

# EKÖLITE SE 65 L

## SORBITAN TRISTEARATE



### *Oils & Fats: Cocoa Butter Alternatives*

Ekölite SE 65 L Sorbitan Tristearate is non-ionic, lipophilic, non-polymorphic emulsifier which is commonly used in oils & fats and confectionery applications as a gloss enhancer and an anti-blooming agent. Ekölite SE 65 L is a specially designed Sorbitan Tristearate that imparts superior anti-blooming properties with good free fatty acid stability in chocolate, compound chocolate and cocoa butter alternatives such as cocoa butter substitute (CBS) that helps to improve the product quality and extend its shelf life.

### PRODUCT NAME

■ Ekölite SE 65 L



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

## Sorbitan Tristearate Product Specifications

PRODUCT NAME	EKÖLITE SE 65 L
FORM	Bead
APPEARANCE	Slightly Yellowish
FEEDSTOCK	Vegetable
ACID VALUE, MG KOH/G	1 max
IODINE VALUE, G I <sub>2</sub> /100G	3 max
SAPONIFICATION VALUE, MG KOH/G	176 – 188
HYDROXYL VALUE, MG KOH/G	66 - 80
MELTING POINT, °C	Approx. 56
SHELF LIFE, MONTHS	24
E NUMBER	E492

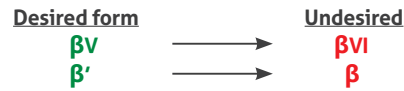
### Improved Anti-Blooming & Gloss Enhancement Properties

The common defect in chocolate and compound chocolate is 'fat bloom' where low melting point fat migrate to the surface and recrystallise in an unappealing whitish haze. Poor tempering processes or exposure to high temperatures during storage and/or distribution negatively affects its smooth appearance, bright colour

and gloss. Fat bloom is attributed to polymeric transition of triglycerides, which is polymorphic by nature.

**EköLite SE 65 L** helps to delay polymorphic transition that is associated with chocolate fat bloom by locking the fat crystals in the desired form to prolong the duration before fat bloom occurs.

- a) Chocolate (cocoa butter):
- b) Compound chocolate (CBS/ CBR):



**Note:** Accelerated Blooming Test in Compound Chocolate (2% STS in Cocoa Butter Substitutes).

Test conducted with chocolate samples exposed to temperature cycling (20°C and 30°C over a period of 24 hours) to induce bloom.

Compound chocolate with 2% **Ekölite SE 65 L** in CBS has improved appearance and glossiness when subjected to fluctuations in temperature. Fat bloom is delayed with the introduction of **Ekölite SE 65 L**.

The ability of **Ekölite SE 65 L** in disrupting the packing or formation of fat crystals in CBS relates to its functionality as a bloom inhibitor.

The following nucleation test demonstrates the functionality of **Ekölite SE 65 L** in disrupting fat crystal formation. The nucleation test was conducted with CBS dosed with 2% of sorbitan tristearate (STS) and stored at different testing temperatures. The total time taken to show the first signs of clouding or nucleation at the tested temperature will be recorded.

TESTING TEMPERATURE °C	REFERENCE SAMPLE	EKÖLITE SE 65 L	PRODUCT X	PRODUCT Z
20	8 mins	25 mins	26 mins	13 mins
25	13 mins	36 mins	36 mins	29 mins
30	27 mins	48 mins	47 mins	39 mins

**Note:** Nucleation test – Time indicated above are the first show signs of clouding or nucleation at the tested temperature. Test conducted with cocoa butter substitutes (CBS) dosed with 2% of sorbitan tristearate (STS).

The longer the duration before the first signs of clouding, the better is the functionality of the product in disrupting fat crystal formation, as demonstrated by **Ekölite SE 65 L**.

