

Frequently Asked Questions

# ***Sustane SAIB Food-Grade***



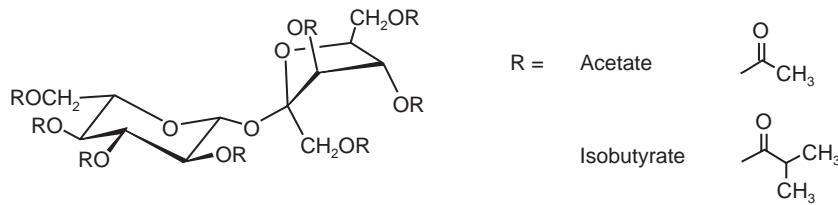
**EASTMAN**

## What is *Sustane* SAIB (Sucrose Acetate Isobutyrate) food-grade?

*Sustane* SAIB food-grade is 100% sucrose acetate isobutyrate and is produced by Eastman in a dedicated plant.

*Sustane* SAIB food-grade is produced by the controlled esterification of natural sugar (sucrose) with acetic and isobutyric anhydrides. It meets all specifications of the Joint Expert Committee on Food Additives and specifications of countries where it has been approved around the world (see page 5). Also, it is produced under current food Good Manufacturing Practices (GMP) conditions. *Sustane* SAIB food-grade is manufactured under rabbinical supervision in full accordance with Jewish dietary laws, making it kosher and pareve all year, including Passover.

### *Sustane* SAIB food-grade



## How is *Sustane SAIB* food-grade used?

*Sustane SAIB* food-grade is being used as a weighting agent in beverages that contain essential flavoring oils. The density of a typical orange oil is 0.84 g/mL. The density of an orange drink is approximately 1.05 g/mL; and for diet drinks, it is approximately 1.0 g/mL. If beverage manufacturers do not take the density differences between the oil phase and the finished beverage into consideration, the flavoring oil will separate and ringing or creaming will occur. Weighting agents are used to decrease the density difference, thus increasing beverage stability.

*Sustane SAIB* food-grade is used in flavor emulsions, premixes, and syrups used for producing carbonated or noncarbonated citrus beverages. It can also be used in drinks formulated with artificial sweeteners. Sport drinks and nutritional drinks also utilize *Sustane SAIB* food-grade.

## What are the advantages of choosing *Sustane SAIB* food-grade?

Some of the advantages of choosing *Sustane SAIB* food-grade over other weighting agents include:

- High purity.
- Good solubility in flavoring oils.
- Odorless and flavorless at typical beverage levels.
- Eastman's metabolism data states that SAIB is extensively metabolized in the GI tract, probably to sucrose and partially acylated sucrose, which are readily absorbed in the gut.
- Specific gravity, 1.146.
- Oxidative and hydrolytic stability.
- Regulated at higher use levels than BVO and ester gum.

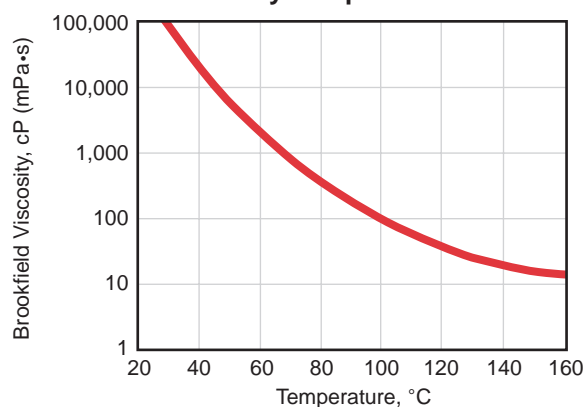
## What are the important chemical and physical properties of *Sustane* SAIB food-grade?

