



Saffron Post-Harvest Handling Best Practice Recommendations

Margaret Skinner & Hans Estrin, Univ. of Vermont

Arash Ghalegholabbehbahani, Rodale Institute

Jane Wilson, American Herbal Products Association

March 2023

Introduction: These recommendations were prepared specifically for saffron, based on field experience of the authors and information gleaned from the “Good Agricultural and Collection Practices” handbook produced by the American Herbal Products Association (AHPA) for growers, collectors and processors of botanical crops (https://www.ahpa.org/files/Document%20Library/AHPA%20Guidance%20Documents/GACP-GMP%20Guidance/2021_AHPA_GACP_GMP_for_Botanical_Materials.pdf). Guidelines for the best handling practices to obtain the highest quality saffron is evolving as new research findings become available and therefore the practices suggested herein may change. This document focuses only on post-harvest handling, which is only one factor known to be critical to ensure product quality. Many other conditions affect saffron quality, including growing and climatic conditions, soil fertility and moisture, and drying methods.

General guidelines: Saffron is a food crop and should be handled recognizing its final use. Anyone handling saffron, either during harvesting or post-harvest handling should always first wash their hands with soap before each procedure. Work surfaces and collecting containers should be sanitized before saffron flowers or other saffron byproducts are handled or processed. A written description of the standard operating procedures (SOPs) used to harvest, separate, dry and store saffron should be maintained. These procedures are valuable to share with buyers or regulators.

Factors for Consideration	Best practices
Flower Harvest	
Weather	Wait until rain is over if possible; Check weather forecast and plan harvest accordingly.
Flower condition	Wait until flowers thaw before harvesting.
	Wait to harvest flowers until dew evaporates and when flowers are dry. Wet flowers are very difficult to separate, and stigma quality is reduced.
	Harvest flowers that are just beginning to open.
Collection	Generally, harvest flowers in the early morning.
	Handle flowers gently and as little as possible. Saffron flowers contain essential oils that can be destroyed if not handled with care.
	Spread flowers out on the collecting container in a thin layer, ideally no more than a few flowers deep. Flowers can generate heat and condensation when piled up which can destroy oils and make separation difficult.
Hygiene	Remove dirt and other foreign matter from flowers during harvest that contaminate crop.
	Use a clean container to collect flowers, and if possible use one with ventilation.
	Only select clean fresh flowers for harvest, discard those covered with dirt or mold, or those that have come in contact with the soil.
Holding & Transfer	
Handling	Keep harvested flowers under cover to avoid exposure to sun, heat, wind, rain, animals, birds, etc.
	Keep harvested flowers cool before separation.
Separation	Separate stigmas from the other flower parts within a few hours of harvesting, if possible.
	If it is not possible to complete the stigma separation right away, refrigerate flowers, but try to complete separation within 24 hr after harvest.
	Spread flowers on a tray and store in a cool, dark, dry place if immediate separation is not possible. A refrigerator is best.

Factors for Consideration	Best practices
Record-keeping	Assign a number for each flower harvest, distinguishing different fields or beds. Mark collected flowers with the lot number.
	Maintain record of the harvest number and date of flower harvest for each harvest event indicating special situations that could influence quality or yield.
Flower Separation	
Hygiene	Establish specific area reserved for handling flowers.
	Cover work area with heavy plastic sheet or other material that is easily cleaned.
	Sanitize work space before every separation event.
Record-keeping	Maintain lot numbers to coincide with harvest number.
Stigma Drying	
Hygiene	Keep all equipment clean and sanitized during drying. There are currently no specific FDA guidelines for saffron.
General	Check stigmas regularly for dryness. Saffron should be dried so it has a water content of less than 12%. That means the stigmas snap when broken in two. Saffron that is not dried enough can mold after storage and be unusable and unsaleable. Research is underway to determine the best temperature and duration for drying saffron to maximize on quality. Our current findings show that ~212°F (100°C) is the best. However, most dehydrators only reach around 160°F (~71°), but that is sufficient.
In a dehydrator	Prepare parchment paper liners on trays for easy transfer.
	If possible, spread stigmas out so they don't overlap during drying. Some growers use forceps (tweezers) to position stigmas on trays so they don't touch.
	Reposition dehydrator trays during drying to ensure saffron on all trays are fully dry. Saffron dries at different rates depending on the tray level.
In a frying pan	Watch saffron carefully and move it around the pan so it doesn't burn.
On tray in oven	Place stigmas on parchment paper on the baking sheet for easy transfer.
Air drying at ambient temp.	Protect stigmas from contamination during drying. In locations where natural air humidity is high, air drying is generally not recommended.
Record-keeping	Include information on date of drying, drying time, method and temperature with each lot number.
Saffron Storage	
General	Allow dried saffron to cool completely and weigh it before placing in air tight storage containers. In areas where natural air humidity is high, saffron can reabsorb moisture, so don't leave it out in the air for too long.
	Air-tight, screw-top glass jars or snap-top vials are the preferred containers to use. Important compounds may leach out into the plastic or paper in bags or boxes.
	Store saffron containers in the dark.
	Saffron properly stored can retain its quality for at least 2 years. Some say it is best to hold saffron for 1 month to enhance flavor and aroma.
Record keeping	Include lot number with every saffron storage container.
Saffron Quality Assessment	
	Limited opportunities currently exist for getting saffron assessed for quality. Until the industry expands and sufficient quantities are produced, assessment may not be financially worthwhile. Standard guidelines for testing saffron are established by the International Organization of Standardization (ISO), but few labs are available to conduct the tests, and it is expensive.
	Quality testing is not required to sell saffron.