GRAPE SKIN EXTRACT

Prepared at the 28th JECFA (1984), published in FNP 31/1 (1984) and in FNP 52 (1992). Metals and arsenic specifications revised at the 59th JECFA (2002). An ADI of 0-2.5 mg/kg bw was established at the 26th JECFA (1982).

SYNONYMS Enociania, Eno; INS No. 163(ii)

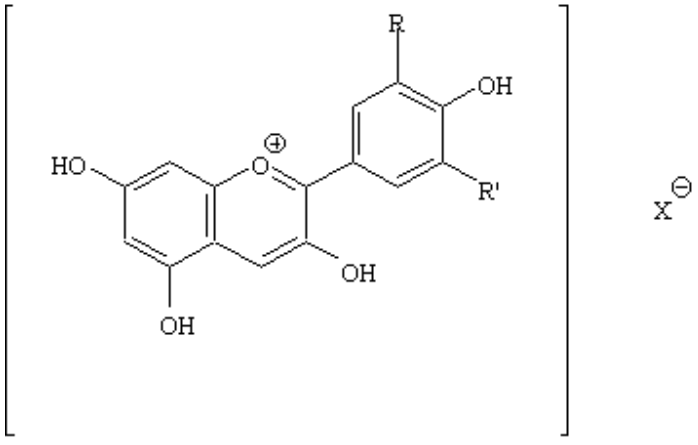
DEFINITION Obtained by aqueous extraction of grape skin or marc after the juice has been expressed from it; contains the common components of grape juice, namely: anthocyanine, tartaric acid, tannins, sugars, minerals, etc., but not in the same proportions as found in grape juice. During the extraction process, sulphur dioxide is added and most of the extracted sugars are fermented to alcohol; the extract is concentrated by vacuum evaporation during which practically all the alcohol is removed; a small amount of sulphur dioxide may be present.

Chemical names The principal colouring matters are anthocyanins, glucosides of anthocyanidins (2-phenylbenzopyrylium salts) such as peonidin, malvidin, delphinidin, and petunidin.

Chemical formula

Peonidin: $C_{16}H_{13}O_6X$
Malvidin: $C_{17}H_{15}O_7X$
Delphinidin: $C_{15}H_{11}O_7X$
Petunidin: $C_{16}H_{13}O_7X$
X: acid moiety

Structural formula



Peonidin: R = OCH_3; R' = H
Malvidin: R, R' = OCH_3
Delphinidin: R, R' = OH
Petunidin: R = OCH_3; R' = OH
X^-: acid moiety

Assay The colour intensity is not less than declared

DESCRIPTION Purplish-red liquid, lump, powder or paste, having a slight characteristic odour

FUNCTIONAL USES Colour

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) — Soluble in water

Spectrophotometry (Vol. 4) — At pH 3 the absorbance maximum is about 525 nm

Colour reaction — Add 0.1 g of the sample to 50 ml of water and shake thoroughly. Filter if necessary. The solution shows red to purplish-red colour and it turns to blue or dark green on the addition of sodium hydroxide TS.

PURITY

Sulfur dioxide — Not more than 0.005% per 1 colour value
Distil 1 g of the sample with 100 ml of water and 25 ml of phosphoric acid solution (2 in 7) in a distilling flask with the Wagner tube (Figure 1). In an absorption flask, place 25 ml of lead acetate solution (1 in 50) previously prepared. Insert the lower end of condenser into lead acetate solution in the absorption flask. Distil until the liquid in the absorption flask reaches about 100 ml and rinse the end of the condenser with a little amount of water. To the distilled solution add 5 ml of hydrochloric acid and 1 ml of starch TS, and titrate with 0.01 N iodine. Each ml of 0.01 N iodine is equivalent to 0.3203 mg of SO_2.

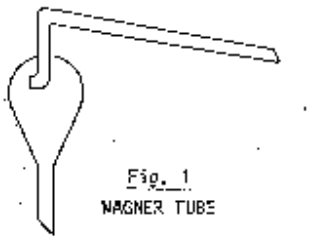


Fig. 1
WAGNER TUBE

Basic colouring matters — Add 1 g of the sample to 100 ml sodium hydroxide solution (1 in 100) and shake well. Take 30 ml of this solution and extract with 15 ml of ether. Extract this ether extract twice with each 5 ml of dilute acetic acid TS. The acetic acid extract is colourless.

Other acidic colouring matters — Add 1 ml of ammonia TS and 10 ml of water to 1 g of the sample and following the directions *Chromatography* place 0.002 ml of the solution on the chromatographic sheet and dry it. Use a mixture of pyridine and ammonia TS (2:1 by volume) as developing solvent and stop the development when the solvent front reaches about 15 cm height from the

point where the sample solution was placed. No spot is observed at the solvent front after drying under daylight. If any spot is observed, it should be decolourized when sprayed with a solution of stannous chloride in hydrochloric acid (2 in 5).

Arsenic (Vol. 4) — Not more than 3 mg/kg

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 method described in Volume 4, “Instrumental Methods.”

METHOD OF ASSAY

In the absence of an assay method, a measurement of colour intensity by the following method may be used.

Prepare approximately 200 ml of pH 3.0 citric acid - dibasic sodium phosphate buffer solution: Mix 159 volumes of 2.1% citric acid solution and 41 volumes of 0.16% dibasic sodium phosphate solution, and adjust the pH to 3.0, using the citric acid solution or dibasic sodium phosphate solution. Weigh accurately an adequate amount of the sample so that the measured absorbance is between 0.2 and 0.7, and add pH 3.0 citric acid - dibasic sodium phosphate buffer solution to make up a 100-ml solution. Measure the absorbance A of this solution in a 1 cm cell at the wavelength of maximum absorption around 525 nm, using pH 3.0 citric acid - dibasic sodium phosphate buffer solution as the blank.

$$\text{Colour value} = \frac{A \times 10}{\text{weight of sample (g)}}$$