SLOVENSKI STANDARD
SIST ISO 9930:1996

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Stročji fižol - Skladiščenje in hlajen transport

Green beans -- Storage and refrigerated transport

Haricots verts -- Entreposage et transport réfrigéré

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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.

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.

International Standard ISO 9930 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Sub-Committee SC 14, *Fresh fruits and vegetables*.

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Green beans — Storage and refrigerated transport

1 Scope

This International Standard gives guidance on conditions for the successful cold storage and long-distance refrigerated transport of green (snap) beans belonging to the species *Phaseolus vulgaris* L. and *Phaseolus coccineus* L., intended for direct consumption or industrial processing.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2169:1981, *Fruits and vegetables — Physical conditions in cold stores — Definitions and measurement.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 2169 apply.

4 Conditions for harvesting and storage

4.1 Varieties

The number of green (snap) bean varieties changes year by year with their economical availability depending extensively on the seed trade. Suitable methods of storage depend, therefore, on the quality of the pods rather than the variety, although yellow varieties have somewhat better storage properties.

4.2 Harvesting

The product is harvested at an unripe stage (i.e. harvest maturity). The pods should be easily broken by hand and the seeds should be adequately small and tender. Mechanically harvested beans are only suitable for storage when their quality meets the requirements specified in 4.3.

4.3 Characteristics for storage

The main characteristics of species suitable for cold storage are the following.

The pods shall be

— whole and tender;

— free from any defect including mechanical defects;

— clean and dry;

— of a size, shape and colour characteristic of the variety concerned; and

— closed and not withered.

4.4 Packing

The beans shall be packed in such a way as to protect them properly, and to retain their good quality and perfect condition during transport. They may be packed in wooden or plastic crates covered with a coarsely perforated film. Each package may contain green bean pods up to a maximum of 12 kg.

5 Optimum storage and transport conditions

5.1 Temperature

Optimum temperature limits for the beans are between 5 °C and 10 °C for 7 to 10 days. The temperature should not be lower than 5 °C and should never exceed 10 °C. Green beans exposed to higher tem-

peratures will wilt quickly so rapid removal of field-heat subsequent to harvest is necessary. Hydro-cooling may be an efficient procedure to attain, as fast as possible, the desired range of storage temperature.

5.2 Relative humidity

Relative humidity of the ambient air shall be between 90 % and 95 %. Lower relative humidity will result in wilting.

5.3 Air circulation

Circulation of air is necessary to keep the constant temperature and relative humidity as described in 5.1 and 5.2.

5.4 Storage

Green beans packed in wooden or plastic boxes may be placed in a precooled store in stacks. The stacking height depends on the load-bearing capacity of the containers.

6 Storage life

Under the conditions mentioned in 5.1 and 5.2, good-quality beans may be stored for about 10 days. Controlled-atmosphere storage is of little use.

7 Transport

7.1 Means of transport

It is essential to maintain the chain of refrigeration in order for the beans to retain their quality. For this purpose, the use of ice or mechanically refrigerated railway trucks and lorries is recommended.

7.2 Transport vehicle and loading

Beans should not be transported in vehicles in which materials harmful to human health, such as fertilizers or pesticides, were previously carried. The equipment should be in a good serviceable condition. The fans should function and the drains should be free in ice-refrigerated railway trucks; floor racks should be installed to ensure the movement of air.

Before loading, the temperature of the loading space in the vehicles should be set to that required, by adjustments in the bunkers or mechanical refrigeration.

Wooden or plastic boxes should be stacked lengthwise (facing forward), and empty boxes necessary for filling the spaces between the stacks should be placed crosswise to prevent the load from moving. Similarly, any gaps remaining should be filled in with empty boxes or crates.

The ice-bunker in ice-refrigerated railway trucks should be re-iced to capacity after loading and, if necessary, at an interim station to ensure that the trucks arrive with their bunkers containing not less than one-third their capacity of ice at the destination.

8 Operations on arrival

After unloading, the beans should be continuously refrigerated or be consumed or processed immediately.