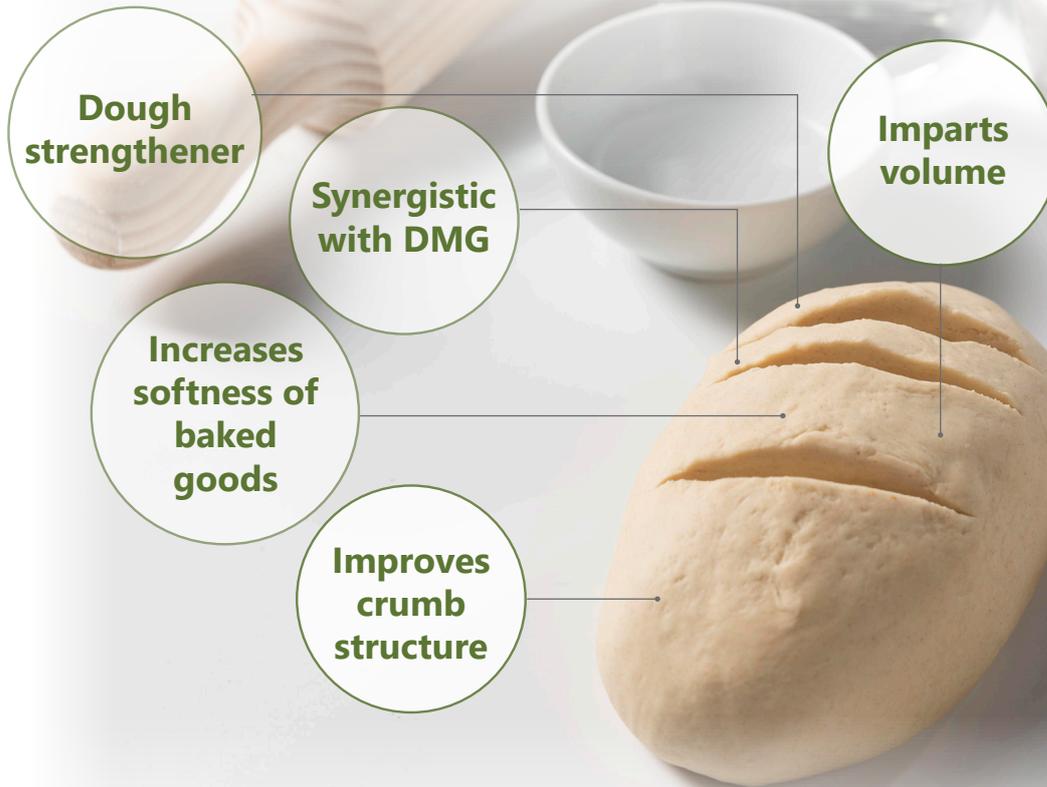


EkÖLITE SL SERIES

SODIUM STEAROYL LACTYLATES



Bakery : Bread Introduction

Ekölite SL series Sodium Stearoyl Lactylates are anionic emulsifiers which are commonly used in bakery and flour applications which imparts functionality at both dough stage and in the finished baked product.

- At dough stage, it improves dough tolerance against mechanical shocks which is typical at the production floor, and improves dough stability, elasticity and extensibility.
- Post baking, **Ekölite SL series** shows improvements in crumb structure, softness, retrogradation, symmetry and volume.

Ekölite SL series Sodium Stearoyl Lactylates and Ekömul series Distilled Monoglycerides work synergistically in creating superior bakery improver formulations.

PRODUCT NAME

- Ekölite SL 68 S
- Ekölite SL 70 S
- Ekölite SL 68 R
- Ekölite SL 70 R



Winner of
Frost & Sullivan's
2016 Best Practices Award
Entrepreneurial Company
of the Year



Winner of
Frost & Sullivan's
2018 Best Practices Award
Food Ingredients
Company of the Year

Bakery: Dough Stage

Ekölite SL series has strong ionic properties which enables the formation of strong complexes with both protein and starch in bread applications. **Ekölite SL series** is designed to maximize lactylate polarity in order to provide optimum functionality. **Ekölite SL series** is very hydrophilic hence hydrates readily in water at ambient temperature.

