

CAROTENES (Vegetable)

Prepared at the 51st JECFA (1998), published in FNP 52 Add 6 (1998) superseding specifications prepared at the 44th JECFA (1995), published in FNP 52 Add 3 (1995). ADI "acceptable", provided the level of use does not exceed the level normally found in vegetables, established at the 41st JECFA in 1993. Metals and arsenic specifications revised at the 59th JECFA (2002).

SYNONYMS Natural β -carotene, carotenes-natural; CI Food Orange 5, mixed carotenes, INS No. 160a(ii); CI (1975) No. 75130; CI (1975) No. 40800 (β -Carotene)

DEFINITION Carotenes (vegetable) are obtained by solvent extraction of carrots (*Daucus carota*), oil of palm fruit (*Elaeis guinensis*), sweet potato (*Ipomoea batatas*) and other edible plants with subsequent purification. The main colouring principles are alpha- and β -carotenes of which β -carotenes account for the major part. Minor amounts of gamma- and delta-carotenes and other pigments may be present. Besides the colour pigments, this substance may contain oils, fats and waxes naturally occurring in the source material. The only solvents used for the extraction are acetone, methanol, ethanol, propan-2-ol, hexane, carbon dioxide and vegetable oils.

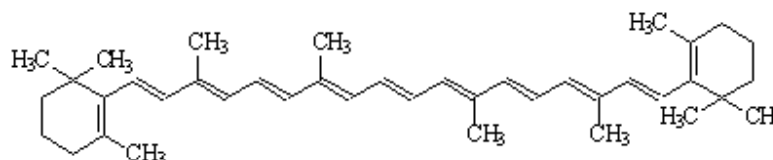
The main articles of commerce are solutions or suspensions in food grade vegetable/plant oil. This is for ease of use and to improve stability as carotenes easily oxidise.

Class Carotenoid

C.A.S. number 7235-40-7

Chemical formula $C_{40}H_{56}$ (β -Carotene)

Structural formula



all-*trans*- β -Carotene

Formula weight 536.88 (β -Carotene)

Assay Content of carotenes (calculated as β -carotene) is not less than declared

DESCRIPTION Red-brown to brown or orange to dark orange solid or liquid

FUNCTIONAL USES Colour

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4)

Insoluble in water

Spectrophotometry (Vol. 4)

A cyclohexane solution of the sample (1 in 200,000) shows maximum absorptions at 440-457 and 470-486 nm

Colour reaction

A spot of a solution of the sample in toluene (about 400 µg /ml of β-carotene) on a filter paper turns blue 2-3 min after application of a spray or drop of 20% solution of antimony trichloride solution in toluene.

PURITY

Residual solvents (Vol. 4)

Not more than 50 mg/kg, singly or in combination, of acetone, hexane, methanol, ethanol and propan-2-ol

Lead (Vol. 4)

Not more than 5 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

Proceed as directed under *Colouring Matters, Total Content by Spectrophotometry* in Volume 4, using the following conditions:

W (g) = amount of the sample to obtain adequate absorbance

$V_1 = V_2 = V_3 = 100$ ml

$v_1 = v_2 = 5$ ml

$A_{1\text{ cm}}^{1\%} = 2500$

$\lambda_{\text{max}} = 440-457$ nm