SRI LANKA STANDARD 313 PART 1- SECTION 2 : 2009
UDC 665.2 : 613.268

METHODS FOR ANALYSIS OF ANIMAL AND VEGETABLE FATS AND OILS

PART 1 – DETERMINATION OF PHYSICAL CHARACTERISTICS

Section 2 : Determination of the relative density at t ^{0}C/ t_0 ^{0}C in air (Second Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
METHODS FOR ANALYSIS OF ANIMAL AND VEGETABLE FATS AND OILS
PART 1 – DETERMINATION OF PHYSICAL CHARACTERISTICS
Section 2 : Determination of the relative density at t ^{0}C/ t_0 ^{0}C in air
(Second Revision)

SLS 313 : Part 1 - Section 2:2009

Gr. 3

SRI LANKA STANDARDS INSTITUTION
No. 17, Victoria Place,
Elvitigala Mawatha,
Colombo - 08.
Sri Lanka

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

Sri Lanka Standard
METHODS FOR ANALYSIS OF ANIMAL AND VEGETABLE FATS AND OILS
PART 1 – DETERMINATION OF PHYSICAL CHARACTERISTICS
Section 2 : Determination of the relative density at t ^{0}C/ t_0 ^{0}C in air
(Second Revision)

FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Agriculture and Food Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2009-03-30.

This standard was first published in 1976 and subsequently revised in 1993. This standard prescribes the general methods for determining whether the material conforms to the requirements of the relevant individual standards and thus form a necessary adjunct to series of Sri Lanka Standard Specification for individual oils and fats. However, keeping in view the experience gained during the years and various International standards brought out by the International Organization for Standardization (ISO) on the subject of testing animal and vegetable fats and oils, it was decided to revise it with a view to updating the existing methods of test and by incorporating those not covered earlier.

In order to accommodate large number of test methods within the scope of one standard, this standard is published in four parts covering different characteristics as indicated below.

Part 1 Determination of physical characteristic
Part 2 Determination of chemical characteristics
Part 3 Determination of foreign substances and parameters affecting quality and stability
Part 4 Determination of principal constituents and natural constituents.

1 SCOPE

This section prescribes a method for the determination of relative density of fats at t ^{0}C/ t_0 ^{0}C in air.

2 DEFINITIONS

For the purpose of this section, the following definition shall apply :

relative density : The ratio of the mass, determined by weighing in air, of a given volume of the fat at t ^{0}C to that of the same volume of water at the weighings being made with weights adjusted to balance weights of density 8 g/cm^3 in air.

3 PRINCIPLE

Measurement of the mass of the liquid fat at the required temperature t ^{0}C, using the density bottle or pyknometer. The density bottle or pyknometer is calibrated with water using similar procedure at t ^{0}C and calculate the relative density.

4 APPARATUS

Density bottle or pyknometer of at least 25 ml capacity.

5 PROCEDURE

5.1 Fats which do not deposit stearin at the temperature of determination.

5.1.1 ***Calibrate a density bottle or pyknometer as follows :***

Clean and dry the density bottle or pyknometer and weigh. Fill it with freshly boiled and cooled water. Keep in a water bath at t_0 ^{0}C until it reaches the temperature. If a bottle is used, insert the stopper in such a way that the capillary portion is completely filled with water, and then maintain it at t_0 ^{0}C until no further alteration in volume occurs. Wipe the stopper. If a pyknometer is used, adjust the volume of liquid to the fixed mark.

Remove the bottle or pyknometer form the bath, dry the outside, allow to cool to the room temperature for about 30 minutes and weigh. Empty and dry the bottle or pyknometer.

5.1.2 Fill the bottle or pyknometer with the sample of fat previously brought closer to the temperature of t ^{0}C. Transfer the bottle or pyknometer to a water bath maintained at t ^{0}C and leave until it reaches that temperature.

If a bottle is used, insert the stopper in such a way that the capillary portion is completely filled with the fat and then maintain it at the temperature t ^{0}C until no further alteration in volume occurs. Wipe the stopper. If a pyknometer is used, adjust the volume to the fixed mark.

Remove the density bottle or pyknometer from the bath, dry the outside, allow to cool to room temperature for about 30 minutes and weigh. Make all weighings in air with weighs adjusted to balance weights of density 8 g/cm^3 in air.

NOTE : *The ambient temperature of the room in which the determination is carried out should be below t ^{0}C. It is important that the temperature and humidity of the room when the determination is made do not differ significantly form the temperature and humidity of the room when the calibration is done.*

5.2 Method for fats which deposit stearin at the temperature of determination

5.2.1 Calibrate the density bottle or pyknometer as prescribed in **5.1.1**.

5.2.2 Make the determination at t ^{0}C after the oil has attained the state which it would be expected to assume in bulk, that is , after it has deposited as much stearin as it is capable of depositing. Heat the fat to a temperature above t ^{0}C at which the fat is in liquid state. Fill the bottle or pyknometer, at a temperature at least 5 ^{0}C below t ^{0}C for 24 hours, to ensure the depositing of the stearin. Transfer the bottle or pyknometer to a water bath maintained at t ^{0}C and leave until it reaches that temperature.

Proceed as prescribed in second para of **5.1.2.**

6 EXPRESSION OF RESULTS

$$\text{Relative density at } t\,^0C/t_0\,^0C \text{ in air} = \frac{(m_2 - m_0)}{(m_1 - m_0)\{1 + \tilde{} (t - t_0)\}}$$

where,

m_0 is the mass, in g, of density bottle or pyknometer ;

m_1 is the mass, in g, of density bottle or pyknometer with water ;

m_2 is the mass, in g, of density bottle or pyknometer with fat ; of fat weighed in the test ;

~ is the co-efficient of cubic expansion of glass at the given temperature t_0 ^{0}C (equal to 0.000 03 ^{0}C $^{-1}$ for soda glass and equal to 0.000 01 ^{0}C^{-1} for borosilicate glass)

t_0 is the temperature, in ^{0}C, of the water ; and

t is the temperature, in ^{0}C, of the fat.

NOTES :

1 *For the fatty oils of commerce the apparent density is lower than the relative density by 0.001 8.*

2 *Provided that no stearin can separate from the oil at a temperature in the neighbourhood of t ^{0}C, and that no visible moisture or impurities are present in the oil, the relative density may be determined at any temperature between (t + 5) ^{0}C and (t – 5) ^{0}C. The relative density at t ^{0}C is calculated form the figure so obtained by adding 0.000 69 to the figure determined for each t ^{0}C by which the temperature of observation exceeds t ^{0}C or by subtracting from it 0.000 69, for each 1 ^{0}C by which it is lower than t ^{0}C.*

7 REPEATABILITY

The difference between the results of the two determinations, carried out simultaneously or in quick succession by the same analyst under the same conditions using the same test sample, shall not exceed two units of the fourth decimal place.

8 TEST REPORT

The test report shall show the method used, the measurement temperature and the results obtained. It shall also mention any operating details not specified in this section, or regarded as optional, together with details of any incidents likely to have influenced the results.

The test report shall include all the information necessary for the complete identification of the sample.

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

Printed at SLSI (Printing Unit)