### Improved Crystallisation Rate of Compound Chocolate

**Ekölite SE 65 L** helps to improve the rate of crystallisation of chocolates and compound chocolates by:

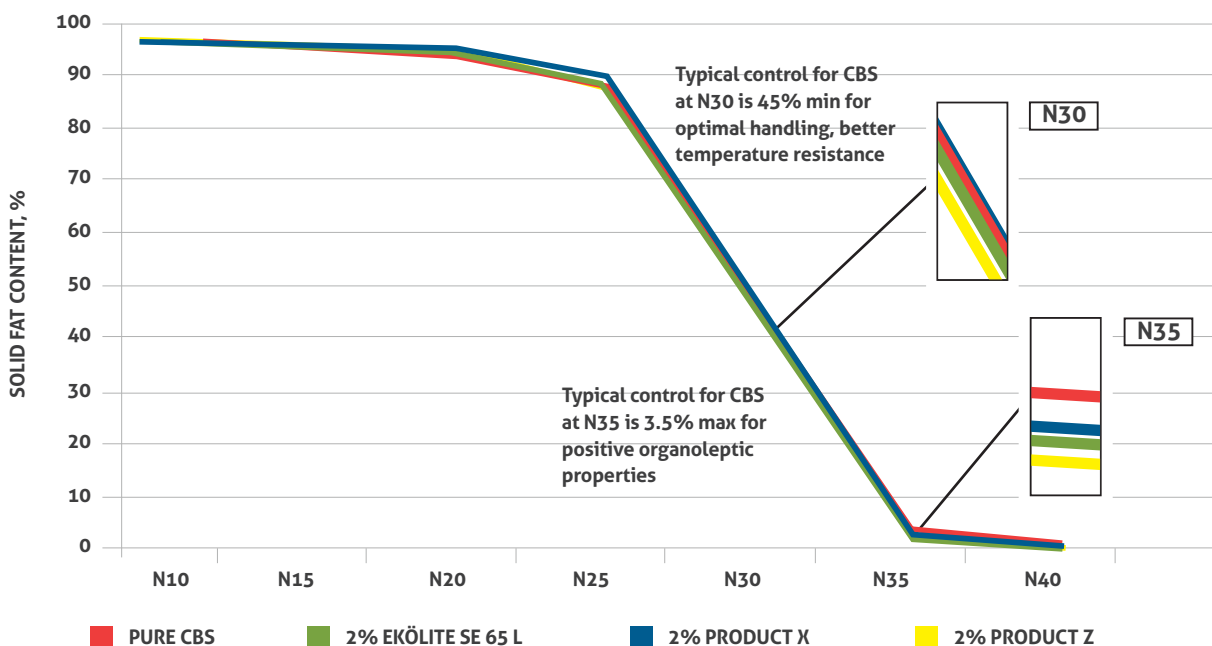
- Increasing the number of desired crystal seeds that are formed

- Reducing the crystal size of fats
- Both factors improve the colour and gloss of chocolate and compound chocolate products.

### Better Thermal Properties of CBS

**Ekölite SE 65 L** modifies the melting or Solid Fat Content profile of Cocoa Butter Substitute (CBS), chocolate and

compound chocolate. This helps to improve handling and organoleptic properties of chocolate products.



**Note:** AOCS Official Method Cd 16-81 Solid Fat Content (indirect method). Test conducted with cocoa butter substitutes (CBS) dosed with 2% of sorbitan tristearate (STS).

The addition of **Ekölite SE 65 L** in CBS improves mouthfeel by reducing the amount of solid fat at 35°C (N35). Additionally, it improves the handling of chocolate during processing and transportation by

preserving or increasing the amount of solid fat at 30°C (N30). In combination, compound chocolate with **Ekölite SE 65 L** is more resistant to melting at ambient temperatures and does not leave a waxy aftertaste.

### Low Acid Value Sorbitan Tristearate

**Ekölite SE 65 L** is a uniquely designed sorbitan tristearate, manufactured with low acid value (AV) specifications. This is beneficial for specialty fat

manufacturers to produce CBS and CBR with low and stable free fatty acids (FFA) over product shelf life.

