

CLEAN LABEL EMULSIFIERS

STRATEGIES TO GROW YOUR BUSINESS

Prepared by:

CPL Business Consultants

Innovation Centre, 99 Park Drive, Milton, Oxfordshire, OX14 4RY
Tel: +44 1865 257 252, info@cplconsult.com, www.cplconsult.com

Dr Matthew Jones
Dr Robert Harwood

TABLE OF CONTENTS

OBJECTIVE	1
SCOPE	1
ABOUT THIS REPORT	1
ABOUT THE SUMMARY REPORT	1
ABOUT THE REFERENCE REPORT	1
PRINCIPAL FINDINGS	3
OPPORTUNITY STUDY	3
VOICE OF CUSTOMER	3
<i>Clean Label Trend</i>	3
<i>Key Targets for Replacement</i>	4
<i>Options for Clean Label Emulsification and Key Challenges</i>	5
MARKETS	7
WORKSHOP	8
CONCLUSIONS	10
RECOMMENDATIONS	11
OPPORTUNITIES IN CLEAN LABEL EMULSIFIERS	12
METHOD	12
NON-PARAMETRIC ANALYSIS MODEL FOR OPPORTUNITIES	13
NATURAL EMULSIFIERS	19
<i>Emulsion and Foam Formation</i>	19
<i>Emulsion Stability</i>	19
ANIMAL PROTEINS	20
PLANT PROTEINS	23
MICROBIAL PROTEINS	28
POLYSACCHARIDES	31
PHOSPHOLIPIDS	39
OTHER LIPIDS	43
SAPONINS	45
POLYPHENOLS	45
OTHERS	46
VOICE OF CUSTOMER	48
CONTACT SUMMARY	48
<i>Market Estimates of Emulsifiers and Inclusion Levels</i>	48
<i>Clean Label Trend</i>	49
<i>Limitations of Existing Emulsifiers</i>	53
<i>Options for Clean Label Emulsification</i>	55
<i>Challenges in Developing and Using Clean Label Emulsifiers</i>	58
<i>Desired Attributes/Properties Sought in Emulsifiers</i>	61
44 CONTACT REPORTS	63
EMULSIFIERS MARKET	126
<i>Markets by Region</i>	126
<i>Applications</i>	128
<i>Pricing</i>	129
MARKET BY EMULSIFIER TYPE	131
<i>Lecithin</i>	132
<i>Mono- and Diglycerides</i>	134
<i>Stearyl Lactylates</i>	135

WORKSHOP.....	136
<i>Clean Label Keywords</i>	<i>136</i>
<i>Most Relevant Categories.....</i>	<i>137</i>
<i>Rating of Existing Options.....</i>	<i>138</i>
<i>Must Haves and Nice to Haves.....</i>	<i>139</i>
<i>Main Challenges.....</i>	<i>139</i>
<i>Emulsifier Brainstorming and Prioritisation.....</i>	<i>141</i>
PRE-WORK.....	146
<i>Challenges in Developing a Clean Label Emulsifier.....</i>	<i>146</i>
<i>Effectiveness of Emulsifiers and Challenges of Replacing Them</i>	<i>146</i>
APPENDIX.....	159
ANIMAL PROTEINS	159
PLANT PROTEINS.....	159
MICROBIAL PROTEINS.....	161
POLYSACCHARIDES	161
PHOSPHOLIPIDS AND OTHER LIPIDS	163
POLYPHENOLS.....	164
OTHERS.....	164

TABLES

TABLE 1	CLASSIFICATION OF FACTORS NOR NON-PARAMETRIC ANALYSIS	13
TABLE 2	CPL'S NON-PARAMETRIC ANALYSIS IN FULL	15
TABLE 3	NON-PARAMETRIC ANALYSIS COMMENTS AND PRIORITISATION.....	17
TABLE 4	TYPICAL USAGE RATES OF EMULSIFIERS BY APPLICATION	82
TABLE 5	COMMON EMULSIFIERS AND THEIR ROLE	99
TABLE 6	BELDEM ENZYMES FOR THE MILLING, BAKING AND BISCUIT INDUSTRIES	110
TABLE 7	FOOD HYDROCOLLOIDS MARKET	116
TABLE 8	TEXTURANTS MARKET ESTIMATES BY TYPE	116
TABLE 9	EMULSIFIERS MARKETS BY REGION AND APPLICATION CATEGORY	127
TABLE 10	GLOBAL EMULSIFIERS MARKET BY APPLICATION	129
TABLE 11	EMULSIFIER PRICES	129
TABLE 12	FOOD GRADE EMULSIFIER PRODUCT PRICES	130
TABLE 13	GLOBAL FOOD EMULSIFIERS MARKET VOLUME BY TYPE (KT).....	131
TABLE 14	MARKET VALUE FOR NATURAL AND SYNTHETIC EMULSIFIERS.....	131
TABLE 15	GLOBAL PACKAGED FOOD EMULSIFIERS MARKET VOLUME BY TYPE.....	132
TABLE 16	GLOBAL LECITHIN MARKET VALUE BY REGION.....	132
TABLE 17	LECITHIN MARKET VOLUMES BY CATEGORY	133
TABLE 18	LECITHIN VOLUMES IN BAKED GOODS	133
TABLE 19	CLEAN LABEL WORKSHOP EXPERT PANEL.....	136
TABLE 20	MUST HAVES AND NICE TO HAVES FOR EMULSIFIERS ACROSS THE VALUE CHAIN	139
TABLE 21	EMULSIFIERS USED IN SELECT CATEGORIES AND KEY EMULSIFICATION CHALLENGES	140
TABLE 22	LONG LIST OF CLEAN LABEL EMULSIFIER OPTIONS	142
TABLE 23	APPLICATIONS CLEAN LABEL EMULSIFIER OPTIONS	143
TABLE 24	EXPERT PANEL'S NON-PARAMETRIC ANALYSIS IN FULL.....	145
TABLE 25	EFFECTIVENESS OF EXISTING EMULSIFIERS	147
TABLE 26	COMMENTS OF EMULSIFIER PERFORMANCE AND USES IN DIFFERENT FOOD CATEGORIES	148
TABLE 27	MAIN CHALLENGES WHEN REPLACING EXISTING EMULSIFIERS	152

FIGURES

FIGURE 1 WATER-BINDING CAPACITIES OF DIFFERENT FIBRES, STIRRED WITH A WHISK..... 36

FIGURE 2 FOOD EMULSIFIERS MARKET SHARE BY REGION (\$M)..... 127

FIGURE 3 EUROPEAN EMULSIFIER MARKET BREAKDOWN BY VALUE..... 128

FIGURE 4 US EMULSIFIER MARKET BREAKDOWN BY VALUE 128

FIGURE 5 MONO- AND DI-GLYCERIDES MARKETS BY APPLICATION (KT)..... 134

FIGURE 6 MONOGLYCERIDES MARKET BY REGION (\$M)..... 134

FIGURE 7 FOOD AND BEVERAGE CATEGORIES FOR WHICH CLEAN LABEL IS MOST RELEVANT 137

FIGURE 8 RATING OF EMULSIFIERS BY FUNCTIONAL AND PERCEPTION OF CLEAN LABEL 138