

## POLYOXYETHYLENE (20) SORBITAN MONOOLEATE

Prepared at the 17th JECFA (1973), published in FNP 4 (1978) and in FNP 52 (1992). Metals and arsenic specifications revised at the 55<sup>th</sup> JECFA (2000). An ADI of 0-25 mg/kg bw was established at the 17<sup>th</sup> JECFA (1973)

### SYNONYMS

Polysorbate 80; INS No. 433

### DEFINITION

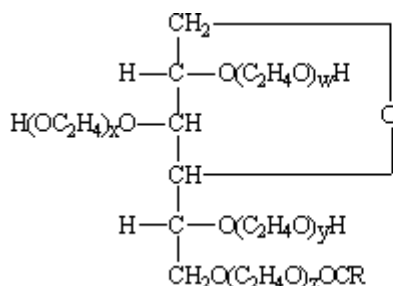
Consists of a mixture of the partial esters of sorbitol and its mono- and dianhydrides (which have an acid value below 7.5 and a water content below 0.2%) with edible commercial oleic acid and condensed with approximately 20 moles of ethylene oxide per mole of sorbitol and its anhydrides.

C.A.S. number

9005-65-6

Structural formula

Nominal formula and approximate composition:



where  $w + x + y + z = \text{approx. } 20$  and RCO- is the fatty acid moiety

Assay

Not less than 65.0 and not more than 69.5% of oxyethylene groups, equivalent to not less than 96.5 and not more than 103.5% of polyoxyethylene (20) sorbitan monooleate, calculated on the anhydrous basis.

### DESCRIPTION

Lemon to amber coloured oily liquid at 25°, with a faint characteristic odour

**FUNCTIONAL USES** Emulsifier, dispersing agent

### CHARACTERISTICS

#### IDENTIFICATION

Solubility (Vol. 4)

Soluble in water, ethanol, methanol, ethyl acetate and toluene; insoluble in mineral oil and petroleum ether

Infrared absorption

The infrared spectrum of the sample is characteristic of a partial fatty acid ester of a polyoxyethylated polyol

Colour reaction

To 5 ml of a 5% (w/v) aqueous solution of the sample add 10 ml of ammonium cobalthiocyanate solution and 5 ml of chloroform, shake well and allow to separate; a blue colour is produced in the chloroform layer. (Ammonium cobalthiocyanate solution: 37.5 g of cobalt nitrate and 150 g

of ammonium thiocyanate made up to 100 ml with water - freshly prepared).

Test for fatty acids To 5 ml of a 5% (w/v) aqueous solution of the sample add 5 ml sodium hydroxide TS. Boil for a few min, cool, and acidify with dilute hydrochloric acid. The solution is strongly opalescent, owing to the fatty acids liberated.

Test for unsaturation To a solution of the sample (1 in 20) add bromine TS dropwise. The bromine is decolourized

Gelatinization A mixture of 60 parts by volume of the sample and 40 parts of water yields a gelatinous mass at or below room temperature

Saponification (Vol. 4) 100 g of the sample yields approximately 23 g of fatty acids and 75 g of polyols

#### PURITY

Water (Vol. 4) Not more than 3% (Karl Fischer Method)

Sulfated ash (Vol. 4) Not more than 0.25%  
Test 5 g of the sample

Acid value (Vol. 4) Not more than 2

Saponification value (Vol. 4) Not less than 45 and not more than 55

Hydroxyl value (Vol. 4) Not less than 65 and not more than 80

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."

#### **METHOD OF ASSAY**

Determine the content of *Oxyethylene groups*.