The protein aggregating ability of **Ekölite SL series** helps in the formation of a robust gluten matrix where it helps to improve dough handling properties. **Ekölite SL series** helps to improve the dough tolerance towards mechanical shock. In addition, the use of **Ekölite SL series** improves the dough mixing tolerance and machinability.

Improved Dough Tolerance

SAMPLES	DOUGH CONDITION BEFORE MECHANICAL SHOCK (TOP VIEW)	DOUGH CONDITION AFTER MECHANICAL SHOCK (TOP VIEW)
REFERENCE SAMPLE (WITHOUT EMULSIFIER)		
EKÖLITE SL 68 S (0.3% DOSAGE)		
EKÖLITE SL 70 S (0.3% DOSAGE)		

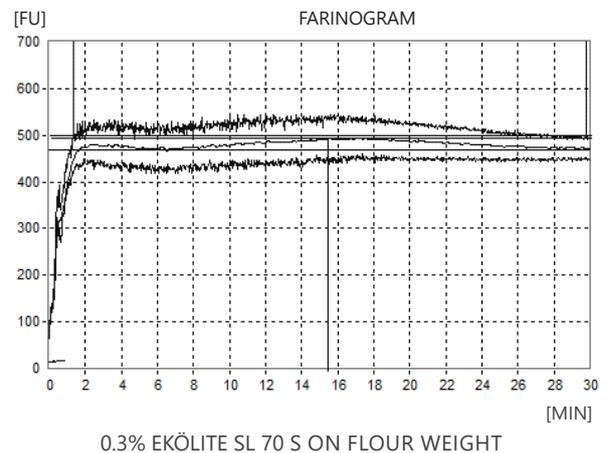
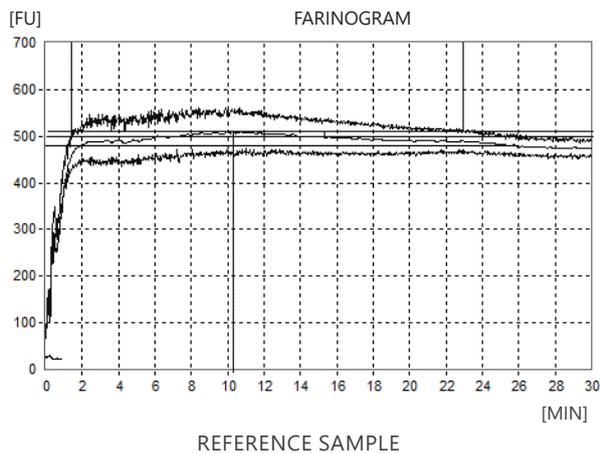
Note: Dough are subjected to a controlled drop test.

Improved Dough Properties

Farinographs and extensographs are tools used to measure dough rheological properties. Farinographs are used to measure water absorption, flour stability & tolerance under mixing. Extensographs are used to measure the

extensibility and resistance to extension (elasticity) of the dough. The improvement in dough properties with the use of **Ekölite SL series** can be demonstrated below:

a) Farinogram



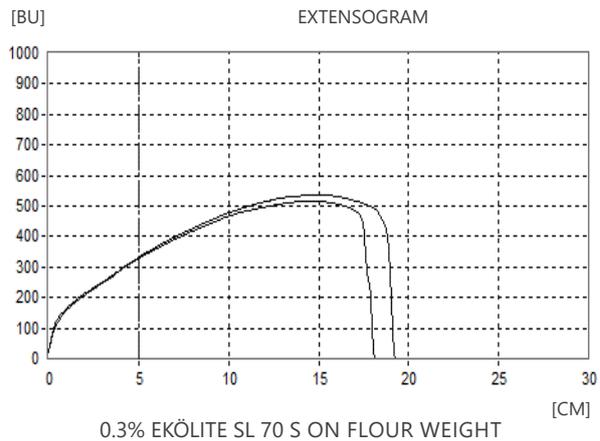
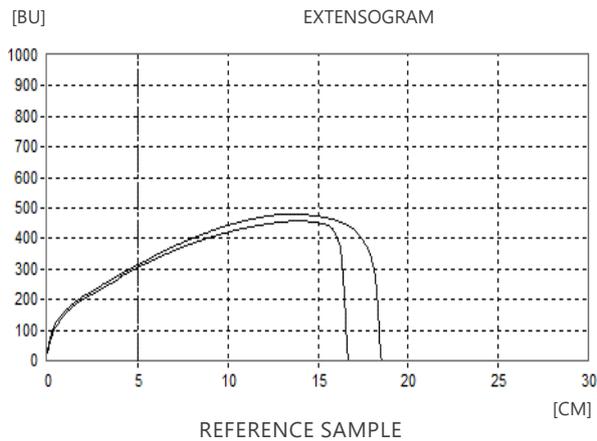
Note: AACC Standard Method 54-21 Farinograph Method for Flour

