

EASTMAN

Eastman Sustane™ SAIB, Food Grade

Frequently asked questions

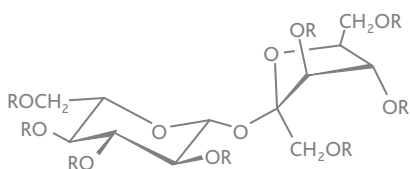


What is Eastman Sustane™ SAIB (Sucrose Acetate Isobutyrate), Food Grade?

Eastman Sustane™ SAIB, Food Grade, is 100% sucrose acetate isobutyrate and is produced by Eastman in a dedicated plant.

Eastman 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 globally approved (see page 5). Also, it is produced under current Good Manufacturing Practices (cGMP) 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.

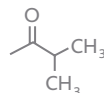
Eastman Sustane™ SAIB, Food Grade



R = Acetate



Isobutyrate



How is Eastman Sustane™ SAIB, Food Grade, used?

Eastman Sustane™ SAIB, Food Grade, is 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 beverage is approximately 1.05 g/mL; for diet beverages, 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.

Eastman Sustane™ SAIB, Food Grade, is used in flavor emulsions, premixes, and syrups to produce carbonated or noncarbonated citrus beverages. It can also be added to beverages formulated with artificial sweeteners. Sports drinks and nutritional drinks also utilize Eastman Sustane™ SAIB, Food Grade.

What are the advantages of choosing Eastman Sustane™ SAIB, Food Grade?

Some of the advantages of choosing Eastman Sustane™ SAIB, Food Grade, over other weighting agents include:

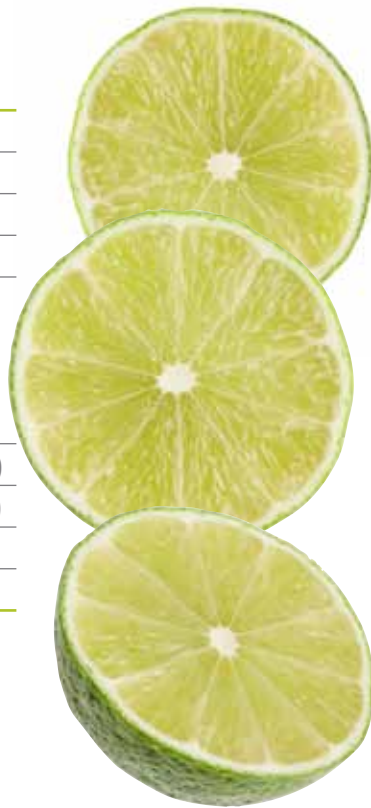
- High purity
- Readily soluble in flavoring oils
- Flavorless and odorless at typical beverage levels
- Metabolizes to food components
- Specific gravity, 1.146
- Oxidative and hydrolytic stability
- Regulated at higher use levels than BVO and ester gum

What are the important chemical and physical properties of Eastman Sustane™ SAIB, Food Grade?

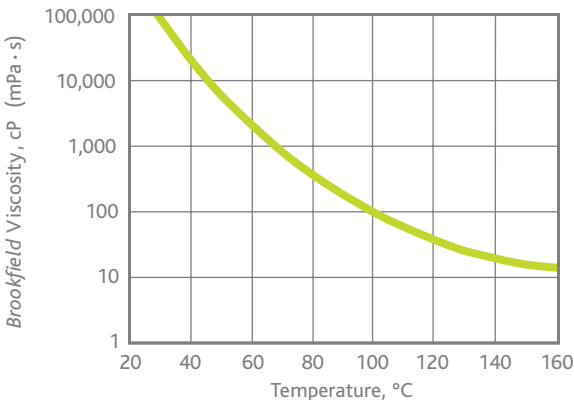
Typical properties^a

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

^aProperties 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 Eastman Sustane™ SAIB, Food Grade, as influenced by temperature



What is the regulatory status of Eastman Sustane™ SAIB, Food Grade?

Eastman Sustane™ SAIB, Food Grade, is approved in more than 50 countries or authoritative bodies. A complete listing of regulatory clearances is available on request.

A selection of regulatory clearances follows.

Country/authoritative body	Permitted levels
Codex Alimentarius	500 ppm
Argentina	300 ppm
Australia	200 ppm
Brazil	300 ppm
Canada	300 ppm
Chile	200 ppm
Czech Republic	300 ppm
European Union ^a	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

^aAustria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom



Is Eastman Sustane™ SAIB, Food Grade, safe for human consumption?

Studies conducted on Eastman 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 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.

Eastman Sustane™ SAIB, Food Grade, clearance for use in beverages 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 Eastman Sustane™ SAIB, Food Grade?

Labeling requirements for Eastman Sustane™ SAIB, Food Grade, are country specific, and the appropriate regulatory authorities should be consulted.

Some countries permit the following label declarations:

- The common name, SAIB
- Sucrose esters or sucrose fatty esters
- Sucrose acetate isobutyrate
- Numbers or Codes:

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, Eastman 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 Eastman Sustane™ SAIB, Food Grade, products are available?

Low viscosity blends include

Eastman Sustane™ SAIB CO,
Food Grade

Eastman Sustane™ SAIB
blend with 10% orange terpenes
Viscosity @ 25°C (77°F) 3,000 cP

Eastman Sustane™ SAIB ET-10,
Food Grade

Eastman Sustane™ SAIB
blend with 10% ethanol
Viscosity @ 25°C (77°F) 1,000 cP

Eastman Sustane™ SAIB MCT,
Food Grade

Eastman Sustane™ SAIB
blend with 20% medium chain
triglycerides
Viscosity @ 25°C (77°F) 5,500 cP

Eastman Sustane™ SAIB CO, Food Grade, Eastman Sustane™ SAIB ET-10, and Eastman Sustane™ SAIB MCT, Food Grade, are blends of Sustane SAIB 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 the potential for oxidative deterioration of flavoring oils.

Eastman 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 Eastman Sustane™ SAIB, Food Grade, products packaged?

Product	Container Size
Eastman Sustane™ SAIB, Food Grade	208 L (55 gal, U.S.; 45.8 gal, U.K.) 19 L (5 gal)
Eastman Sustane™ SAIB CO, Food Grade	208 L (55 gal, U.S.; 45.8 gal, U.K.)
Eastman Sustane™ SAIB ET-10, Food Grade	208 L (55 gal, U.S.; 45.8 gal, U.K.)
Eastman Sustane™ SAIB MCT, Food Grade	208 L (55 gal, U.S.; 45.8 gal, U.K.) 19 L (5 gal)

208-L containers are available in closed-head or open-head steel drums.

19-L containers are available in open-head steel drums.

Drums have been treated with “food-approved” linings.

The 208-L drums have one 51 mm (2 in.) diameter opening and one 19 mm (.75 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 Eastman Sustane™ SAIB, Food Grade, in flavor emulsions and beverages?

Although compositions vary widely, the procedure shown on the following page is a starting point for evaluating Eastman 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 Eastman 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 Eastman Sustane™ SAIB.

Dissolve benzoate or sorbate in deionized or distilled water. Adjust pH to 3.0 with the addition of citric acid. 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%
Eastman Sustane™ SAIB, Food Grade	3%

Water Phase

Acacia gum or	18%
Modified starch	12%
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/cm²
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 when handling and storing Eastman products, are available online or by 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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