

Tab. 1: Composition of glycerol phase (in wt.%)

type of sample	glycerol	soaps	KHCO ₃	K ₂ CO ₃	water	methanol	esters
I	56.4	17.1	1.0	0.8	14.0	1.9	8.8
II	51.3	21.8	0.5	0.8	11.7	4.6	9.3
III	58.9	16.8	0.8	1.0	14.1	2.2	6.2

Tab. 2: Composition of CGP and yield of precipitate following neutralization with different acids

acid	yield of precip. (%)	yield of CGP (%)	glycerol (wt.%)	acid (wt.%)	salt (wt.%)	water (wt.%)	methanol (wt.%)
sulphuric	99.8	52.8	88.1	0.19	0.1	10.8	0.55
hydrochloric	50.6	64.9	80.5	0.07	7.6	11.5	0.46
phosphoric	87.1	64.4	83.9	0.18	1.8	13.2	0.52
acetic	0	59.0	82.3	0.45	12.2	4.2	0.48

Tab. 3: Composition of OP after neutralization with different acids

acid	yield of OP (%)	density (g/cm ³)	acid number (mgKOH/g)	free fatty acids (wt.%)	esters (wt.%)	others (wt.%)
sulphuric	26.0	0.899	107	53.4	46.1	0.5
hydrochloric	24.1	0.899	101	50.7	48.9	0.4
phosphoric	30.9	0.899	105	52.3	47.4	0.3
acetic	31.2	0.952	86	43.3	56.3	0.4

Tab. 4: Comparison of the utility of different acids for purification of GP (sign plus means that the process was carried out without problems)

acid	neutralization	precipitation	filtration	separation	separation time (h)
sulphuric	+	+	-	-	9-10
hydrochloric	+	-	-	-	2-3
phosphoric	+	+	+	+	0.5
acetic	-	-	-	-	9-10

Tab. 5: Composition of concentrated glycerol phase

molar ratio KOH : esters	yield (%)	glycerol (wt.%)	H ₃ PO ₄ (wt.%)	KH ₂ PO ₄ (wt.%)	water (wt.%)	methanol (wt.%)	others (wt.%)
1:1	62.5	84.7	0.21	2.18	12.1	0.46	0.35
1.2:1	63.8	85.1	0.25	2.62	11.1	0.37	0.56

Tab. 6: Composition of organic phase

molar ratio KOH : esters	yield (%)	density (g/cm ³)	acid number (mgKOH/g)	free fatty acids (wt.%)	esters (wt.%)	others (wt.%)
1:1	23.2	0.88	190	95	4.8	0.2
1.2:1	19.9	0.88	199	99.5	0	0.5