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**Guidelines for the harvesting,  
transportation, separation of stigma,  
drying and storage of saffron before  
packing**

*Lignes directrices pour la récolte, le transport, la séparation des  
stigmates, le séchage et le stockage du safran avant l'emballage*

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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.

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](http://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](http://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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 7, *Spices, culinary herbs and condiments*.

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](http://www.iso.org/members.html).

## Introduction

The main factor affecting the quality of saffron is the attention paid to the correct procedures of harvesting, processing and packing. Familiarity with the principles of harvesting the flowers from farms and attention to the transportation conditions from the farm to the processing place play an important role in maintaining the flavour, colour and other specifications of saffron. In addition, the processing method of separation, the collection of stigma and the drying method are very important.

After drying the stigma, storage in good conditions can maintain the quality of saffron, especially regarding colour and flavour. Unfortunately, in many cases during the harvest, due to a lack of knowledge of farmers and processors, aspects such as transportation, the separation of stigma, and drying and storage are neglected and the quality of saffron is compromised. Not only does this cause economic losses but consumers receive a substandard product. This guidance document on the correct principles of harvesting, transportation, the separation of stigma, and the drying and storage of saffron is designed to help growers and processors provide higher quality products.

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# Guidelines for the harvesting, transportation, separation of stigma, drying and storage of saffron before packing

## 1 Scope

This document gives guidelines for the harvesting, transportation, separation of stigma, drying and storage of saffron before processing and packaging.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

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/>

### 3.1

#### **saffron plant**

flowering plant of the *Crocus* genus (*Crocus sativus* L.) in the Iridaceae family

### 3.2

#### **saffron**

dried *stigmas* (3.3) and part of *styles* (3.4) of the flower (*Crocus sativus* L.) that is edible in nature

### 3.3

#### **stigma**

section of the aerial part of the pistil of *Crocus sativus* L. flower, dark red in colour and trumpet shaped, serrated or indented at the top and joined to the *style* (3.4) at the end

Note 1 to entry: The stigma length is about 20 mm to 40 mm.

### 3.4

#### **style**

part of the pistil between the *stigma* (3.3) and the ovary

Note 1 to entry: The style length is usually between 5 cm and 10 cm, and the diameter between 0,15 mm and 0,25 mm.

### 3.5

#### **stamen**

yellow male reproductive organ of the *Crocus sativus* L. flower

### 3.6

#### **extraneous matter**

all matter visible to the naked eye or with a maximum 10 times magnification that are other parts of the plant to which the spice belongs

Note 1 to entry: In the *Crocus sativus* L. flower, the origin of extraneous matter can be floral waste [e.g. petals, separated *styles* (3.4), *stamen* (3.5), pollens and ovary parts] and other parts of the plant different from floral origin.

**3.7  
foreign matter**  
all matter visible to the naked eye or with a maximum 10 times magnification that are not parts of the plant to which the spice or herb belongs

**3.8  
saffron in filament**  
dried *stigmas* (3.3) with a part of *style* (3.4) of the *Crocus sativus* L. flower

Note 1 to entry: The stigmas can be separated or joined in groups of two or three at the tip of a part of the style that is white/yellow in colour.

**3.9  
saffron in cut filament**  
dried *stigmas* (3.3) of the *Crocus sativus* L. flower, with *styles* (3.4) removed completely and detached from each other

**3.10  
harvesting**  
procedure of separating and collecting the *saffron* (3.2) flowers from a *saffron plant* (3.1)

**3.11  
separation**  
procedure of removing the *stigma* (3.3) and some of the *style* (3.4) from other parts of the *saffron* (3.2) flower

**3.12  
drying**  
procedure of reducing the moisture content of *stigma* (3.3) and *style* (3.4) to a standard level

Note 1 to entry: See ISO 3632-1 for the acceptable range of moisture content.