The hypothetical FFA calculation based on STS acid values is illustrated below:

	DOSAGE	FFA/AV SPECIFICATIONS	FFA/AV TYPICAL	CALCULATED FFA
Fat	98%	FFA: 0.1% max	FFA: 0.05%	0.049%
STS	2%	AV: 2.0 max	AV: 1.5	0.015%
	100%			0.064%

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Fat	98%	FFA: 0.1% max	FFA: 0.05%	0.049%
STS	2%	AV: 1.0 max	AV: 0.7	0.007%
	100%			0.056%

Note: 1. Acid Value = 2 x Free Fatty Acid

2. Typical FFA specification for CBS is max 0.1%.

Low AV Ekölite SE 65 L (1.0 max) contributes to a lower amount of FFA content in CBS as compared to STS with a higher AV. Starting with a lower amount of FFA in

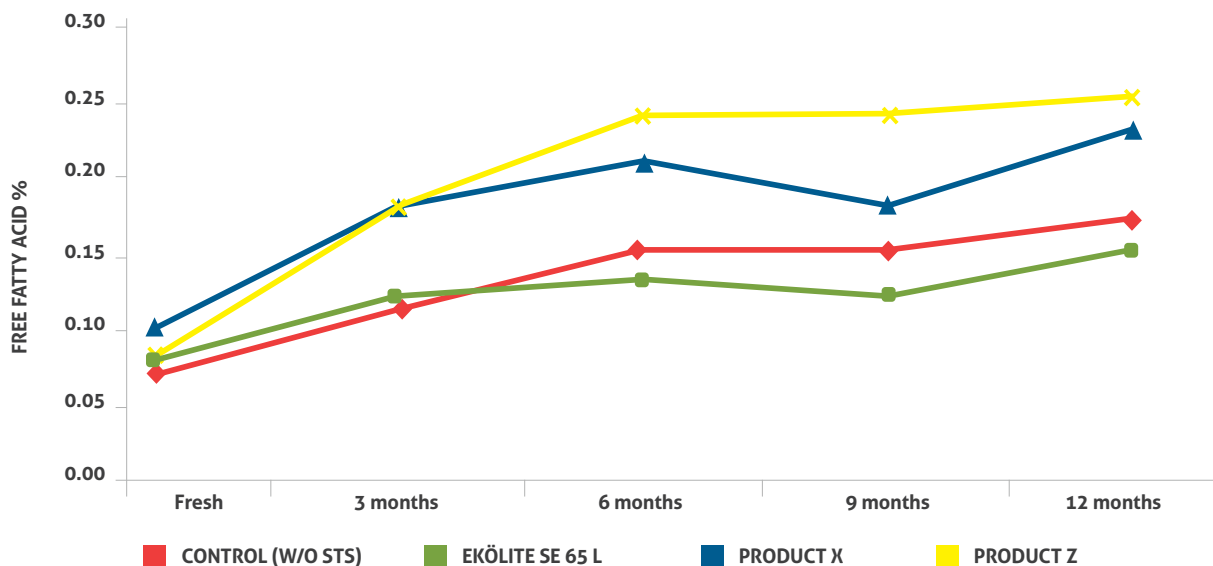
fat products will ensure better oxidative stability over product shelf life to reduce the risk of rancidity.

### Oxidative Stability of Sorbitan Tristearate in CBS

**Ekölite SE 65 L** is able to reduce the formation of free fatty acids and control the rate of oxidation of CBS

throughout the storage period. This provides greater product stability over shelf life.