### Typical Properties<sup>a</sup>

Molecular Weight Range	832–856
Color, Gardner Scale	1
Refractive Index, n 20/D	1.454
Specific Gravity @ 25°C/25°C	1.146
Weight/Volume	
kg/L	1.14
lb/gal (U.S.)	9.55
lb/gal (Imperial)	11.46
Flash Point, Tag Closed Cup, °C (°F)	226 (440)
Decomposition Temperature, °C (°F)	288 (550)
Solubility in Water @ 25°, wt %	0.1
Shelf Life, years	3

<sup>a</sup>Properties reported here are typical of average lots. Eastman makes no representation that the material in any particular shipment will conform exactly to the values given.

**Viscosity of *Sustane* SAIB Food-Grade as Influenced by Temperature**



## What is the regulatory status of *Sustane SAIB* food-grade?

*Sustane SAIB* food-grade is approved in >50 countries or authoritative bodies. A complete listing of regulatory clearances is available on request.

A selection of regulatory clearances follows.

<b>Country/Authoritative Body</b>	<b>Permitted Levels</b>
Codex Alimentarius	500 ppm
Argentina	300 ppm
Australia	200 ppm
Brazil	300 ppm
Canada	300 ppm
Chile	200 ppm
China	140 mg/kg
Czech Republic	300 ppm
European Union <sup>a</sup>	300 mg/L
Iceland	300 ppm
India	300 ppm
Japan	GMP
Kenya	300 ppm
Mexico	300 ppm
New Zealand	200 ppm
Norway	300 ppm
Paraguay	300 ppm
Singapore	300 ppm
South Africa	500 mg/kg
United States	300 ppm
Uruguay	300 ppm

<sup>a</sup>Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom

## Is *Sustane SAIB* food-grade safe for human consumption?

Studies conducted on *Sustane SAIB* food-grade since the early 1960s demonstrate that it may be safely ingested at allowed levels in beverages. Safety studies have been conducted with *Sustane SAIB* food-grade in rodents, nonrodents, primates, and humans. These studies included metabolism, reproductive and developmental toxicity, carcinogenicity, mutagenicity, and acute and subchronic toxicity. These studies have been published in a peer-reviewed journal: *Food and Chemical Toxicology*, Volume 36, Number 2, February 1998.

*Sustane SAIB* food-grade clearance for use in beverages in a large number of countries around the world further demonstrates the view of regulatory agencies that *Sustane SAIB* food-grade is safe for human consumption at allowed use levels.

## What label declaration is required for *Sustane SAIB* food-grade?

Labeling requirements for *Sustane SAIB* food-grade are country specific, and the appropriate regulatory authorities should be consulted.

Some countries permit the following label declarations.

- The common and usual name, SAIB
- Sucrose esters or sucrose fatty esters
- Sucrose acetate isobutyrate
- Numbers or Codes; e.g.,

INS	E 444
EU Countries	E 444
Brazil	ET XXII

## Do you have nutrition labeling information?

In accordance with the Nutrition Labeling and Education Act, *Sustane* SAIB food-grade can be considered 100% carbohydrate and contains 400 Calories per 100 g of material. *Sustane* SAIB food-grade is a high-purity weighting agent and contains no nutritionally significant components.

## What other *Sustane* SAIB food-grade products are available?

Low viscosity blends include:

*Sustane* SAIB-CO  
food-grade

*Sustane* SAIB food-grade  
blend with 10% orange  
terpenes

Viscosity @ 25°C  
(77°F) – 3,000 cP

*Sustane* SAIB-ET10  
food-grade

*Sustane* SAIB food-grade  
blend with 10% ethanol

Viscosity @ 25°C  
(77°F) – 1,000 cP

*Sustane* SAIB-CO food-grade and *Sustane* SAIB-ET10 food-grade are blends of *Sustane* SAIB food-grade with food-grade solvents. These blends have reduced viscosities that allow pouring and/or pumping at ambient temperatures without heating. This minimizes loss of flavor and aroma and reduces potential for oxidative deterioration of flavoring oils.

*Sustane* SAIB food-grade is very viscous at room temperature. Warming to 60°–70°C (140°–158°F) will produce viscosities suitable for pouring or pumping.