FARINOGRAPH	REFERENCE	EKÖLITE SL 70 S
Water absorption (%)	66.1	65.9
Development Time (min)	10.3	15.5 ↑
Stability (min)	21.6	28.4 ↑
Departure Time (min)	23	29.8 ↑

The increase in development time, stability and departure time through the addition of **Ekölite SL series** shows improved dough strength, thus increasing dough tolerance against over-mixing during dough mixing stage. The

addition of **Ekölite SL series** does not have a statistically significant effect on water absorption as the difference to the reference sample is lesser than ± 0.5%.

b) Extensogram



Note: AACC Standard Method 54-10 Extensigraph Method

EXTENSOGRAF	REFERENCE	EKÖLITE SL 70 S
Extensibility (cm)	17.6	18.7 ↑
Max Height (BU)	468	526 ↑

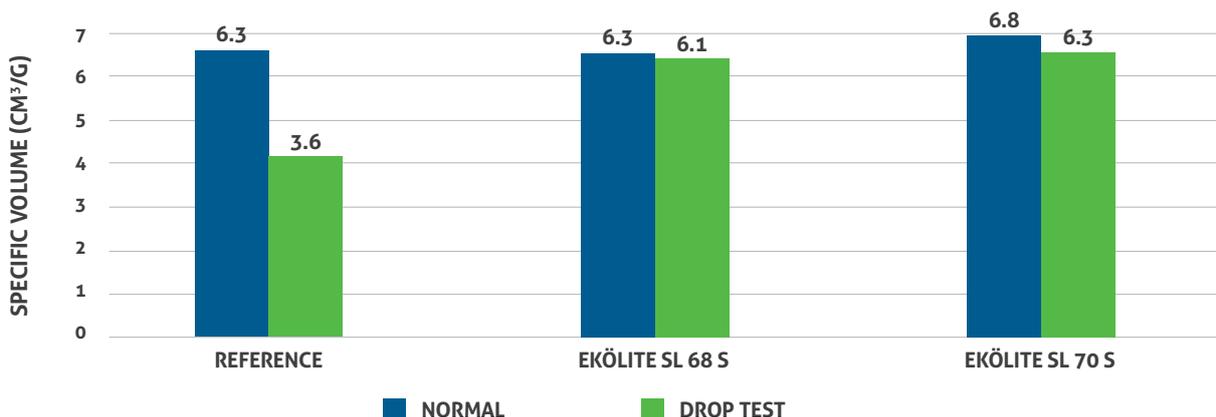
From the extensogram, the addition of Ekölite SL series improves the elasticity and extensibility of the dough.

