CANTHAXANTHIN

Prepared at the 51st JECFA (1998), published in the Combined Compendium of Food Additive Specifications, FAO JECFA Monographs 1 (2005). Corrected at the 69th JECFA. An ADI of 0-0.03 mg/kg bw was established at the 44th JECFA (1995).

SYNONYMS CI Food Orange 8; INS No. 161 g; CI (1975) No 40850

DEFINITION Consists predominantly of trans-ß-carotene-4,4'-dione together with minor amounts of other isomers; diluted and stabilized forms are prepared from canthaxanthin meeting these specifications and include solutions or suspensions of canthaxanthin in edible fats or oils, emulsions and water dispersible powders; these preparations may have different cis/trans isomer ratios; the analytical methods described for the parent colour are not necessarily suitable for the assay of or determination of impurities in the stabilized forms (appropriate methods should be available from the manufacturer).

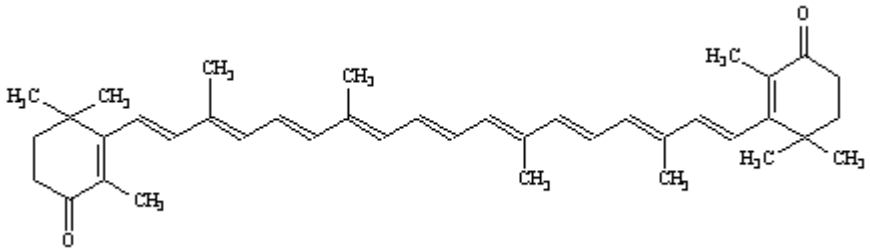
These specifications define only synthetic canthaxanthin and do not cover any commercially available food colour from natural sources.

Chemical names ß-Carotene-4,4'-dione; canthaxanthin; 4,4'-dioxo-ß-carotene

C.A.S. number 514-78-3

Chemical formula $C_{40}H_{52}O_2$

Structural formula



Formula weight 564.86

Assay Not less than 96% total colouring matters (expressed as canthaxanthin)

DESCRIPTION Deep violet crystals or crystalline powder; sensitive to oxygen and light and should therefore be kept in a light-resistant container under inert gas

FUNCTIONAL USES Colour

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4)	Insoluble in water, insoluble in ethanol, practically insoluble in vegetable oils, very slightly soluble in acetone
Spectrophotometry (Vol. 4)	A solution in cyclohexane has an absorbance maximum between 468 and 472 nm
Positive test for carotenoids	The colour of a solution of canthaxanthin in acetone disappears after successive additions of a 5 % solution of sodium nitrite and 1 N sulfuric acid

PURITY

Sulfated ash (Vol. 4)	Not more than 0.1% Test 2 g of the sample (Method I)
Subsidiary colouring matters	Carotenoids other than canthaxanthin: not more than 5% of total colouring matters 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 methods described in Volume 4, “Instrumental Methods”.

TESTS

PURITY TESTS

Subsidiary colouring matters

Dissolve about 80 mg of sample in 100 ml chloroform. Apply 400 µl of this solution as a streak 2 cm from the bottom of a TLC-plate (Silicagel 0.25 mm). Immediately develop the chromatogram with a solvent mixture of 95 parts dichloromethane and 5 parts diethyl ether in a saturated chamber, suitably protected from light, until the solvent front has moved 15 cm above the initial streak. Remove the plate, allow the main part of the solvent to evaporate at room temperature and mark the principal band as well as the bands corresponding to other carotenoids. Remove the silicagel adsorbent that contains the principal band, transfer it to a glass-stoppered 100 ml centrifuge tube and add 40.0 ml chloroform (solution 1).
Remove the silicagel adsorbent that contains the combined bands corresponding to the other carotenoids, transfer it to a glass-stoppered, 50 ml centrifuge tube and add 20.0 ml chloroform (solution 2).
Shake the centrifuge tubes by mechanical means for 10 min and centrifuge for 5 min. Dilute 10.0 ml of Solution 1 to 50.0 ml with chloroform (solution 3).
Determine, with a suitable spectrophotometer, the absorbances of Solutions 2 and 3 in 1-cm cells at the wavelength maximum about 485 nm, using chloroform as blank.
Calculation
Carotenoids other than canthaxantin (%) =

$$\frac{A_2 \times 100}{10\,A_1 + A_2}$$

where
A_2 = absorbance of Solution 2
A_3 = absorbance of Solution 3

METHOD OF ASSAY Proceed as directed under *Total Content by Spectrophotometry* (see Volume 4) using the following conditions:

W = 0.1 g
$V_1 = V_2 = V_3$ = 100 ml
$v_1 = v_2$ = 5 ml
$A^{1\%}_{1\ cm}$ = 2200
wavelength $_{max}$ = about 470 nm