## **How are *Sustane SAIB* food-grade, *Sustane SAIB-CO* food-grade, and *Sustane SAIB-ET10* food-grade packaged?**

*Sustane SAIB* food-grade, *Sustane SAIB-CO* food-grade, and *Sustane SAIB-ET10* food-grade are packaged in 208-L (55-gal, U.S.; 45.8-gal, U.K.) closed-head or open-head steel drums and *Sustane SAIB* food-grade is also available in 19-L (5-gal) open-head steel drums. These drums have been treated with “food-approved” linings. The 208-L drums have one 51-mm (2-in.) diameter opening and one 19-mm ( $\frac{3}{4}$ -in.) diameter opening on top with no side openings. The net weight of each drum is 215.5 kg (475 lb). The 19-L drums have one 40-mm (1.5-in.) diameter opening on top with no side openings and a net weight of 20.0 kg (44 lb).

## **Do you have a procedure and formula for evaluating *Sustane SAIB* food-grade in flavor emulsions and beverages?**

Although compositions vary widely, the procedure shown on the following page is a good starting point for evaluating *Sustane SAIB* food-grade in citrus flavor emulsions for 12 Brix beverages.

Flavor emulsions and beverages can be evaluated by microscopy, particle size analysis, and visual examination for emulsion instability (lifting, creaming, flocculation, and separation).

Testing can be accelerated by centrifugation or storing samples at 40°–45°C (104°–113°F).

Ratios of orange oil to Sustane SAIB food-grade are generally in the range of 1:1 to 1:1.7, depending on specific gravity requirements.

Where permitted, emulsions containing acacia gum can be improved by adding 6–8 ppm DOSS (dioctyl sodium sulfosuccinate), based on finished beverage. DOSS should be added to the oil phase as a 50% solution in propylene glycol or ethanol, or it can be added directly to the orange oil prior to adding the Sustane SAIB.

Use deionized or distilled water.

Add sorbate or benzoate to water. Dissolve. Add citric acid to obtain pH of 3.0. Add acacia gum or starch with good agitation. Mix for 2 hours. Solution may be heated to 40°–45°C (104°–113°F) for faster dissolution of acacia gum. Allow time for the emulsifier to hydrate and deaerate.

**Oil Phase**

Orange Flavor Oil	3%
Sustane SAIB Food-Grade	3%

**Water Phase**

Acacia Gum or Modified Starch	18%
Potassium Sorbate or Sodium Benzoate	0.1%
Citric Acid	0.2%
Water q.s.	100%

Slowly add oil to water phase with high shear agitation. Mix until emulsion has particle size of 5 microns or less.

Homogenize 2,500–3,500 psi or 175–250 kg/cm<sup>2</sup>  
Two passes may be required.  
Obtain particle size of 0.5–1 micron.

Dilute with sugar water to produce beverage.

## References

1. W. J. Krasavage, G. D. Di Vincenzo, B. D. Astill, R. L. Roudabush, and C. J. Terhaar, "Biological Effects of Sucrose Acetate Isobutyrate in Rodents and Dogs," *J. Agric. Fd. Chem.*, 21, 473 (1973).
2. B. G. Procter, P. Dussault, and C. I. Chappel, "Biochemical Effects of Sucrose Acetate Isobutyrate (SAIB) on the Liver," *Proc. Soc. Exp. Biol. Med.*, 142, 595 (1973).
3. J. C. Phillips, J. Kingsnorth, I. Rowland, S. D. Gangolli, and A. G. Lloyd, "Studies on the Metabolism of Sucrose Acetate Isobutyrate in the Rat and in Man," *Fd. Cosmet. Toxicol.*, 14, 375 (1976).



Material Safety Data Sheets providing safety precautions that should be observed in handling and storing Eastman products are available online or on request. You should obtain and review the available material safety information before handling any of these products. If any materials mentioned are not Eastman products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

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