International Standard 873

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Peaches — Guide to cold storage

Pêches — Guide pour l'entreposage réfrigéré

First edition — 1980-08-15

UDC 634.25 : 664.8.037 **Ref. No. ISO 873-1980 (E)**

Descriptors : agricultural products, fruits, peaches, storage, cold storage.

Price based on 5 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 873 was developed by Technical Committee ISO/TC 34, *Agricultural food products.*

It was submitted directly to the ISO Council, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces ISO Recommendation R 873-1968, which had been approved by the member bodies of the following countries :

Australia	Germany, F.R.	Romania
Brazil	Hungary	South Africa, Rep. of
Bulgaria	India	Turkey
Chile	Iran	United Kingdom
Colombia	Israel	USSR
Czechoslovakia	Italy	Yugoslavia
Egypt, Arab Rep. of	New Zealand	
France	Poland	

The member body of the following country had expressed disapproval of the document on technical grounds :

Netherlands

Printed in Switzerland

Peaches — Guide to cold storage

1 SCOPE AND FIELD OF APPLICATION

This International Standard describes methods for obtaining conditions for the successful cold storage of varieties of peaches (peaches, nectarines and clingstone peaches) obtained from *Prunus Persica* Sieb. and Zucc. immediately after picking until their use in the fresh state.

The limits of application of these methods are given in annex A.

2 REFERENCES

ISO 2169, *Fruits and vegetables — Physical conditions in cold stores — Definitions and measurement.*

AGRI/WP 1/EUR.STAN.6, *Peaches* (revised European Standard, recommended by the Working Group on standardization of perishable goods, of the Economic Commission for Europe).

3 CONDITIONS OF HARVEST AND PUTTING INTO STORE

3.1 Harvesting

It is difficult to characterize the degree of maturity for harvesting. The practical criteria of maturity most frequently used for determining the best time for harvesting are :

— the basic ground colour[1] of the outer skin;

— the hardness of the flesh, estimated by means of a spring penetrometer;

— the age of the fruit from full flowering.

These criteria are not universally valid; for a given variety they vary from one region to another and it is for the grower to decide on his own criteria for picking, on the basis of experience.

The basic ground colour and the recommended hardness vary according to the variety. In general, it is advisable to pick the fruit at the time when their colour is changing from green and yellow. At the time of picking, the flesh should be firm, somewhat juicy, with a slight aroma and slight acidity.

3.2 Quality characteristics for storage

Only fruit of quality "extra" and "I", the characteristics of which are defined in AGRI/WP 1/EUR.STAN.6, should be put into store.

Fruit put into cold store should be sound, free from bruises or physiological disorders and free from any visible sign of fungal or bacterial attack. It should also be clean.

3.3 Various treatments

For most varieties, the fruit should be rapidly cooled after harvesting. Certain varieties, for example Elberta and Red Haven, are sensitive to this treatment, however, and show a tendency to a cotton-wool texture. Treatment with iced water, to which sodium hypochlorite has been added, has sometimes been recommended, as has treatment with wax.

3.4 Putting into store

The fruit should be put into the cold store as soon as possible after harvesting.

3.5 Method of storage

The fruit should be handled with care. Packages should contain only a single layer of fruit. Storage densities of the order of 200 to 220 kg per cubic metre of usable space are recommended for a stack of pallets.

4 OPTIMUM CONDITIONS OF STORAGE

4.1 Temperature

Temperatures of −1 to 2 °C, subject to exception, have been recommended. A period of 2 to 5 days at a higher temperature, before the fruit is put into the cold, may avoid the development of a cotton-wool texture in certain varieties which are susceptible to this disorder, for example 2 to 3 days at 24 °C for Elberta and Red Haven varieties.

The table given in annex B gives the recommended temperatures for a number of varieties.

1) The basic ground colour should be distinguished from the anthocyanin red pigmentation, the intensity and extent of which vary according to the variety and to a certain extent with exposure to sunlight.

4.2 Relative humidity

The optimum relative humidity for the storage of peaches is 90 %.

4.3 Air circulation

An air circulation ratio of 20 to 25 (see ISO 2169), or a ventilation of 80 to 100 $m^3/t/h$ is recommended.

4.4 Storage life

According to the variety, keeping for 2 to 6 weeks at 0 °C may be expected.

Storage should not be prolonged beyond limits compatible with the maintenance of good quality.

Samples of fruit should be taken in such a way as to detect the appearance of any wastage.

The table given in annex B shows the expected storage life for a number of varieties.

4.5 Operations at the end of cold storage

In certain cases, complementary ripening may be needed at the end of the period in the cold store. Good results have been obtained with ripening temperatures of 18 to 20 °C. If cold storage has been too prolonged, the fruit is, in many cases, no longer capable of ripening normally.

