

SPLITTING OF LOW ERUCIC RAPESEED OIL

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Low erucic rapeseed oil can be a valuable raw material because of its high content of oleic acid.

However, more frequently raw material used for technical purposes isn't straight oil but fatty acids separated from it. There are some different methods of obtaining these acids. At our Institute, we have studied the process of acids' isolation from low erucic rapeseed oil by non-catalytic hydrolysis under high pressure. The influence of hydrolysis' conditions upon the degree of splitting and upon the fatty acid composition, mainly changes of the composition of unsaturated compounds, has been examined.

The oil applied to our researches dated from 1985th crops. Some data of using oil are shown in table 1.

Table 1. Data of applying low erucic rapeseed oil.

Specification	Content
Iodine value /by Hanus method/	115,5
Acid value mg KOH/g	6,7
Saponification value mg KOH/g	179,9
Fatty acid composition m%	
C ₁₆	4,2
C _{16:1}	0,6
C ₁₈	0,9
C _{18:1}	49,8
C _{18:2}	23,2

Table 1. continuation

Specification	Content
C _{18:3} + C ₂₀	10,7
C _{20:1}	5,5
C _{22:1}	5,1

The experiments have been carried out using an autoclave made in Hungary /Lampart/, working capacity 3 litres fitted with a magnetic stirrer /number of strokes 9-11/min/.

The splitting process has been run over periodically in two steps.

The pressure of 2,0 and 3,0 MPa and suitable temperatures of 200 and 230°C have been used.

The ratio water - fatty has been as follows:

- for the 1th step of the splitting process 0,8 + 1,0
and 1,2 + 1,0
- for the 2nd step of the splitting process 0,8 + 1,0
and 1,0 + 1,0

The experimental time of the carrying process has been 2, 3 and 4 hours for each stage.

The obtained results have shown that there is no essential influence of pressure, the quantity of water and process's time upon the changes of the fatty acids' composition, mainly for the unsaturated acids.

On the other hand, the significant influence of those parameters on the degree of the splitting process and on the content of glycerine in the crude glycerine has been stated for an individual step.

The most profitable results for two - step splitting of low erucic rapeseed oil have been obtained in the following conditions:

- the 1th step of the splitting process
 - pressure 3,0 MPa
 - temp. 230°C
 - time 3 hours
 - water/fat ratio 1,2 : 1,0

- the 2nd step of the splitting process

- pressure 3,0 MPa
- temp. 230°C
- time 3 hours
- water/fat ratio 1,0 : 1,0

The characterization, crude fatty acids composition and the content of glycerine in crude glycerine obtained from splitting of low erucic rapeseed oil, under mentioned conditions are announced in table 2.

Table 2. The characterization of fatty acids and crude glycerine.

Products of splitting				
Characterization	fatty acids		crude glycerine	
	after the 1th step	after the 2nd step	after the 1th step	after the 2nd step
Iodine value /by Hanus method/	117,5	119,6	-	-
Acid value mg KOH/g	165,7	185,3	-	-
Saponification value mg KOH/g	190,8	194,2	-	-
Degree of splitting in %			-	-
Fatty acid composition in %:				
C ₁₆	4,2	4,2	-	-
C _{16:1}	1,0	0,6	-	-
C ₁₈	1,2	1,2	-	-
C _{18:1}	49,9	49,3	-	-
C _{18:2}	24,8	24,1	-	-
C _{18:3} + C ₂₀	11,1	12,9	-	-
C _{20:1}	3,4	4,2	-	-
C _{22:1}	4,4	3,7	-	-
Glycerine content in %	-	-	6,4	2,6