

## TAGETES EXTRACT

Prepared at the 57th JECFA (2001) and published in FNP 52 Add 9 (2001), superseding tentative specifications prepared at the 55th JECFA (2000) and published in FNP 52 Add 8 (2000). No ADI was allocated at the 31st JECFA (1987).

### SYNONYMS

Xanthophylls, INS No. 161b(ii)

### DEFINITION

The major colouring principles are lutein and its dipalmitate (helenien), obtained by hexane extraction of dried petals of *Tagetes erecta* L. with subsequent removal of the solvent. Other hydroxy derivatives of carotenes may be present together with other oxyderivatives such as epoxides; may contain fats, oils and waxes naturally occurring in the plant material. Products of commerce are normally further formulated e.g. in order to standardise the colour content or to obtain water soluble/dispersible products.

### Chemical names

Lutein:  $\beta,\epsilon$ -Carotene-3,3'-diol,  
Helenien: Lutein dipalmitate;  $\beta,\epsilon$ -Carotene-3,3'-diol dipalmitate

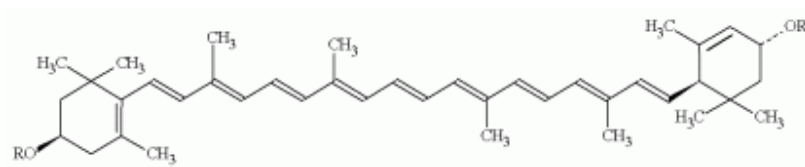
### C.A.S. number

127-40-2 (Lutein)

### Chemical formula

Lutein:  $C_{40}H_{56}O_2$   
Helenien:  $C_{72}H_{116}O_4$

### Structural formula



Lutein: R = H  
Helenien: R =  $CH_3(CH_2)_{14}CO$

### Formula weight

Lutein: 568.88  
Helenien: 1045.71

### Assay

Content of total colouring matter (calculated as lutein) not less than declared

### DESCRIPTION

Dark yellow-brown liquid

### FUNCTIONAL USES

Colour

### CHARACTERISTICS

### IDENTIFICATION

<u>Solubility</u> (Vol. 4)	Insoluble in water; soluble in hexane
<u>Spectrophotometry</u>	An acetone solution of the sample shows maximum absorption at about 444 nm
<u>Positive test for carotenoids</u>	The colour of a solution of the sample in acetone disappears after successive addition of a 5% solution of sodium nitrite and 0.5 M of sulfuric acid.

#### PURITY

<u>Residual solvent</u> (Vol. 4)	Hexane: not more than 50 mg/kg
<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

Accurately weigh 0.5 - 1.5 g of the sample into a 50 ml volumetric flask. Add about 30 ml of a 1:1 mixture of cyclohexane and ethanol (96%) and swirl gently until the sample is dissolved. Fill to the mark with cyclohexane/ethanol mixture and mix well. Pipette 0.200 ml of the solution into a 25 ml volumetric flask. Make up to mark with cyclohexane/ethanol and mix well. Measure the absorbance at maximum of about 444 nm using cyclohexane/ethanol mixture as blank. The absorbance should be between 0.2 and 0.8, otherwise an appropriate dilution must be prepared.  
Calculation:

$$\% \text{ lutein} = \frac{A * V_1 * V_2}{2900 * v * w}$$

Where

A = absorbance

V<sub>1</sub> = Volume of first volumetric flask (ml)

V<sub>2</sub> = Volume of second volumetric flask (ml)

2900 = specific absorbance for lutein in cyclohexane/ethanol at 444 nm

v = volume of pipette (0.200 ml)

W = weight of sample (g)