#### a) Free Fatty Acid Stability of CBS with Sorbitan Tristearate

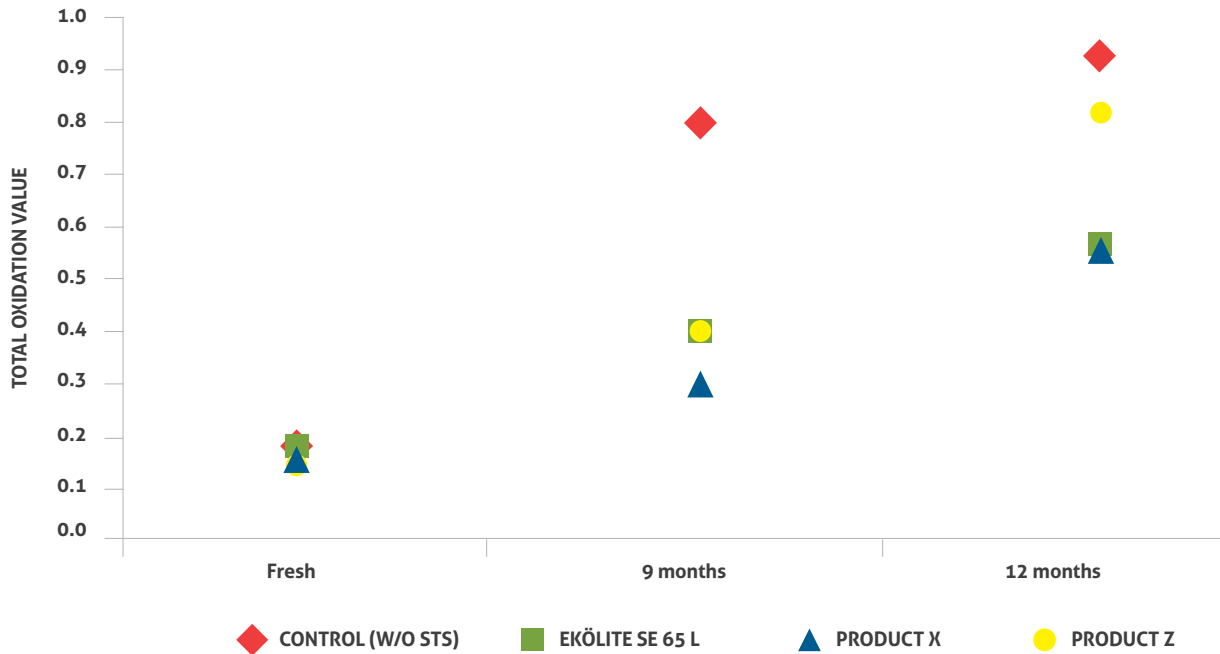


Note: AOCS Official Method Ca 5a-40 Free Fatty Acids test. Test conducted with cocoa butter substitutes (CBS) dosed with 2% of sorbitan tristearate (STS).

In addition to the measurement of Free Fatty Acids, the oxidative stability of a fat product can be determined by its Peroxide Value and its Anisidine Value. The sum of both values is referred to as the TOTOX value, which

typically increases over product shelf life as it is exposed to environmental factors. The lower the TOTOX value, the better quality is the fat product.

**b) Total Oxidative Stability of CBS with Sorbitan Tristearate**



**Note:** AOCS Official Method Cd 18-90 p-Anisidine Value test and 8b-90 Peroxide Value test. TOTOX value: Anisidine Value + (2x Peroxide Value). Test conducted with cocoa butter substitutes (CBS) dosed with 2% of sorbitan tristearate (STS).