**3.13  
physical damage**  
physical deterioration due to impact and pressure, such as fractures, decay or compression

## 4 Recommendations

### 4.1 General

In addition to the following recommendations, the general principles of food hygiene as contained in the CAC/RCP 1<sup>[4]</sup> and CAC/RCP 42<sup>[5]</sup> should also be considered.

Prerequisite programmes in accordance with ISO/TS 22002-1 and ISO/TS 22002-3 should also be considered.

### 4.2 Flower harvesting

#### 4.2.1 Harvesting time

The flowers of saffron plants are harvested in mid-autumn, usually by the manual method of cutting the base of the flower stem with a fingernail. The harvest begins when the first flowers on the farm are seen. The harvest time for saffron depends on the environmental and farming conditions. Although picking flowers is usually done manually by hand, the use of special machines is possible.

Gathering saffron flowers requires care and intensive manual labour. The flowers only grow a few centimetres above ground and, depending on vegetative activity, can be surrounded by several leaves that cannot be damaged otherwise daughter corms will not be produced. Harvesting the flowers in a field takes about 20 days.

The saffron flower is highly temporary with a very short life. It should be picked the same day of flowering. Best practice is to pick the flower early in the morning when the temperature is low and the corolla is still closed, thereby preventing the stigmas from losing colour and quality, avoiding any sudden deterioration by wind or rain, and allowing a ready separation into the constituent parts. This makes it easier to collect flowers and physical damage is reduced during the handling and transportation of the flowers.

#### 4.2.2 Personnel hygiene

The workers assigned to pick the flowers should be healthy and free of infection, especially on their hands.

#### 4.2.3 Containers

For the collection and handling of flowers, appropriate clean and dry baskets (wicker or metal) should be used. Containers that are used for the collection and handling of flowers should protect flowers against physical damage and environmental pollution.

### 4.3 Flower transportation to the processing unit

#### 4.3.1 Conditions

The flowers should be protected against mechanical damage and environmental pollution. The excessive accumulation and compaction of flowers during transportation should be prevented. The containers should be placed in such an arrangement to prevent any mechanical damage.

#### 4.3.2 Duration

After collection, the flowers should be transported as soon as possible to a farmhouse or some other storage facility. During transportation, the flowers should be protected against light and heat.

### 4.4 Flower separation of stigma

#### 4.4.1 Intermediate storage of flowers

The flowers should be kept in a clean and shady place until further processing. If necessary, the saffron flowers should be stored at 4 °C to 5 °C, with the layer of fresh flowers not exceeding 10 cm in height. Under these conditions, saffron flowers can be stored for up to seven days.

#### 4.4.2 Personnel hygiene

Personnel should not be suffering from any contagious disease that would cause or act as a precursor to cause a food-borne health illness. In the event of observing any signs of a disease, the person responsible for supervising should take the necessary measures to prevent the person(s) from handling the separation until they are fully cured from the disease(s).

Basic sanitary practices should be followed by personnel before and during separation and handling of the saffron. Workers involved in the separation of saffron stigma should be aware of the risk of contaminating the crop. Eating and drinking should be prohibited in working areas. Personnel should keep their hands clean at all times and should wash them thoroughly with antibacterial soap before embarking on the separation work. The separation should take place in a clean environment. The processing area should be free from dust.

#### 4.4.3 Containers

Containers should be clean, washable and made of a material that cannot affect product safety or quality. Damaged and dirty containers should not be used. Maintenance and regular inspection of the containers and accessories used should be done at appropriate intervals.

#### 4.4.4 Producing different grades

Stigmas should be separated from the petals and stamen as soon as possible by opening the corolla and cutting the stigmas with the fingers below the branching, based on the saffron grade.

For saffron in cut filament form, grade I (see ISO 3632-1), the stigmas should be isolated from each other. This grade has the least floral waste. The length is about 10 mm to 20 mm. For saffron in filament form, grades II and III, the stigmas should be joined in twos or threes at the end of portion of the style that changes colour (from red to yellow or white). The maximum floral waste should be 0,5 % for grade I, 3 % for grade II, and 5 % for grade III. The length is about 20 mm to 40 mm depending on the percentage of the white/yellow part and the grade. Extraneous matter and foreign matter should be removed from the product as much as possible.

