RESOLUTION OENO 30/2004

MALIC ACID

THE ASSEMBLY GENERAL,

IN VIEW of Article 2 paragraph iv of the Agreement of 3 April 2001 establishing the International Organisation of Vine and Wine

UPON THE PROPOSAL by the Sub-Commission of Methods of Analysis and Appraisal of Wine,

DECIDES to add to the International Oenological International Oenological Codex, the following monograph:

L-MALIC ACID, DL-MALIC ACID

2-hydroxybutanedioic acid

N° SIN: 296

C.A.S. number 617-48-1

Chemical formula $C_4H_6O_5$

Molecular mass: 134.09

1. OBJECT, ORIGIN AND FIELD OF APPLICATION

An acid of natural origin contained in most fruit (L-malic acid) or synthetically made: DL-malic.

It is used for the acidification of musts and wines in the conditions set by the regulation.

2. LABELLING

The label must mention particularly clearly that it is L-malic or D,L-malic acid, the storage conditions and date of expiry.

Malic acid content should be at least 99%.

3. CHARACTERISTICS

White or off-white crystalline powder or granules with a clearly acid flavour.

Melting point of D,L-malic: 127°C-132°C

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Melting point of L-malic: 100°C.

4. SOLUBILITY

Water at 20°C: 55.8 g/100

Alcohol at 95% vol.: 45.5 g/100.

Ether: 0.84 g/ 100

5. OPTICAL ROTATION

For the L-Malic acid in aqueous solution at 8.5 g for 100 ml.

$\alpha^{D}_{20°C}$ is - 2.3°

6. IDENTITY CHARACTERS

6.1. Characterisation of malic acid

Malic acid can be determined by an enzymatic process according to the methods in the Compendium of international methods of analysis of wines and musts (specifically L-malic and D-malic acids. Malic acid can also be determined by HPLC according to the method in the Compendium of international methods of analysis of wines and musts.

7. TEST TRIALS

7.1. Preparation of the test trial solution

For purity trials, prepare a solution containing 10% m/v of malic acid.

7.2. Sulphuric cinders

From a 2 g sample of malic acid, determine the sulphuric cinders as indicated in chapter II of the International Oenological Codex.

Content must be less than or equal to 1 g/kg.

7.3. Chlorides

To 0.5 ml of the test trial solution (7.1), add 14.5 ml of water, 5 ml of diluted nitric acid (R) and 0.5 ml of silver nitrate solution at 5% (R). The solution should satisfy for the test trial, the determination limit of chlorides described in chapter II of the

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International Oenological Codex.

Content must be less than 1 g/kg expressed in hydrochloric acid.

7.4. Iron

To 10 ml of the test trial solution (7.1), add 1 ml of concentrated hydrochloric acid (R) and 2 ml of potassium thiocyanate solution at 5% (R). The red colouration obtained should not be darker than that of the control prepared with 1 ml of an iron salt solution (III) at 0.010 g of iron per litre (R), 9 ml of water and the same quantities of the same reagents.

Content must be less than 10 mg/kg.

Iron can also be determined by atomic absorption spectrometry according to the method described in chapter II of the International Oenological Codex.

7.5. Lead

Using the test trial solution (7.1), apply the method described in chapter II of the International Oenological Codex.

Lead content must be less than 5 mg/kg.

7.6. Mercury

Using the test trial solution (7.1), determine the mercury according to the method described in chapter II of the International Oenological Codex.

Mercury content must be less than 1 mg/kg.

7.7. Cadmium

Using the test trial solution (7.1), determine the cadmium according to the method described in chapter II of the International Oenological Codex.

Cadmium content must be less than 1 mg/kg.

7.8. Arsenic

Using the test trial solution (7.1), determine the arsenic according to the method described in chapter II of the International Oenological Codex.

Arsenic content must be less than 3 mg/kg.

7.9. Sulphates

To 1 ml of the test trial solution (7.1), add 18 ml of water, 1 ml of diluted hydrochloric acid at 10% (R) and 2 ml of the barium chloride solution at 10% (R). The solution should

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satisfy for the test trial, the determination limit of sulphates described in chapter II of the International Oenological Codex.

Sulphates content must be less than 1 g/kg, expressed in sulphuric acid.

7.10. Cyanides

In a 40 ml volumetric flask containing 25 ml of distilled water and 2.5 ml of buffer solution at pH 7.5 (R), introduce 0.4 ml of the test trial solution (7.1), add 0.3 ml of chloramine T solution at 0.1% (R). Wait 90 seconds and add 6 ml of pyridine-pyrazolone reagent (R). Complete to 40 ml with distilled water and mix. The colouration obtained must not be darker than that obtained by treating the same way 4 ml of a freshly prepared potassium cyanide solution titrating 1 mg of hydrocyanic acid per litre (R).

Free cyanide content expressed in hydrocyanic acid must be less than 1 mg/kg.

7.11. Sugars

Add 2 ml of the test trial solution (7.1) to 10 ml of cupro-alkaline reagent (R). No red precipitate should form.

7.12. Fumaric and maleic acids

Limit in fumaric acid: 1% in weight.

Limit in maleic acid: 0.05% in weight. These acids are determined by HPLC according to the method described in the Method of Analysis of Wines and Musts in the same way as malic and tartaric acids.

8. STORAGE

Malic acid should be stored in hermetically sealed containers away from heat and light.

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