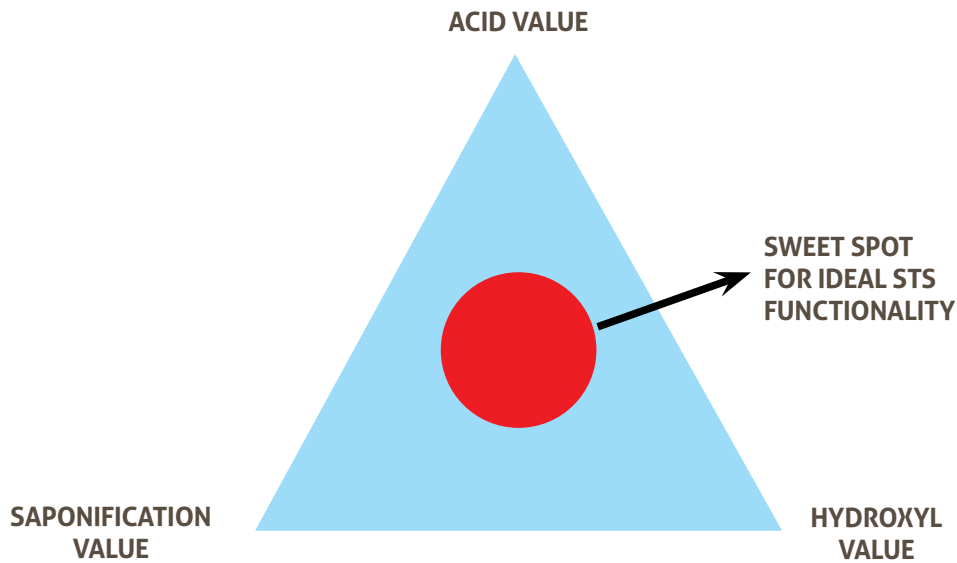
**Typical Sorbitan Tristearate Dosage in Confectionery Applications**

SEGMENT	APPLICATIONS	FUNCTION	TYPICAL DOSAGE APPLIED
Oils & Fats	Cocoa Butter Alternatives (CBS, CBR)	Anti-Blooming Agent	2% w/w
Confectionery	Compound Chocolate	Anti-Blooming Agent, Gloss Enhancer	2% of fat weight
Confectionery	Chocolate (CB)	Anti-Blooming Agent, Gloss Enhancer	1% of fat weight

**Ekölite SE 65 L: Summary of Benefits**

EKÖLITE SE 65 L PRODUCT BENEFITS	ADVANTAGES IN CBS, CBR AND COMPOUND CHOCOLATES
Low Acid Value profile	<ul style="list-style-type: none"> <li>Higher starting quality &amp; stability of CBS and CBR</li> </ul>
Stable Acid Value over time	<ul style="list-style-type: none"> <li>Improved oxidation stability leading to longer CBS and CBR shelf life</li> <li>Stability of FFA and PV over lifetime</li> </ul>
Stable Peroxide Value	<ul style="list-style-type: none"> <li>Improved oxidation stability and organoleptic properties</li> </ul>
Ideal SFC profile	<ul style="list-style-type: none"> <li>Superior organoleptic properties</li> <li>Good handling properties</li> <li>Steady crystallisation leading to improved colour and glossiness of chocolates</li> </ul>
Positive impact on nucleation	<ul style="list-style-type: none"> <li>Superior anti-blooming control</li> </ul>

## Sorbitan Tristearate: Balance of Parameters



The three key parameters of Sorbitan Tristearate; Saponification Value, Hydroxyl Value and Acid Value have to be controlled within a tight range for ideal functionality in CBS and CBR.

- Saponification Value is a measure of ester bonds and fatty acids.
  - ✓ The higher the value indicates
  - ✓ over esterification
  - ✓ The lower the value indicates
  - ✓ incomplete esterification.

**Ekölite SE 65 L** is designed specially to perform as an excellent anti-blooming agent whilst imparting superior

- Hydroxyl Value provides an indicator of free hydroxyl groups.
  - ✓ The lower the value indicates over
  - ✓ esterification.
  - ✓ The higher the value indicates
  - ✓ incomplete reaction.

While the major focus of CBS and CBR quality is on the Acid Value of Sorbitan Tristearate, the Saponification and Hydroxyl Values must also be taken into consideration.

oxidative stability to specialty fat products, chocolates and compound chocolates.

**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.

### MANUFACTURING SITE

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