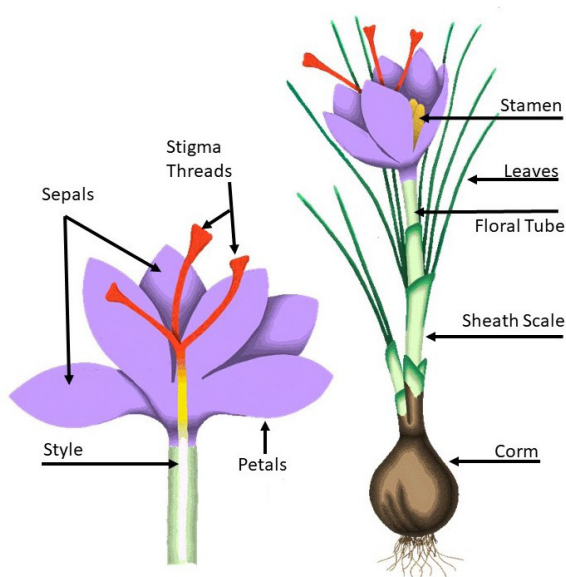


Saffron Types and Quality Indicators

Pradip Poudel, Graduate Research Assistant,
Dr. Leigh Whittinghill, Assistant Professor of Urban Agriculture,
and **Dr. Hideka Kobayashi**, Assistant Professor of Horticulture

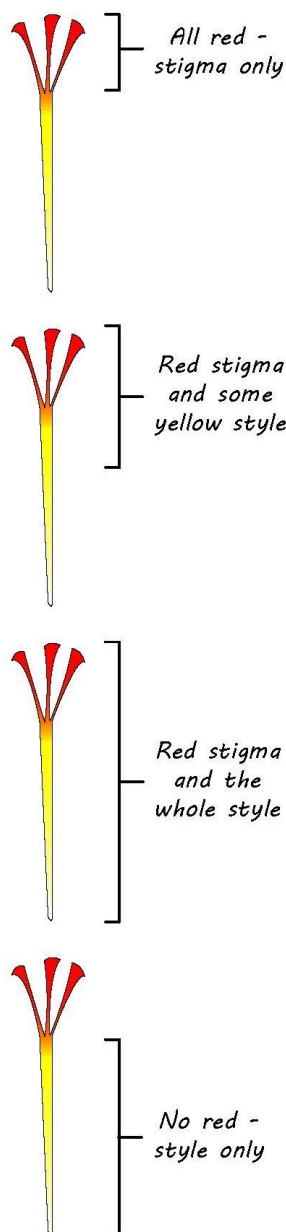


The red-colored stigma threads are the main economic part of the saffron flower, and it is the most expensive spice in the world. To take advantage of high prices, saffron floral parts and foreign materials such as dyed corn silk, safflower petals, other flowers, wax, sugar, fat, or even inorganic compounds are sometimes added to make the final product heavier. The most common practice is to include the yellow and white colored style along with the stigma threads. However, these practices decrease the quality and price of saffron spice. Saffron quality depends on the level of three compounds; crocin (for color), picrocrocin (for flavor), and safranal (for aroma). These three compounds are concentrated in the red-colored part of the stigma threads; thus, adding any other flower parts or external materials decreases the saffron quality and market price. The International Organization for Standardization (ISO) sets the standard of saffron quality using three categories based on these three compounds' laboratory analysis.

ISO 3632 Categories of saffron

- Moisture content should be below 12 % on a mass basis in the filament form or 10% in the powder form.
- Artificial colorant should be absent.
- ISO categorizes saffron into Category I (best quality), Category II, and Category III (lower quality) based on the laboratory analysis. Table 1 shows the ISO categories and their characteristics based on that analysis.
- Different floral parts like the style, petals, and foreign waste materials like dyed corn silk, wax, and sugar should be avoided for better quality.
- Picrocrocin, safranal, and crocin levels are expressed as absorbance of 1 % aqueous solution of saffron in 1 cm optical path length cell at 250 nm, 330 nm, and 440 nm wavelength, respectively.

Characteristics	ISO 3632-1 Categories		
	I	II	III
Floral waste, % by mass, maximum	0.5	3	5
Foreign waste, % by mass, maximum	0.1	0.5	1
Flavor (Picrocrocin level) $A_{1cm}^{1\%}$ (250 nm), minimum	70	55	40
Aroma (Safranal level) $A_{1cm}^{1\%}$ (330 nm), minimum-maximum	20-50	20-50	20-50
Color (Crocin level) $A_{1cm}^{1\%}$ (440 nm), minimum	200	170	120
Total Ash % by mass, maximum	8	8	8
Acid insoluble ash, % by mass, maximum	1	1	1
Soluble extract in cold water, % by mass, maximum	65	65	65



There is also the practice of grading saffron based on the amount of stigma and style present, and there are different grades in different saffron growing regions such as Iran, Spain, and Kashmir.

General saffron types based on the proportion of style and stigma present:

- **All red- stigma only**
This includes only red stigma threads after cutting off the yellow style and is the best quality saffron with intense flavor and color. In Iran, this type of saffron is called “Sargol” if the stigma threads not attached to each other or “Negin” if the stigma threads remain attached to each other. It has other names including “Coupe” in Spain, and “Mongra” in Kashmir. It is more expensive than other types of saffron because of the work required to cut off the yellow style and has a lower yield per acre.
- **Red stigma plus some yellow style**
Some yellow style (2-3 mm) remains along with the red stigma. This type of saffron is called “Pushal” in Iran, “Mancha” in Spain, and “Lachha” in Kashmir. This is the second-best quality saffron. Some consumers prefer this type of saffron as yellow style attached ensures the authenticity and purity of saffron, differentiating it from an adulterant like corn silk dyed red.
- **Red stigma plus the whole style**
This includes all parts of the saffron threads - the red stigma threads and yellow and white parts of the style. This type of saffron is called “Bunch” in Iran and generally sold in a tiny bundle. Farmers sell this type of saffron because of the higher yield per acre; however, it has a lower market value.
- **No red- style only**
This is leftover from saffron processing when the red stigma is removed from the threads. This type consists of only yellow and white style. This has some safranal content, which provides aroma to the final product; however, the crocin level is very low, so the final product lacks color. This type of saffron is called “Konge” in Iran and “Zarda” in Kashmir. This is the lowest quality and least expensive type of saffron.

References:

- Azarabadi, N., & Özdemir, F. (2018). Determination of Crocin content and volatile components in different qualities of Iranian saffron. *Gida/ The Journal of Food*, 43(3), 476–489.
- Golmohammadi, F. (2014). Saffron and its Farming, Economic Importance, Export, Medicinal characteristics, and Various Uses in South Khorasan Province- East of Iran. *International Journal of Farming and Allied Sciences*, 3(5), 566–596.
- Government of India geographical indication registry. (2020). Geographical indication journal no. 127. Retrieved from Geographical indication journal website: http://www.ipindia.nic.in/writereaddata/Portal/IPOJournal/1_4826_1/Journal_127.pdf
- ISO. (2011). *Spices — Saffron (Crocus sativus L.) —Part 1: Specification* (No. ISO 3632-1:2011(E)). Geneva, Switzerland.