Claims:

1. Process for preparing fatty acids by hydrolysis of fatty acid alkyl esters, especially fatty acid methyl esters (FAME), or of fatty acid triglycerides, comprising the following steps:

a) providing the fatty acid alkyl esters or the fatty acid triglycerides,

b) reacting the fatty acid alkyl esters or the fatty acid triglycerides with water under hydrolysis conditions at temperatures of at least 200°C, where the pressure is chosen such that the water is in the liquid phase and where no external substance extraneous to the process is added as homogeneous or heterogeneous catalyst,

c) discharging a hydrolysis product comprising free fatty acids (FFA), water, unconverted fatty acid alkyl esters and the corresponding alkanol, especially methanol, or unconverted fatty acid triglycerides and glycerol,

d) feeding the hydrolysis product to a phase separation apparatus and separating the hydrolysis product under phase separation conditions into a light phase comprising free fatty acids and unconverted fatty acid alkyl esters or unconverted fatty acid triglycerides and a heavy phase comprising water and methanol or glycerol,

e) feeding the light phase into a first separation apparatus that works by a thermal separation process and separating the light phase into a first separation product enriched in free fatty acids and a second separation product enriched in unconverted fatty acid alkyl esters or in unconverted fatty acid triglycerides, the separation being conducted in such a way that the second separation product further comprises a proportion of free fatty acids,

f) discharging the first separation product as FFA product,

g) recycling at least a portion of the second separation product to reaction step b).

2. Process according to Claim 1, characterized in that the separation of the light phase (step e)) and/or the recycling of at least a portion of the second separation product to reaction step b) (step g)) are effected in such a way that, during reaction step b), the proportion of free fatty acids, based on the proportion of fatty acid alkyl ester or fatty acid triglycerides, is > 0% to 10% by weight, preferably 0.1% to 8% by weight, most preferably 0.5% to 5% by weight.

3. Process according to Claim 1 or 2, characterized in that reaction step b) is conducted at a temperature of at least 220°C, preferably at least 240°C, most preferably at least 260°C.

4. Process according to any of Claims 1 to 3 for preparation of fatty acids by hydrolysis of fatty acid methyl esters (FAME), characterized in that the methanol-comprising heavy phase obtained in step d) is fed to a second separation apparatus that works by a thermal separation process and separated into a methanol-enriched third separation product and a water-enriched fourth separation product, the third separation product being discharged from the process as methanol product and the fourth separation product being at least partly recycled to reaction step b).

5. Process according to any of Claims 1 to 3 for preparation of fatty acids by hydrolysis of fatty acid methyl esters (FAME), characterized in that the hydrolysis product obtained in step b) is first fed to the second separation apparatus in which a methanol-enriched top product is selectively separated from the hydrolysis product and discharged from the process as methanol product.

6. Process according to Claim 5, characterized in that the second separation apparatus is configured as a flash stage which is preferably configured and operated in an adiabatic manner.

7. Process according to Claim 5 or 6, characterized in that the methanol-depleted hydrolysis product is fed to the phase separation apparatus and separated therein under phase separation conditions into a light phase comprising free fatty acids and unconverted fatty acid alkyl esters and a heavy phase comprising water and methanol, the heavy phase being at least partly recycled to reaction step b) and the light phase being fed to the first separation apparatus.

8. Process according to any of the preceding claims, characterized in that the phase separation conditions comprise the cooling of the hydrolysis product or of the methanol-

depleted hydrolysis product to a temperature of ≤ 220°C, preferably ≤ 200°C, most preferably ≤ 180°C.

9. Process according to Claim 8, characterized in that the cooling is brought about by means of a cooling apparatus upstream of the phase separation apparatus and/or by virtue of the separation of the methanol-enriched top product from the hydrolysis product being conducted adiabatically.

10. Process according to any of the preceding claims, characterized in that the ratio of water to fatty acid methyl ester in the reaction of fatty acid methyl ester with water in step b) is at least 2 mol/mol, preferably at least 10 mol/mol, most preferably at least 20 mol/mol.