

# ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

## ISO RECOMMENDATION R 709

DETERMINATION OF ESTER VALUE  
AND CALCULATION OF ESTER CONTENT OF ESSENTIAL OILS

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## BRIEF HISTORY

The ISO Recommendation R 709, *Determination of ester value and calculation of ester content of essential oils*, was drawn up by Technical Committee ISO/TC 54, *Essential oils*, the Secretariat of which is held by the Repartição de Normalização (IGPAI).

Work on this question by the Technical Committee began in 1953 and led, in 1963, to the adoption of a Draft ISO Recommendation.

In November 1965, this Draft ISO Recommendation (No. 873) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Ireland	South Africa,
Australia	Israel	Rep. of
Belgium	Italy	Sweden
Brazil	Japan	Turkey
Canada	New Zealand	U.A.R.
Chile	Paraguay	United Kingdom
France	Poland	U.S.S.R.
Germany	Portugal	Yugoslavia
India	Romania	

One Member Body opposed the approval of the Draft :

Netherlands

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in April 1968, to accept it as an ISO RECOMMENDATION.

## DETERMINATION OF ESTER VALUE AND CALCULATION OF ESTER CONTENT OF ESSENTIAL OILS

### 1. SCOPE

This ISO Recommendation describes the method to be used in determining the ester value and calculating the ester content of essential oils, expressed as a conventionally accepted ester, with the exception of certain oils containing lactones and oils containing a substantial proportion of aldehydes.

### 2. DEFINITION

*Ester value E.* The number of milligrammes of potassium hydroxide required to neutralize the acids liberated by the hydrolysis of esters present in 1 g of the essential oil.

### 3. PRINCIPLE OF THE METHOD

Hydrolysis of the esters by standard volumetric solution of alkali and titration of the excess alkali.

### 4. REAGENTS

- 4.1 *Ethanol*, 95 % (v/v), at 20 °C, freshly neutralized with the alkali solution (4.2) using the solution (4.4) as indicator, or the solution (4.5) when the essential oil has components that contain phenol groups.
- 4.2 *Potassium hydroxide*, 0.5 N solution in ethanol (4.1).
- 4.3 *Hydrochloric acid*, 0.5 N standard volumetric aqueous solution.
- 4.4 *Phenolphthalein alcoholic solution*, obtained by dissolving 0.2 g of phenolphthalein in ethanol (4.1) until a volume of 100 cm<sup>3</sup> is obtained.
- 4.5 *Phenol red alcoholic solution*, obtained by dissolving 0.04 g of phenol red in 20 % (v/v) ethanol until a volume of 100 cm<sup>3</sup> is obtained.

### 5. APPARATUS

- 5.1 *Suitable device for maintaining ebullition.*
- 5.2 *Saponification flask*, alkali-resistant glass flask, with ground-glass neck, of capacity 100 to 200 cm<sup>3</sup> to which can be fitted a ground-glass tube at least 1 m in length and about 1 cm internal diameter, serving as a reflux condenser or, if necessary, a reflux cooler. Equip the condenser during cooling with a guard tube containing a carbon dioxide absorbant.
- 5.3 *Cylinders*, of 5 cm<sup>3</sup> capacity.
- 5.4 *Standard burettes*, of 25 cm<sup>3</sup> capacity, graduated in tenths of a cubic centimetre.\*
- 5.5 *Standard pipette*, of 25 cm<sup>3</sup> capacity.\*\*

### 6. SAMPLING

See ISO Recommendation R 212, *Essential oils – Sampling*.

\* See Class B of ISO Recommendation R 385, *Burettes*.

\*\* See Class B of ISO Recommendation R 648, *One-mark Pipettes*.