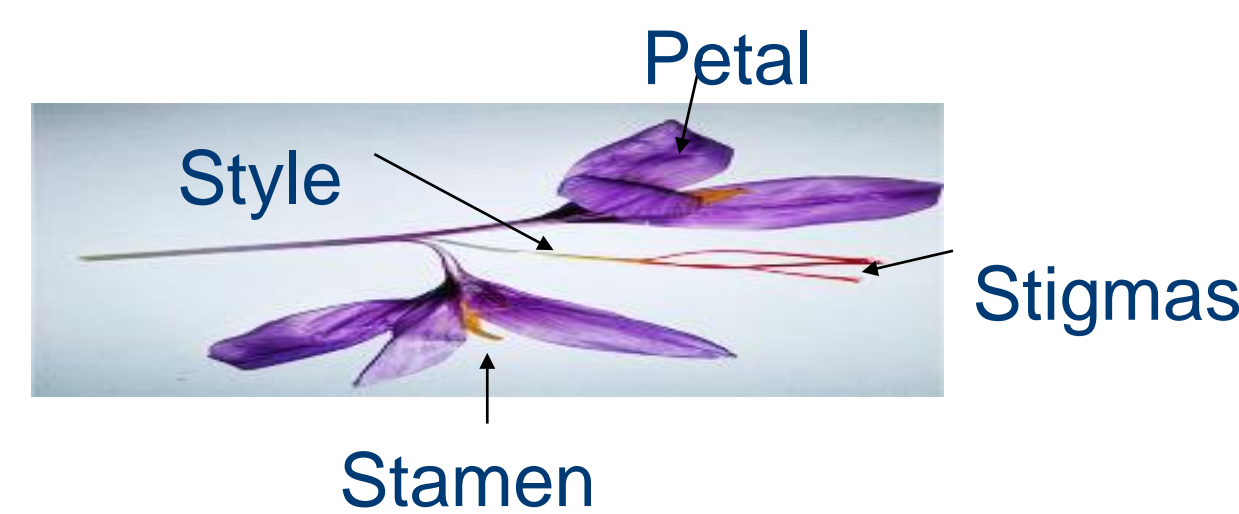


Generally Saffron harvesting is done by hand. Mechanical and robotic harvesters have been introduced in Iran and Spain, but the technology is still in development and has not been widely adopted. Experienced harvesters can pick 8 to 10 kilograms of flowers each day. Harvesting begins before sunrise and is completed for the day within 4 to 5 hours.

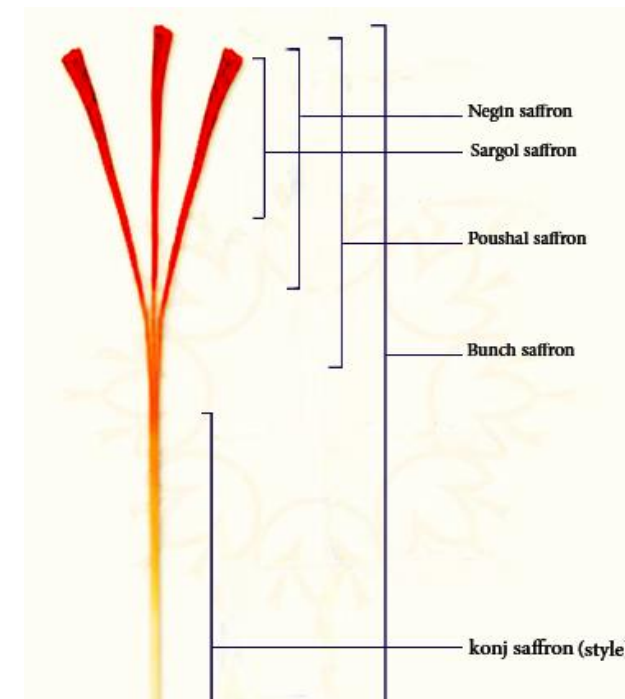


The best color, taste, and aroma are associated with stigmas from flowers harvested early in the morning before the flowers open. Buds are also easier to transport to the sorting house without damage to the stigmas. In the desert climate of Iran, temperatures increase rapidly once the sun is up, and saffron flowers begin to fade by 9 am.

Workers collect buds and flowers in shallow lacquered baskets. The harvested saffron flowers are transferred to large bags or cartons for transport to the sorting house. Bags are preferred when saffron is to be sorted on the farm, and cartons when the saffron is shipped longer distances to an industrial processing plant.



Saffron is processed indoors, either in the farmhouse or in a factory. The first step is to split the flowers and remove the pistil (stigmas + style), discarding the petals and stamens. Then the stigmas are separated from the style. The highest price saffron is sargol, which contains just the tips of the stigmas. Concentrations of crocin, picrocrocin, and safranal decrease in a gradient from the stigma tips to the style base; including more of the pistil increases yields but decreases the price per gram.



After the stigmas are separated, they must be dried. Traditionally the saffron is spread on a thin cloth, covered with a second thin cloth, and left to air dry in the shade for 5 to 7 days. Sometimes the saffron is placed in direct sunlight for faster drying. The saffron is fluffed and mixed daily to prevent mold and ensure even drying.

The traditional method is very inexpensive but it has multiple disadvantages. The long drying time greatly increases the possibility of mildew and microbial contamination of the saffron. Extended exposure to the air darkens the saffron, reducing the quality. The moisture content of the saffron cannot be reduced below the ambient humidity, which may be higher than optimal.

Many farmers build enclosed drying racks which can be placed over a space heater and under a ceiling fan. These simple dryers reduce drying time to less than one day and greatly increase saffron quality.



Saffron spread on a sieve



Saffron toasting over an electric hot plate



Flipping the saffron and toasting again

In Iran and Spain farmers dry saffron by toasting it over a radiant heat source. The saffron is spread on a silk sieve which is stacked over an electric heater set at 60-75°C. After toasting for 15 to 20 minutes the saffron is flipped into a second sieve and returned to the heater for an additional 15 to 20 minutes. This method is superior to traditional room temperature drying, but still does not provide accurate control of the drying temperature and no control over humidity.

Cabinet dryers are a medium-scale solution offering precise control over temperature and humidity



A continuous-throughput belt dryer in a saffron processing plant. Such dryers are very expensive but allow for high throughput and precise control.

Researchers are actively investigating other medium-scale methods of rapidly and consistently drying saffron. Possible methods include electric ovens, vacuum ovens, microwave ovens, and freeze drying. All of these methods offer the advantage of being computer-controlled, allowing for high repeatability.

After drying saffron is sent to a laboratory for grading. Saffron grades are based on the content of picrocrocin, crocin, and safranal, which give saffron its flavor, color, and aroma, respectively. The higher the content of each of these compounds, the better the saffron.

Following grading the saffron is packaged for sale. Saffron will absorb moisture from the air, and above 12% moisture the picrocrocin and safranal begin to degrade. Saffron should always be kept in tightly covered containers and resealed right after use. Saffron should be stored away from heat, light, and moisture.

A saffron separating machine in a factory. The process has not been fully mechanized, but throughput is increased.