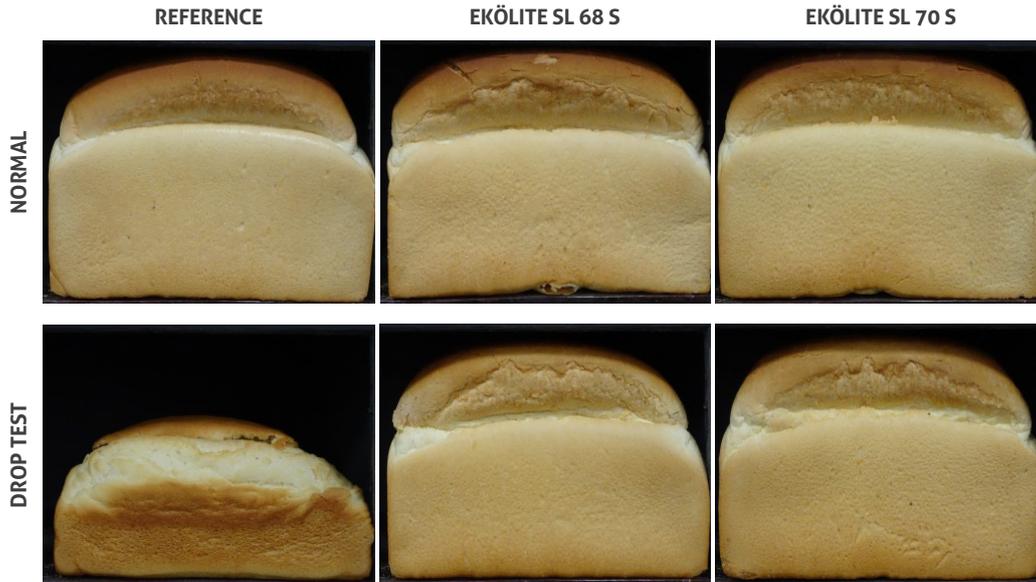
Bakery: White Sandwich Bread

Interaction between **Ekölite SL series** and protein in bread dough results in increased dough viscosity, better gas retention and therefore better bread volume enhancement. Additionally, **Ekölite SL series** aids in improving crumb structure of bread.

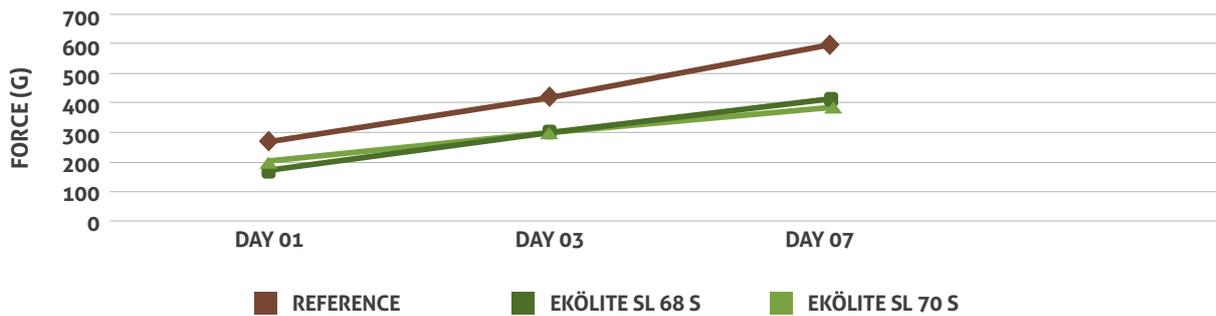
The interaction between **Ekölite SL series** and starch forms an insoluble starch and lactylate complex. This complex retards retrogradation and reduces staling in bakery products. Thus, **Ekölite SL series** provides a softening effect and extends shelf life of baked goods.

**Specific Volume
Different Lactic Acid Content SSL**





**Crumb Softness
Different Lactic Acid Content SSL**



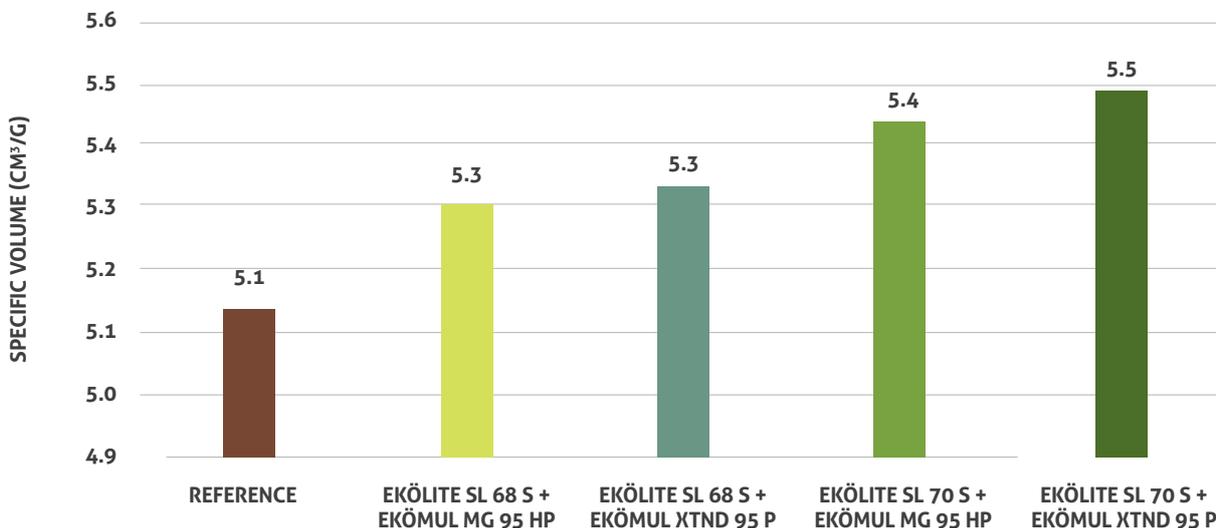
Note:

