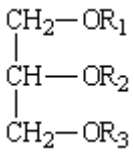
SUCCINYLATED MONOGLYCERIDES

Prepared at the 26th JECFA (1982), published in FNP 25 (1982) and in FNP 52 (1992). Metals and arsenic specifications revised at the 55th JECFA (2000). No ADI was allocated at the 26th JECFA (1982)

SYNONYMS INS No. 472 (g)

DEFINITION A mixture of succinic acid esters of mono- and diglycerides produced by the succinylation of a product obtained by the glycerolysis of edible fats and oils, or by the direct esterification of glycerol with edible fat-forming fatty acids.

Structural formula (approximate composition)



where R_1, R_2 and R_3 may be a fatty acid or succinic acid or hydrogen

DESCRIPTION Waxy solid having an off-white colour

FUNCTIONAL USES Emulsifier, dough conditioner

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Soluble in warm methanol, in ethanol and in propan-1-ol

Test for fatty acids (Vol. 4) Passes test

Test for succinic acid (Vol. 4) Passes test

Test for glycerol (Vol. 4) Passes test

PURITY

Acid value (Vol. 4) Between 70 and 120

Hydroxyl value (Vol. 4) Between 138 and 152

Iodine value (Vol. 4) Not more than 3 (Wijs method)

Free and bound succinic acid	Not more than 3% of free succinic acid; not less than 14.8% of bound succinic acid See description under TESTS
Lead (Vol. 4)	Not more than 2 mg/kg Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, “Instrumental Methods.”

TESTS

PURITY TESTS

Free and bound succinic acid

0.02 N Sodium hydroxide in methanol: Dissolve 4 g of sodium hydroxide in 1000 ml of anhydrous methanol. Transfer 200 ml of this solution to a 1000 ml volumetric flask, dilute to volume with anhydrous methanol, and mix. Standardize the solution against dried succinic acid, using phenolphthalein TS as the indicator.

Procedure

Transfer about 125 mg of the sample, accurately weighed into a 250 ml separator containing 100 ml of benzene, and dissolve the sample by heating the separator with warm water. Treat the sample and a blank, consisting of 100 ml of benzene in another separator, in the same manner as follows: cool the contents of the separator, add 50 ml of water, and mix by inverting the separator about 20 times. Allow to stand for about 15 min and then transfer the aqueous layer into a 125-ml Erlenmeyer flask. Add 10 ml of water to the separator, wash the benzene layer by inverting the separator five times, and add the washings to the 125 ml flask. To the flask add five drops of phenolphthalein TS and titrate with 0.02 N sodium hydroxide in methanol. Perform a blank determination and record the net volume of alkali, in ml, as V_1.

Transfer the benzene layer into a 500-ml round-bottom flask and rinse the separator with 10 ml of benzene. Add a few boiling chips to the flask, and evaporate the benzene, preferably on a thin-film evaporator, under partial vacuum at about 60^{o}. Dissolve the residue in the flask in 10 ml of methanol, add 10 ml of water and five drops of phenolphthalein TS, and titrate with 0.02 N sodium hydroxide in methanol. Perform a blank determination, and record the net volume of alkali, in ml, as V_2.

Calculate the weight, in mg, of free succinic acid in the sample by the formula $(V_1/2)$ (N) (118.1), and calculate the weight, in mg, of bound succinic acid in the sample by the formula (V_2) (N) (118.1), in which N is the exact normality of the sodium hydroxide solution.