



SLOVENSKI STANDARD
oSIST ISO 3631:2020

01-november-2020

Citrusi - Smernice za skladiščenje

Citrus fruits -- Guidelines for storage

Agrumes -- Lignes directrices pour l'entreposage

Ta slovenski standard je istoveten z: ISO 3631:2019

ICS:

67.080.10 Sadje in sadni proizvodi Fruits and derived products

oSIST ISO 3631:2020

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/3ed67009-7e2c-4dec-9644-c5d8b5749f00/osist-iso-3631-2020>

INTERNATIONAL STANDARD

**ISO
3631**

Second edition
2019-09

Citrus fruits — Guidelines for storage

Agrumes — Lignes directrices pour l'entreposage

ITeH STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/3ed67009-7e2c-4dec-9644-c5d8b5749f00/osist-iso-3631-2020>



Reference number
ISO 3631:2019(E)

© ISO 2019

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/3ed67009-7e2c-4dec-9644-c5d8b5749f00/osist-iso-3631-2020>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Conditions of harvesting and putting into store	1
4.1 Varieties (cultivars).....	1
4.2 Harvesting.....	1
4.3 Quality characteristics for storage.....	2
4.3.1 Condition of fruit at harvesting.....	2
4.3.2 Treatment of fruit.....	2
4.4 Putting into store.....	3
5 Storage conditions	3
5.1 Storage without refrigeration.....	3
5.2 Refrigerated storage.....	3
5.2.1 General.....	3
5.2.2 Pre-cooling.....	3
5.2.3 Short-, medium- and long-term refrigerated storage.....	4
5.3 Keeping life.....	4
Annex A (informative) List of cultivars and their synonyms	8
Annex B (informative) List of principal commercial cultivars and producing countries(non-restrictive list)	12
Annex C (informative) Damage in storage	15
Bibliography	17

ISO 3631:2019(E)

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 3, *Fruits and vegetables and their derived products*.

This second edition cancels and replaces the first edition (ISO 3631:1978), which has been technically revised. The main changes compared with the previous edition relate to storage temperatures, durations and cultivars.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Citrus fruits are divided into five major groups from different species which differ from each other in their behaviour during transport and should therefore be considered separately from the point of view of storage conditions. The groups are the following:

- oranges;
- mandarins, tangerines and their hybrids;
- lemons;
- grapefruits and their hybrids;
- limes.

Citrus fruits undergo little change after harvesting. They have no climacteric phase, and should therefore be harvested ready for consumption.

Peel colour is not always an indication of maturity; there is not necessarily a direct relation between colour and degree of ripeness.

The keeping life of the fruit depends on several factors, including the following:

- growing climate conditions;
- agrotechnical factors (nature of rootstock, size of fruits, method of pruning, etc.);
- harvesting conditions (time of picking, condition of fruit at harvest);
- degree of maturity and treatments during storage; keeping temperature;
- relative humidity of the store.

The longer the fruits remain on the trees after they have reached edible condition, the shorter the time they can be kept after harvest. However, growth regulators can be used to enhance the keeping quality of late harvest fruit.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/3ed67009-7e2c-4dec-9644-c5d8b5749f00/osist-iso-3631-2020>

Citrus fruits — Guidelines for storage

1 Scope

This document specifies the conditions required for good keeping of the following groups of citrus fruits during their storage with or without refrigeration, in stores or in various transport equipment (such as containers, railway cars, trucks or ships):

- oranges: *Citrus sinensis* (Linnaeus) Osbeck;
- mandarins: *Citrus reticulata* Blanco;
- lemons: *Citrus limon* (Linnaeus) N. L. Burman;
- grapefruits: *Citrus paradisi* Macfadyen;
- limes:
 - *Citrus aurantifolia* (Christmann) Swingle;
 - *Citrus latifolia* Tanaka.

Detailed information concerning cultivars in these different groups is given in [Annexes A](#) and [B](#).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Conditions of harvesting and putting into store

4.1 Varieties (cultivars)

This document concerns fresh fruit intended for storage and belonging to the varieties listed in [Annex A](#).

4.2 Harvesting

The fruits should be harvested when they have reached the stage of maturity that makes them fit for consumption. Harvesting may be temporarily interrupted when weather conditions (rain, etc.) are likely to have an adverse influence on the keeping qualities.

Fruit collected from the ground is often infected with *Phytophthora*, and therefore dropped fruit should not be harvested.

ISO 3631:2019(E)

The maturity criteria usually considered are the following:

- juice content, expressed as a percentage by mass (the juice content may vary slightly as a result of the conditions and duration of storage);
- flavour;
- titrable acid (TA) and/or the TSS/TA ratio, which is calculated by the formula $\frac{x}{y}$

where

x is the total soluble solids content (see ISO 2173);

y is the acidity expressed as an hydrous citric acid (see ISO 750).

The values to be adopted for these last two criteria depend on the varieties under consideration, and on ecological conditions. They should therefore be considered only in relation to the variety and to a well-defined area of production. Reference should be made to the specialized documents that have been published on the subject in the different areas of production.

4.3 Quality characteristics for storage

4.3.1 Condition of fruit at harvesting

Fruits intended for storage should be clean, firm and without blemishes (damage caused by pickers' fingernails, insect punctures, bruises, etc.). There should be no evidence of fungal or physiological disorders. They should retain their calyces.

Ethylene degreening is not advisable for fruit intended for long storage. This treatment hastens the physiological development of the fruit and shortens its keeping life. If it has been carried out, this fact should be brought to the attention of prospective purchasers. Ethylene-degreened fruit may be packed without stem-ends.

4.3.2 Treatment of fruit

4.3.2.1 After a first sorting in order to remove leaves, trash and defective fruits (such as those that are damaged or heavily infected with *Penicillium*), the fruits are preferably washed by spraying (which reduces the risk of infection) or by sprinkling or soaking in tanks. They are then rinsed and brushed and receive a fungicidal treatment. This should be applied as soon as possible after harvesting. For fruit picked with a high degree of turgidity, treatment should be delayed for 24 h after picking. Lemons and limes are not always washed.

The fungicidal treatment is carried out with a solution or a suspension of a fungicidal product and, in the case of infection by *Phytophthora*, can include a heat treatment carried out by dipping the fruit in a treating solution or water for 1,5 min to 5 min, at a temperature varying between 35 °C and 48 °C. This treatment is effective when carried out shortly after rains and infection in the grove.

Fungicidal treatments are applied as applicable. They should not leave visible deposits on the fruits.

The fungicidal treatment is generally followed by rinsing in order to ensure that the fungicide residues after treatment do not exceed the limits authorized.

A certain period of exposure to air before washing and fungicidal treatment renders the skins less turgid and less subject to bruising, which may arise during subsequent handling. As any bruising may lead to rotting, this procedure should only be followed in the case of fruit from areas of production in a dry climate. As a general rule, this period should not exceed 24 h.