

INTERNATIONAL  
STANDARD

ISO  
21807

First edition  
2004-09-01

---

---

**Microbiology of food and animal feeding  
stuffs — Determination of water activity**

*Microbiologie des aliments — Détermination de l'activité de l'eau*



Reference number  
ISO 21807:2004(E)

© ISO 2004

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS

© ISO 2004

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## 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 21807 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 9, *Microbiology*.

## Introduction

Microorganisms require water for their metabolic activities, but only a certain fraction, the so-called “free water”, of the total water present in any foodstuff is available for this purpose. The amount of “free water”, termed the water activity, depends upon the nature and quantity of the components dissolved in the aqueous phase of the product (see reference [1]). Various species of microorganisms tolerate only water activities that are within certain levels. Water activity can therefore be used to predict microbial growth and determine the microbiological stability of a food product.

This document is a preview generated by EVS

# Microbiology of food and animal feeding stuffs — Determination of water activity

## 1 Scope

This International Standard gives basic principles and requirements for physical methods of determining the water activity of products intended for human consumption and the feeding of animals.

Water activity can be used to predict microbial growth and determine the microbiological stability of a food product, and it also provides an important, quantitatively determinable criterion for estimating the times for which a foodstuff can be kept.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7218, *Microbiology of food and animal feeding stuffs — General rules for microbiological examinations*

## 3 Terms and definitions

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

### 3.1 water activity

$a_w$   
ratio of the water-vapour pressure in the foodstuff to the vapour pressure of pure water at the same temperature

$$a_w = \frac{c_{EM}}{100} = \frac{p_F(T)}{p_S(T)}$$

where

$c_{EM}$  is the relative equilibrium moisture content of the atmosphere in contact with the foodstuff;

$p_F(T)$  is the partial water-vapour pressure in equilibrium with the foodstuff at the temperature  $T$  (kept constant during measurement);

$p_S(T)$  is the saturated partial pressure of pure water at the same temperature ( $T$ ); this can be obtained from reference tables of water vapour pressure.

NOTE The water activity is therefore a dimensionless quantity, with a completely anhydrous test specimen having a water activity of 0,0 and pure salt-free water having one of 1,0. The water activities of most foodstuffs are at the upper end of this scale, and range from approximately 0,992 for untreated, raw meat down to about 0,800 for salted and dried products.