The mechanization of some cropping techniques has been carried out for saffron, but it is a rather difficult crop. The lack of mechanization in saffron is due to the delicacy of the corms and flowers, which require handling with care, and also to the considerable variation in size of the corms.

In addition, planting requires regular and correctly oriented placement of corms. A modified onion planter can be used to plant saffron, but the impossibility of placing the corms with the apex in the upward direction leads to a delay in the emergence of flowers and a decrease in production.

#### 4.5 Flower drying

##### 4.5.1 General

Poor drying and storage methods can compromise the quality of the saffron and therefore it is very important to use the appropriate method.

The stigma should be dried immediately after separation to maintain the quality. The environmental conditions should be managed to ensure the moisture content level is appropriate. When conditions are too moist, there is a risk that the stigma will become infected with a fungus, especially the type that causes aflatoxins. On the contrary, if conditions are too dry, the stigmas will break easily and turn into powder. This will cause a reduction in weight to below trade requirements, resulting in an economic loss for farmers.

The processing of wet saffron should be carried out as quickly as possible. The equipment and facilities should be kept clean, with any debris removed prior to use. The equipment should be dried before use. The drying area should be free from dust.

##### 4.5.2 Drying methods

Saffron can be dried using a heater, hot air oven, vacuum oven or freeze drying. Indirect heat drying is recommended. When hot air drying is used, care should be taken to ensure that there is no risk of fumes from the fuel coming into contact with the product. A heat exchanger should be used so that only clean air comes into contact with saffron. Waste from wet processing, such as petals and stamen, should be disposed of away from clean, dry saffron stigma.

Traditionally, the dehydration of saffron is carried out at room temperature in the sunlight or with forced air. Drying saffron using this method takes up to a week. This method reduces saffron quality during the drying process. To reduce this risk, the following measures should be considered when saffron is air-dried:

- a) the drying area should be free from dust and direct sunlight;
- b) birds should have no access to the area;
- c) stigmas should be placed in a drying container such as a basin, a tray or a big plate;
- d) the container should then be covered with a thin cloth or screen, with good aeration, to prevent contamination.

#### 4.5.3 Optimum drying temperature

The drying temperature in normal conditions should be constant and invariable and not more than 60 °C.

#### 4.5.4 Moisture content

Processing should achieve a uniform moisture content that is as low as feasible and not higher than 12,0 %, in accordance with ISO 3632-1.

### 5 Packing, marking and labelling

#### 5.1 Packing

After drying and cooling, saffron should be packed in airtight, light protected containers such as tin cans or dark glass containers. Some buyers, however, prefer saffron to be packed in clear glass containers to allow for an easy quality assessment of the saffron without having to remove it from the container. When packing saffron in clear glass containers, they should be stored in a dark place until sold. This will prevent any deterioration in the quality of the saffron.

#### 5.2 Marking and labelling

A specification card should be put inside the package, including the manufacturer's name, area name, type of saffron, date of production and other specifications that are needed in accordance with ISO 3632-1.

### 6 Storage of dried saffron

Saffron should be stored in good quality, well-maintained warehouses that do not allow the ingress of water, whether through leaks in the roof or walls, under doors or through open windows, etc. The saffron should be stored off the floor and away from the walls so that any potential condensation does not moisten it. In addition, there should be good air movement through the warehouse to prevent sweating and mould formation. Suitable ventilation should be provided to ensure that both temperature and humidity are correctly managed. The storage temperature for saffron should not be more than 20 °C and the relative humidity should be less than 60 %. When the saffron is moved into or out of the warehouse, it should be protected from rain. If the saffron is packaged in transparent packaging, it should be protected from light.