
International Standard



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Carrots — Guide to storage

Carottes — Guide pour l'entreposage

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Descriptors : agricultural products, vegetables, carrots, food storage.

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 2166 was developed by Technical Committee ISO/TC 34, *Agricultural food products*.

This second edition 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 the first edition (i.e. ISO 2166-1974), which had been approved by the member bodies of the following countries :

Australia	Germany, F. R.	Portugal
Austria	Hungary	Romania
Belgium	India	South Africa, Rep. of
Chile	Iran	Sweden
Czechoslovakia	Israel	Turkey
Egypt, Arab Rep. of	New Zealand	United Kingdom
France	Poland	

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

Netherlands

Carrots — Guide to storage

1 Scope and field of application

This International Standard describes methods for obtaining conditions for the successful conservation, with or without artificial cooling, of carrots of varieties of *Daucus carota* Linnaeus.

It applies only to carrots produced for storage during the winter.

See also the limits of application given in the annex.

2 Reference

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

3 Conditions of harvesting and putting into store

3.1 Harvesting

For storage purposes, it is recommended that carrots originating preferably from late sowing should be selected. The carrots should be harvested in good time and should not be over-mature. The tops should be cut off at the level of the crown, without damaging the roots.

If harvesting is carried out in wet weather, the carrots should be dried for just as long as necessary before storage, avoiding excessive dehydration which adversely affects keeping.

Cultivation in soils which are too rich in assimilable nitrogen may adversely affect the keeping quality of the carrots during the storage period.

3.2 Quality characteristics for storage

Carrots intended for storage should be firm, sound, not run to seed, not frozen, free from abnormal external moisture, unwithered, whole, and free from bruises.

If carrots are harvested from heavy, wet soil, it is practically impossible and even inadvisable to remove the adhering earth mechanically. General experience has shown that carrots keep better with the earth adhering. Washing before storage is not recommended, whereas after storage there is no objection to washing and this may even be necessary.

3.3 Putting into store

The carrots should be put into store as soon as possible after being harvested.

Carrots should not be put into storage with other fruit and vegetables which produce ethylene.

3.4 Method of storage

The carrots may be stored in box-pallets, boxes or bags, or in bulk. If they are stored in bulk, the height of the layer of carrots should be specified according to the hardness of the variety of carrot, the quality of the lot and the condition of the ventilation device. The maximum recommended height is 2 to 3 m. In the case of bags, the maximum height is 3 m.

Perforated plastics films may be used, either as internal linings of boxes or for covering stacks of boxes.

4 Optimum storage conditions¹⁾

4.1 Temperature

The storage temperature should be kept between 0 and + 5 °C. The optimum keeping temperature is between 0 and + 1 °C.

4.2 Relative humidity

In refrigerated chambers where the temperature is maintained between 0 and + 1 °C, the relative humidity should be maintained at 95 to 98 %; in chambers provided with fans (without artificial cooling), where the temperature varies from + 1 to + 5 °C, the relative humidity should be maintained at 90 to 95 %.

4.3 Air circulation

The air circulation should make it possible to keep the temperature and relative humidity constant and uniform within the limits mentioned in 4.1 and 4.2. The circulation should be particularly vigorous, i.e. 100 to 120 m³/(t·h), when the carrots are stored in bulk and the height approaches the maximum value specified.

4.4 Storage life

The expected storage life is from 4 to 6 months.

1) For definitions and measurement of the physical quantities affecting storage, see ISO 2169.

Annex

Limits of application

This International Standard gives guidance of a very general nature only. Because of the variability of the product 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.

These recommendations do not apply unreservedly, therefore, to all varieties in all climates, and each specialist will have to judge whether any modifications need to be made.

Moreover, this International Standard does not take into account the role played by ecological factors, and wastage during storage is not dealt with.

Subject to all possible restrictions arising from the fact that vegetables are living materials, the application of the guidance contained in this International Standard should enable much wastage in storage to be avoided and satisfactory keeping for long periods to be achieved in most cases.

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