INTERNATIONAL STANDARD

ISO 8156

IDF 129

Second edition
2005-10-01

Dried milk and dried milk products — Determination of insolubility index

Lait sec et produits laitiers en poudre — Détermination de l'indice d'insolubilité

Reference numbers
ISO 8156:2005(E)
IDF 129:2005(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

International Dairy Federation
Diamant Building • Boulevard Auguste Reyers 80 • B-1030 Brussels
Tel. + 32 2 733 98 88
Fax + 32 2 733 04 13
E-mail info@fil-idf.org
Web www.fil-idf.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8156|IDF 129 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF). It is being published jointly by ISO and IDF.

This edition of ISO 8156|IDF 129 cancels and replaces ISO 8156:1987, of which it constitutes a minor revision.

Foreword

IDF (the International Dairy Federation) is a worldwide federation of the dairy sector with a National Committee in every member country. Every National Committee has the right to be represented on the IDF Standing Committees carrying out the technical work. IDF collaborates with ISO in the development of standard methods of analysis and sampling for milk and milk products.

Draft International Standards adopted by the Action Teams and Standing Committees are circulated to the National Committees for voting. Publication as an International Standard requires approval by at least 50 % of the IDF National Committees casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. IDF shall not be held responsible for identifying any or all such patent rights.

ISO 8156|IDF 129 was prepared by the International Dairy Federation (IDF) and Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*. It is being published jointly by IDF and ISO.

All work was carried out by the Joint ISO/IDF/AOAC Group of Experts on *Physical properties of dried milk products*, under the aegis of its chairman, Mr J. de Vilder (BE).

This edition of ISO 8156|IDF 129 cancels and replaces IDF 129A:1988, of which it constitutes a minor revision.

Introduction

0.1 There are several rather elaborate gravimetric methods for determining the solubility of dried milk (for example, References [1] and [2]), but for routine purposes, including grading, the most widely used procedure is the so-called solubility index method of the American Dry Milk Institute (see Reference [3]), in which a test portion is mixed with water and the reconstituted product is centrifuged. The volume, in millilitres, of the sediment finally obtained (i.e. insoluble residue) is the solubility index. Since the solubility index is thus inversely related to solubility, it seems more direct and more rational to use the term "insolubility index" to describe what is determined by a "solubility" method such as that of the ADMI. Accordingly, "insolubility index" was adopted to designate what is determined in the sediment-volume solubility method described in this International Standard. Use of this new expression also serves to differentiate the method described in this International Standard from the solubility index method of the ADMI.

Although the ADMI solubility index method has been in use in many countries for a considerable period, it became evident some time ago that its precision (repeatability, reproducibility), which is not stated by ADMI, is unsatisfactory with some types of spray-dried whole milk and with roller-dried milk and milk products. This led to the conclusion that the apparatus and technique of the ADMI method are inadequately defined, and are unsuitable for some dried milks, and consequently either the ADMI method should be more closely specified, and possibly modified in some respects, or an alternative method developed. The latter approach was at first favoured because of difficulty in obtaining the special mixer (and spare parts) manufactured in the USA for the ADMI method. However, when improved models of this mixer came to be manufactured in several countries and hence were readily available, it was decided to concentrate on improving the precision of the ADMI method whole retaining its principal features so that most of the existing ADMI solubility index specifications for grading would still be applicable.

0.2 In any sediment-volume solubility method applied to a dried milk or a dried milk product, the temperature at which the test portion is reconstituted is the main factor influencing what the result will be. In the ADMI solubility index method, a reconstituting temperature of 75 °F (23,9 °C) is used with spray-dried or roller-dried whole milk, skimmed milk and buttermilk, instant or non-instant as appropriate. But for the insolubility index method, it was decided to adopt the principle that the reconstituting temperature should be either 24 °C or 50 °C depending on whether the product, in normal usage from its quality specification, is expected to be reconstitutable in "cold" water or "warm" water respectively. **This means that the reconstituting temperature to be used in the insolubility index method will, in general, be 24 °C for spray-dried products and 50 °C for roller-dried products**. Exceptions to this general rule are spray-dried milk-based baby food and, in some instances, spray-dried whole milk or partly skimmed milk, intended to be reconstituted in warm water. However, it is important to note that if the insolubility index of spray-dried fat-containing milks is determined at 50 °C, the values obtained will all tend to be very small because the method will no longer detect products that have been subjected to excessive dry heat through faulty manufacture or storage. This is because milk protein denatured by dry heat is insoluble at 24 °C and, along with entrapped or combined fat, is precipitated as sediment when centrifuging is performed. At 50 °C, the dry-heat-denatured protein is soluble and this, with the release of the associated fat, can cause a marked reduction in the volume of sediment (see References [4] to [6]).

0.3 The insolubility index method described in this International Standard is thus basically the same as the ADMI solubility index method, but with all the apparatus and experimental conditions as closely defined as practicable and the reconstituting temperature either 24 °C or 50 °C, as appropriate (see 0.2). The latter innovation means that an insolubility index value will require to be accompanied by the reconstituting temperature used, for example 0,25 ml (24 °C), 0,10 ml (50 °C). The precision of the insolubility index method has been determined in an interlaboratory collaborative study and is considered to be satisfactory.

Dried milk and dried milk products — Determination of insolubility index

1 Scope

This International Standard specifies a method of determining the insolubility index, as a means of assessing the solubility, of dried whole milk, dried partly skimmed milk and dried skimmed milk, whether non-instant or instant.

NOTE These milks are defined in Reference [7] as “whole milk powder”, “partly skimmed milk powder” and “skimmed milk powder”, respectively.

The method is also applicable to dried whey, dried buttermilk and dried milk-based baby food, as well as to any of the dried products listed in which milk fat has been replaced by another fat, or which has been roller-dried instead of spray-dried.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
insolubility index
volume, in millilitres, of sediment (insoluble residue) obtained when a dried milk or dried milk product is reconstituted and the reconstituted milk or milk product is centrifuged, under the conditions specified in this International Standard

3 Principle

Water at 24 °C (or at 50 °C if appropriate, see 0.2) is added to a test portion, which is reconstituted using a special mixer. After a specified standing period, a specified volume of the reconstituted milk or milk product is centrifuged in a graduated tube. The supernatant liquid is removed and the sediment is redispersed after the addition of water at the same temperature as used for the reconstitution. The mixture is centrifuged and the volume of sediment (insoluble residue) obtained is recorded.

4 Reagents

Use only distilled water or demineralized water, or water of at least equivalent purity.

4.1 Silicone antifoaming agent, for example an aqueous emulsion containing 30 % (mass fraction) of silicone.

Test the suitability of the silicone antifoaming agent by carrying out the procedure described in Clause 7 without a test portion. No more than a trace of silicone fluid ($\leqslant$ 0,01 ml) should be visible at the bottom of the tube at the end of the procedure.