Test conducted with white sandwich bread recipe added with 0.3% SSL. Test method: AACC Standard Method 74-09 Bread Firmness Test; using Texture Analyser TAXT PLUS. The higher the reading, the firmer the bread

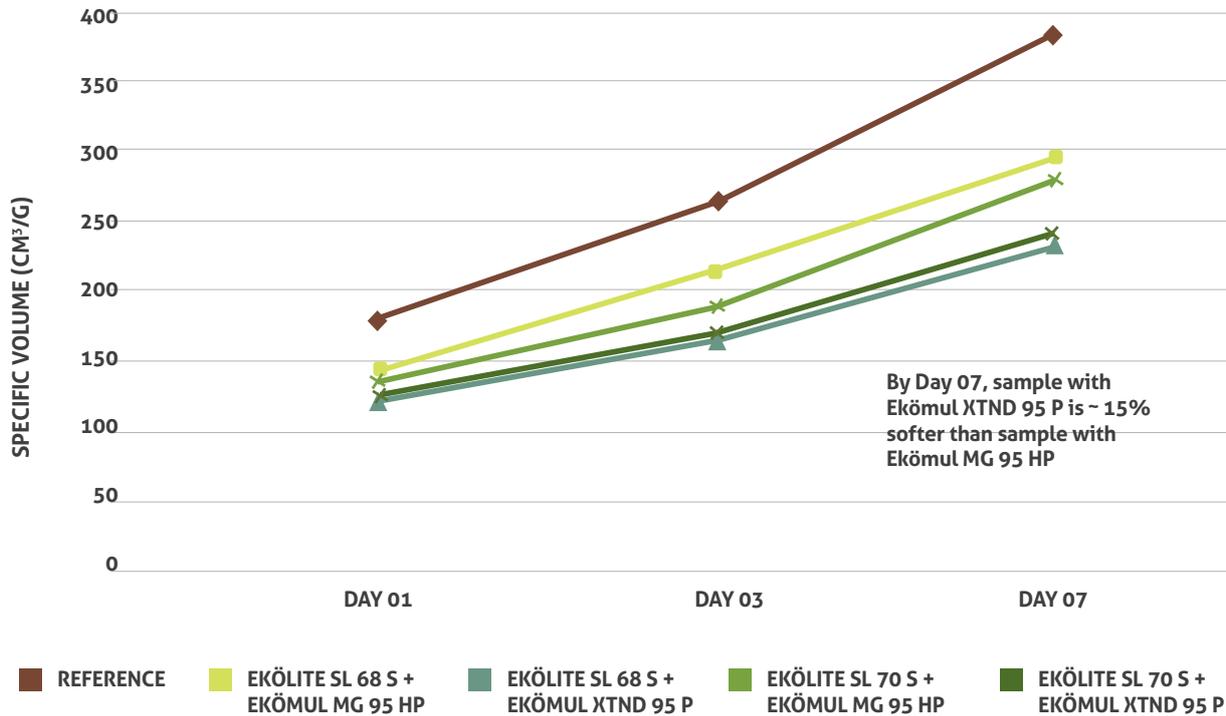
Synergies with Ekömul MG 95 HP / Ekömul XTND 95P

Ekölite SL series works synergistically with Distilled Monoglycerides (Ekömul MG 95 HP and Ekömul XTND 95 P) to boost the volume and softness of baked products.

The combination of Ekölite SL 70 S and Ekömul XTND 95 P provides the best enhancement in bread volume.



Improved Bread Softness



The combination of **Ekölite SL series** and **Ekömul XTND 95 P** slows down the retrogradation process better than the combination of fully saturated monoglycerides and

Ekölite SL series. Therefore, it imparts superior softness in baked products.

