



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 1886.315-2021

**National food safety standard - Food additives - Dactylopius
coccus Costa and its aluminum lake**

Issued on: February 22, 2021

Implemented on: August 22, 2021

Issued by: NHC; SAMR

Table of Contents

- 1 Scope
- 2 Molecular formula, structural formula, and relative
 - 2.1 Molecular formula
 - 2.2 Structural formula
 - 2.3 Relative molecular mass
- 3 Technical requirements
 - 3.1 Sensory requirements
- Appendix A Inspection method

1 Scope

This Standard applies to the food additive Dactylopius coccus Costa aluminum lake, which is obtained from the dry body of the female adult of Dactylopius coccus Costa, as the raw material, which is extracted by water, methanol and/or ethanol solution, and then concentrated, and is further refined by chelating with aluminum salt.

2 Molecular formula, structural formula, and relative

molecular mass of iconic components

2.1 Molecular formula

Carminic acid: $C_{22}H_{20}O_{13}$

2.2 Structural formula

Carminic acid:

2.3 Relative molecular mass

Carminic acid: 492.39 (according to the international relative atomic mass in 2018)

Appendix A Inspection method

A.1 General provisions The reagents and water that are used in this Standard, when no other requirements are specified, refer to analytical reagents and grade-III water which is specified in GB/T 6682. The standard solution, the standard solutions, preparations and products for impurity determination, which are used in the test, are all prepared in

accordance with the provisions of GB/T 601, GB/T 602, and

GB/T 603, when no other requirements are specified. The solution used in the test, if not indicated which solvent is used, refers to aqueous solution.

A.2 Identification test A.2.1 Reagents and materials A.2.1.1 Sodium hydroxide (or potassium hydroxide) solution: 100 g/L.

A.2.1.2 Sodium dithionite ($\text{Na}_2\text{S}_2\text{O}_4$).

A.2.1.3 Sulfuric acid.

A.2.1.4 Hydrochloric acid solution: 1+4.

A.2.1.5 Pentanol.

A.2.1.6 Petroleum ether A.2.1.7 5% uranyl acetate solution.

A.2.1.8 Activated carbon: iodine adsorption value ≥ 400 mg/g.

A.2.2 Analysis steps A.2.2.1 Solubility Dactylopius coccus Costa is easily soluble in water. The Dactylopius coccus Costa aluminum lake, of which the main cationic component is ammonium ions (Dactylopius coccus Costa aluminum ammonium), is easily soluble in water at pH 3.0 and pH 8.5; of which the main cationic component is calcium ions (Dactylopius coccus Costa aluminum calcium), is insoluble in water at pH 3.0 and easy soluble in water at pH 8.5.

A.2.2.2 Color reaction Accurately weigh 1 g of Dactylopius coccus Costa sample, accurate to 0.001 g, or 0.1 g of Dactylopius coccus Costa aluminum lake, accurate to 0.000 1 g; dissolve in 30 mL of hydrochloric acid solution and boil; cool to room temperature; then, transfer to a 1 000 mL volumetric flask; use water to fix the volume to the mark; shake well. On the spectrometer, use a 1 cm cuvette; use water to do a blank test; measure the absorbance at the maximum absorption wavelength of 494 nm. The absorbance value of the tested solution shall be between 0.650 ~ 0.750; otherwise, the sample volume needs to be adjusted separately to prepare the sample solution.

A.3.5 Result calculation Calculate the mass fraction w_1 of carminic acid according to Formula (A.1).

Where:

A - absorbance value of the sample solution;

m_1 - mass of the sample, in grams (g);

139 - theoretical extinction value of the 1% carminic acid solution.

The test results are based on the arithmetic mean of the parallel determination results; three significant figures are reserved. The absolute difference between two independent

determination results which are obtained under repeatability conditions shall not be greater than 1.0% of the arithmetic mean.

A.4 Loss on drying Adopt Method I direct drying method of GB 5009.3-2016; the drying temperature and time are 135 °C +/- 2 °C and 3 h respectively.

A.5 Determination of dilute ammonia insoluble matter A.5.1 Reagents and materials A.5.1.1 Ammonia solution: Measure 160 mL of ammonia water; use water to dilute to 500 mL.

A.5.1.2 0.1% dilute ammonia water: Measure 4 mL of nitrogen water; use water to dilute to 1 000 mL.

A.5.2 Instruments and apparatuses A.6.1.4 Water: Grade-1 water that is specified in GB/T 6682.

A.6.2 Instruments and apparatuses Gas chromatograph: with hydrogen flame ionization detector (FID) and headspace sampler.

A.6.3 Reference chromatographic conditions A.6.3.1 Chromatographic column: fused silica; the column length is 30 m; the inner diameter is 0.53 mm; the coating is 100% dimethyl polysiloxane; the coating thickness is 5 µm. Or a chromatographic column of equivalent performance.

A.6.3.2 Carrier gas: helium.

A.6.3.3 Flow rate: 208 kPa, 5 mL/min.

A.6.3.4 Column temperature: maintain 35 °C for 5 minutes; then, rise to 90 °C at a rate of 5 °C/min; maintain for 6 minutes.

A.6.3.5 Temperature of the sample injector: 140 °C.

A.6.3.6 Temperature of the detector: 300 °C.

A.6.4 Reference headspace conditions A.6.4.1 Sample heating temperature: 60 °C.

A.6.4.2 Sample heating time: 10 min.

A.6.4.3 Injector temperature: 70 °C.

A.6.4.4 Transmission temperature: 80 °C.

A.6.4.5 Sample gas injection: split mode, 1.0 mL.

A.6.5 Analysis steps A.6.5.1 Preparation of internal standard solution Pipette 50 mL of water into a 50 mL injection bottle; seal; accurately weigh, accurate to 0.000 1 g. Pipette 15 µL of trimethyldipentanone; inject it into the sample bottle through the membrane; mix well; weigh again, to the nearest 0.000 1 g.

A.6.5.2 Preparation of blank solution