

CONTENTS

Acknowledgements	2
ABSTRACT	3
RESUMÉ	5
List of Figures.....	10
List of Tables	12
List of Symbols and Abbreviations	14
1 STATE OF THE ART	16
1.1 Monoacylglycerols	16
1.2 MAG application	17
1.2.1 Food industry.....	18
1.2.2 Pharmaceutical industry	19
1.2.3 Other industrial application	21
1.3 MAG preparation.....	22
1.3.1 Hydrolysis	23
1.3.2 Esterification	24
1.3.3 Alcoholysis.....	27
1.3.4 Glycerolysis.....	27
1.3.5 Acidolysis.....	30
1.3.6 Fatty acid addition to glycidol by the epoxy ring opening.....	31
1.4 Chromatography	33
1.4.1 Chromatographic techniques applicable for lipid analysis.....	34
1.4.2 Molecular distillation of MAGs	40

2	AIMS OF THE WORK	41
3	EXPERIMENTAL PART	42
3.1	Materials	42
3.2	Preparation of catalysts from fatty acid and chromium(III) chloride hexahydrate ($\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$)	42
3.3	Other catalysts	43
3.4	Preparation of MAGs – the reactions of fatty acids with glycidol	43
3.4.1	The reaction conversion determination	44
3.5	Purification of MAGs by recrystallization from ethanol	46
3.6	High performance liquid chromatography.....	47
3.6.1	Preparation of sample solutions for HPLC.....	47
3.7	Thin-layer chromatography	48
3.7.1	Developing chamber.....	48
3.7.2	TLC	48
4	RESULTS.....	49
4.1	Selection of an effective catalyst and optimization of its preparation conditions.....	49
4.2	Testing of other catalysts.....	58
4.3	MAG preparation with the use of chromium acetate hydroxide (CAH) and optimization of reaction conditions.....	59
4.3.1	MAG preparation from palmitic acid.....	59
4.3.2	MAG preparation from caprylic acid	60
4.3.3	MAG preparation from oleic acid	61
4.3.4	MAG preparation from capric acid	65
4.3.5	MAG preparation from acetic acid.....	69

4.3.6	MAG preparation from 1-naphthylacetic acid	70
4.4	High performance liquid chromatography.....	72
4.4.1	Calibration of the system for fatty acids.....	73
4.4.2	Calibration of the system for MAGs	75
4.4.3	HPLC of MAGs.....	77
4.5	Thin layer chromatography	78
5	CONCLUSIONS	80
6	REFERENCES	83
7	PUBLICATIONS:	93
8	PROJECTS:.....	95
	CURICULUM VITAE	96