5 CONTROLLED-ATMOSPHERE STORAGE

Good results have been obtained for certain varieties at 0 °C with atmospheres containing 8 to 10 % of carbon dioxide and 11 to 13 % of oxygen. Certain varieties, however, keep badly if the content of carbon dioxide reaches 10 %. Mixtures containing 2 % of oxygen and 0 to 5 % of carbon dioxide have also been recommended. In this field, every variety has its special requirements. Thus, for the Elberta variety, the following gas mixtures have been used :

2 % carbon dioxide, 2 % oxygen;

2 % carbon dioxide, 5 % oxygen;

5 % carbon dioxide, 2 % oxygen.

ANNEX A

LIMITS OF APPLICATION

This International Standard provides guidance of a very general nature only. Because of the variability of the fruit according to the time and place of cultivation, local circumstances may make it necessary to specify other conditions of harvesting or other physical conditions in the store.

This International Standard does not apply unreservedly, therefore, to all varieties in all climates, and each specialist will himself decide on any modifications to be made.

Moreover, this International Standard does not take into account the role played by horticultural factors, and wastage during storage is not dealt with. The importance of these two subjects has not been forgotten, but the influential factors (i.e. ecological or agrotechnical factors) are not very well known. Moreover, the origin of many of the most frequent physiological disorders of peaches is still uncertain, as are often the appropriate means of combating them. It was therefore considered difficult to prepare recommendations on these two points.

Nevertheless, it was considered useful to give in annex C, for information only, a few recommendations which appear sufficiently well founded in the present state of knowledge.

Subject to all possible restrictions arising from the fact that fruits are living material and may vary considerably, the rigorous application of the recommendations contained in this International Standard should enable much wastage in cold storage to be avoided and in most cases long-term storage to be achieved.

ANNEX B

TABLE — **Storage in air**

Variety	Recommended temperature °C	Expected storage life weeks	General remarks
Madeleine Pouget	2 to 4	2 to 3	
Mayflower	0 to 2	2 to 3	
Adenot	0 to 2	2 to 3	
Amsden	0 to 2	2 to 3	
Incomparable Guillou	0 to 2	2 to 3	
Ribet	0 to 2	2 to 3	
Précoce de Halle	0	2 to 4	
Dixired	2 to 4	2 to 4	After 4 weeks, tendency to a cotton-wool texture
Fair Haven	0 to 2	2 to 4	
Red Haven	0 to 2	2 to 4	
Southland	0 to 2	2 to 4	
Elberta	−1 to 0	2 to 4	Require 3 days of complementary ripening. Tendency to cotton-wool texture. 24 h in 1 % of acetylene at 24 °C, then 12 h in air at 24 °C, counters cotton-wool texture. A period of 2 to 5 days at 24 °C before putting into cold storage enables the storage life to be extended by 1 week.
J.H. Hale	−1 to 0	4 to 6	
Collins	0 to 2	2 to 3	
Cardinal	0 to 2	2 to 3	
Flacăra	−1 to 0	4 to 6	

ANNEX C

WASTAGE IN STORAGE

C.0 INTRODUCTION

The following recommendations on wastage in storage are, as in the main text, of a very general nature. It therefore rests with specialists to amplify them, if necessary, in a manner appropriate for their national varieties.

In general, a distinction is made between cryptogamic and physiological disorders.

C.1 CRYPTOGAMIC DISORDERS

Disorders originating from micro-organisms, whether they are parasites entering through wounds, or latent parasites, are very numerous.

Hardly any means exist for combating these, other than preventive measures concerned with :

— the systematic removal of sources of contamination in the orchard (cankers, rotten fruit, etc.);

— care in all handling operations;

— the sorting of sound from unsound fruit immediately before putting them into the cold store;

— the preliminary disinfection of the cold store and packages;

— the frequent disinfection of the sorting rooms;

— the use of packages impregnated with antiseptics, if this is not prohibited.

C.2 PHYSIOLOGICAL DISORDERS

The most frequent physiological disorders are internal browning and cotton-wool texture.

C.2.1 Internal browning

Internal browning is usually clearly evident around the stone and often spreads out radially.

Possible causes may be :

— storage at too low a temperature;

— storage for too long a period.

C.2.2 Cotton-wool texture

Cotton-wool texture is usually observed only at temperatures from 2 to 4 °C, and is rarely met at 0 °C. It appears in the cold as well as during complementary ripening.

Methods which have been recommended for overcoming woolliness are :

— storage at 0 °C;

— a preliminary period at higher temperature (see 4.1).

It may also be noted that too long a storage at a temperature which is usually tolerated may hinder the development of aroma and may favour the appearance of a reddish coloration in the flesh, or of the disorders previously described.

This page intentionally left blank