

Application of REAXIS® Catalysts in the Production of a Mixture of Mono- and Diglycerides of Stearic Acid

Formulation

Raw material	weight (g)	mol
Glycerine	92.1 g	1.0
Stearic acid	339.5 g	1.2
Catalyst		0.1 % or 0.05 %

Procedure

The raw materials are filled into a nitrogen-flooded 1 l four-necked flask and melted. The catalyst is added to the melt at 100 - 120° C and dispersed in the reaction mixture by vigorous stirring. The temperature is rapidly increased until the reaction starts; the reaction water formed is separated via a distillation bridge and the reaction temperature is gradually increased to 200° C, thereby ensuring continuous distillation. The reaction is completed once a residual acid value of < 5 has been reached.

Results

The esters produced with the aid of REAXIS® products are of excellent quality, the end products are light in color and odor-free. The distribution of Mono- and Diglycerides in the reaction product is similar to the distribution of a non-catalyzed system.

Product properties after an acid value < 5 is reached

Property	Test Method	Dimension	No Catalyst	REAXIS® C160 (0.1 %)	REAXIS® C188 (0.05 %)	Tetrabutyl Titanate (0.1 %)
Hydroxyl number	DGF/C-V 17 a	mg KOH/1 g	208	193	196	202
Acid value	DGF/C-V 2	mg KOH/1 g	6.5	2.0	2.2	4.1
Melting range	DGF/IV-3c	° C	58 - 61	58 - 61	58 - 61	58 - 61
Color	comparison	-	-	+	+	0
Reaction time	Measured from start of Condensation	hours	8	3	3	5

+ = white to pale ivory 0 = ivory to light brown - = light brown

Study of the Reaction Sequence

REAXIS® C160 and REAXIS® C188 display a high level of catalytic activity from the beginning of the reaction. This activity is maintained even with low residual acid values.

Reaction time (hours)	REAXIS® C160 (0.1 %)	REAXIS® C188 (0.05 %)	Tin (0.05 %)	Tetra-butyl Titanate (0.1 %)	-
1	34.2	30.5	55.8	39.7	62.6
2	5.5	4.1	9.8	16.4	32.8
3	2.0	2.5	6.7	9.4	21.9
4			5.8	5.6	16.5
5			4.9	4.1	13.5
6					11.0
7					9.2