CARNAUBA WAX

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 0-7 mg/kg bw, established at the 39th JECFA in 1992.

SYNONYMS INS No. 903

DEFINITION The refined wax obtained from the fronds of the Brazilian tropical palm tree Copernicia cerifera (Arruda) Mart. [syn. C. purnifera (Muell.)]; a complex mixture of several chemical compounds, predominantly esters, e.g.,

- aliphatic esters (straight-chain acids with even-numbered carbon chains from C_{24} to C_{28} and straight-chain alcohols with even-numbered carbon chains from C_{30} to C_{34}),
- alpha-hydroxy esters (straight-chain hydroxy acids with even-numbered carbon chains from C_{22} to C_{28}, straight-chain acids with even-numbered carbon chains from C_{24} to C_{28}, straight-chain monohydric alcohols with even-numbered carbon chains from C_{24} to C_{34} and dihydric alcohols with even-numbered carbon chains from C_{24} to C_{34})
- cinnamic aliphatic diesters (p-methoxycinnamic acid and dihydric alcohols with even-numbered carbon chains from C_{24} to C_{34})

It also contains free acids (straight-chain acids with even-numbered carbon chains from C_{24} to C_{28}), free alcohols (straight-chain alcohols with even-numbered carbon chains from C_{30} to C_{34}), hydrocarbons (straight-chain odd-numbered carbon chains from C_{27} to C_{31}) and resins.

C.A.S. number 8015-86-9

DESCRIPTION A pale yellow to light brown, hard and brittle solid, having a clean fracture

FUNCTIONAL USES Glazing agent, bulking agent, acidity regulator, carrier

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Insoluble in water; partially soluble in boiling ethanol; soluble in ether

Melting range (Vol. 4) 80 - 86º

PURITY

Acid value (Vol. 4) Between 2 and 7

Saponification value (Vol. 4) Between 78 and 95

Ester value Between 71 and 93
Subtract the Acid value from the Saponification value to obtain the Ester value.

Sulfated ash (Vol. 4)

Not more than 0.25 % w/w
Heat a 2-g sample in a tared, open porcelain or platinum dish over an open flame. It volatilizes without emitting an acrid odour. Ignite as described in procedure for Ash (sulfated ash) Method I.

Unsaponifiable matter

Between 50 % and 55 %
See description under TESTS

Lead (Vol. 4)

Not more than 2 mg/kg
Prepare a sample solution as directed for organic compounds in the Limit Test and determine by *atomic absorption spectroscopy*, Volume 4

TESTS

PURITY TESTS

Unsaponifiable matter

Weigh accurately about 5 g of the sample into a 250-ml flask, add a solution of 2 g of potassium hydroxide in 40 ml ethanol, and boil gently under reflux for 1 h or until saponification is complete. Transfer the content of the flask to a glass-stoppered extraction cylinder (approximately 30 cm in length, 3.5 cm in diameter and graduated at 40, 80 and 130 ml).Wash the flask with sufficient alcohol to achieve a volume of 40 ml in the cylinder, and complete the transfer with warm and then cold water until the total volume is 80 ml. Finally wash the flask with a few ml of petroleum ether, add the washings to the cylinder, cool the contents of the cylinder to room temperature and add 50 ml of petroleum ether. Insert the stopper and shake the cylinder vigorously for at least 1 min, and allow both layers to become clear. Siphon the upper ether layer as completely as possible without removing any of the lower layer, collecting the ether fraction in a 500-ml separator. Repeat extraction and siphoning at least six times with 50-ml portions of petroleum ether, shaking vigorously each time. Wash the combined extracts, with vigorous shaking, with 25-ml portions of 10% ethanol until the wash water is neutral to phenolphthalein, and discard the washings. Transfer the ether extract to a tared beaker and rinse the separator with 10-ml of ether, adding the rinsings to the beaker. Evaporate the ether at a steam bath just to dryness, and dry the residue to constant weight, preferably at 75º to 80º under vacuum of not more than 200 mm of Hg, or at 100º for 30 min. Cool in a desiccator and weigh to obtain weight of unsaponifiable matter.

Dissolve the residue in 50 ml of warm neutral ethanol and titrate with 0.02N sodium hydroxide using phenolphthalein as indicator. Each ml of 0.02N sodium hydroxide is equivalent to 5.659 mg of fatty acids, calculated as oleic acid.

Subtract the calculated weight of fatty acids from the weight of the residue to obtain the corrected weight of unsaponifiable matter in the sample.