. The process of any one of the preceding claims wherein said fatty acid source comprises free fatty acids, mono-, di- or tri-glycerides, their mixtures at any ratio, in the absence or presence of other minor fatty acid derivatives such as phospholipids and sterol esters, wherein said fatty acid

source is unrefined, refined, bleached, deodorized or any of their combinations.

17. The process of any one of claims 1 to 16, wherein said alcohol is a C_1-C_6 alkyl alcohol, or C_1-C_4 alkyl alcohol, which can be any one of methanol or ethanol, or said alcohol is a medium-chain C_6-C_{10} fatty alcohol or a long-chain C_{12}-C_{22} fatty alcohol.

18. The process of any one of claims 1 to 17, wherein said alcohol is methanol and said resulting fatty acid esters are fatty acid methyl esters.

19. The process of any one of the preceding claims, wherein said immobilized lipase is used in continuous stirred-tank reactors or in packed-bed column reactors operating in batch or continuous modes.

20. The process of any one of claims 1 to 19, conducted in a system for the transesterification/esterification of a fatty acid source with an alcohol, to form fatty acid alkyl esters, comprising:
a reaction vessel configured for reacting a reaction medium including a fatty acid source and at least one of an alcohol and an alcohol donor in the presence of an immobilized lipase preparation, wherein the immobilized lipase preparation comprises at least one lipase immobilized on a hydrophobic porous support and the reaction medium contains at least one of an aqueous alkaline buffer solution and water, wherein said transesterification/esterification are carried out simultaneously or sequentially.