

POLYOXYETHYLENE (40) STEARATE

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

SYNONYMS	Polyoxyl (40) stearate, polyoxyethylene (40) monostearate; INS No. 431
DEFINITION	Consists of a mixture of the mono- and diesters of edible commercial stearic acid and mixed polyoxyethylene diols (having an average polymer length of about 40 oxyethylene units) together with free polyol.
Structural formula	Nominal formula and approximate composition: $\text{HO}(\text{CH}_2\text{CH}_2\text{O})_n\text{H} \qquad \text{RCOO}(\text{CH}_2\text{CH}_2\text{O})_n\text{H} \qquad \text{RCOO}(\text{CH}_2\text{CH}_2\text{O})_n\text{OCR}$ <p style="text-align: center;">free polyol monoester diester</p> where RCO- is a fatty acid moiety, and "n" has an average value of approximately 40. The distribution of polymers is approximately in accordance with the Poisson expression.
Assay	Not less than 84.0 and not more than 88.0% of oxyethylene groups equivalent to not less than 97.5 and not more than 102.5% of polyoxyethylene (40) stearate calculated on the anhydrous basis.
DESCRIPTION	Cream-coloured and exists as flakes or as a waxy solid at 25° with a faint odour
FUNCTIONAL USES	Emulsifier
CHARACTERISTICS	
IDENTIFICATION	
<u>Solubility</u> (Vol. 4)	Soluble in water, ethanol, methanol and ethylacetate; insoluble in mineral oil
<u>Congealing range</u> (Vol. 4)	39 - 44°
<u>Infrared absorption</u>	The infrared spectrum of the sample is characteristic of a partial fatty acid ester of a polyoxyethylated polyol
<u>Colour reaction</u>	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).
<u>Saponification</u> (Vol. 4)	100 g of the sample yields approximately 13-14 g of fatty acids and 85-87 g of polyols
PURITY	
<u>Water</u> (Vol. 4)	Not more than 3% (Karl Fischer Method)

<u>Acid value</u> (Vol. 4)	Not more than 1
<u>Saponification value</u> (Vol. 4)	Not less than 25 and not more than 35
<u>Hydroxyl value</u> (Vol. 4)	Not less than 27 and not more than 40
<u>Lead</u> (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*.