Comparative Sodium Stearoyl Lactylates Product Specification of Palm and Non-Palm Variants

a) Lower Lactic Acid SSL

PRODUCT NAME	EKÖLITE SL 68 S	EKÖLITE SL 68 R
Form	Micro-Bead	Micro-Bead
Appearance	Cream	Cream
Feedstock	Palm	Rapseed
Ester Value, mg KOH/g	130 – 160	130 – 160
Acid Value, mg KOH/g	60 – 80	60 – 80
Total Lactic Acid, %	28	28
Sodium Content, %	3.5 – 5.0	3.5 – 5.0
Melting Point, °C	Approx. 47	Approx. 51
Shelf Life, months	18	18
E number	E481	E481
US FDA Number	21 CFR 172.846	21 CFR 172.846
Average PSD	130 - 170µm	130 - 170µm

b) Higher Lactic Acid SSL

PRODUCT NAME	EKÖLITE SL 70 S	EKÖLITE SL 70 R
Form	Micro-Bead	Micro-Bead
Appearance	Cream	Cream
Feedstock	Palm	Rapseed
Ester Value, mg KOH/g	150 – 190	150 – 190
Acid Value, mg KOH/g	60 – 80	60 – 80
Total Lactic Acid, %	32	32
Sodium Content, %	3.5 – 5.0	3.5 – 5.0
Melting Point, °C	Approx. 47	Approx. 51
Shelf Life, months	18	18
E number	E481	E481
US FDA Number	21 CFR 172.846	21 CFR 172.846
Average PSD	130 - 170µm	130 - 170µm

Futura Ingredients offers **Ekölite SL series** in both palm & non-palm variants.

RSPO Offerings For Sodium Stearoyl Lactylates

In meeting customers' demands for greater sustainability, Roundtable on Sustainable Palm Oil (RSPO) offerings are available for **Ekölite SL series - Palm based variants**.

PRODUCT NAME	RSPO	PRODUCT DETAILS
Ekölite SL 68 S (R3) - MB	Mass Balance	Ester Value: 130 – 160
Ekölite SL 70 S (R3) - MB	Mass Balance	Ester Value: 150 – 190
Ekölite SL 68 S (R2) - SH	Segregated	Ester Value: 130 – 160
Ekölite SL 70 S (R2) - SH	Segregated	Ester Value: 150 – 190

Typical Emulsifier Dosage in Bakery Applications

APPLICATIONS	EMULSIFIER	DOSAGE (% FLOUR WEIGHT BASIS)	CRUMB SOFTENING	VOLUME ENHANCEMENT	BETTER CRUMB STRUCTURE	BATTER EMULSIFICATION	IMPROVED MACHINABILITY	IMPROVED FAT DISPERSION	INCREASED SPREAD RATIO	MAXIMISED SYMMETRY	EXTENDED SHELF LIFE
BREADS/BUNS AND IMPROVERS	Ekömul MG 95 HP	0.2 - 0.5	✓		✓						✓
	Ekömul XTND 95 P	0.2 - 0.5	✓		✓						✓
	Ekölite SL 68 S	0.2 - 0.5	✓	✓	✓		✓			✓	✓
	Ekölite SL 70 S	0.2 - 0.5	✓	✓	✓		✓			✓	✓
CAKES AND MIXES	Ekömul MG 95 HP	0.2 - 0.5	✓		✓	✓					✓
	Ekömul XTND 95 P	0.2 - 0.5	✓		✓	✓					✓
	Ekölite SL 68 S	0.15 - 0.3	✓	✓	✓		✓			✓	✓
	Ekölite SL 70 S	0.15 - 0.3	✓	✓	✓		✓			✓	✓
BISCUITS/ COOKIES/ CRACKERS	Ekömul MG 95 HP	0.2 - 0.5						✓			
	Ekölite SL 68 S	0.1 - 0.5					✓	✓	✓		
	Ekölite SL 70 S	0.1 - 0.5					✓	✓	✓		

Disclaimer: The information and recommendations contained herein are to the best of our knowledge reliable. However, nothing herein is to be construed as a warranty of representation in respect of safety in use, suitability, efficacy or otherwise including freedom from patent infringement. Users should conduct their own tests to determine the suitability of our product for their own specific purposes and the legal status for their intended use of the product.

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