Drying Saffron

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http://www.uvm.edu/~entlab/Saffron/Saffron.html

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Saffron is mainly produced in seven different countries around the world, but has in recent years become of particular interest to growers in the US. The high projected retail price has led many growers to grow saffron this year. Hundreds of US growers have started cultivating saffron for the first time, and they have raised many questions about how to do it right, in particular under conditions in the Northeast. Most research on saffron production and processing has been conducted in Iran and Spain, where it is grown extensively. Until research is done locally, these sources are the most accurate information available. Growers are particularly interested in learning how best to dry saffron to obtain the highest quality product.

First of all, the flower is made up of the three parts that must be separated before drying: the red threads (stigmas), yellow center (stamen), and purple petals. Each of these parts may have monetary value. The stigmas are the saffron, the stamens are used as a dye, and the petals have been used as a dye. Growers may want to dry all of the parts, or just the stigmas and stamens, which have the highest value.

Many methods of saffron drying have been reported in the literature. The goal of saffron drying depends on the end purpose. If it will be used as a spice, flavor is critical; whereas if it will be used medicinally, the amount of key therapeutic compounds is important. At this time, we are focusing on the culinary, not medicinal, use of saffron. Research is needed to confirm the medicinal benefits of saffron.

Three important compounds have been identified in saffron: 1) crocin, which produces the yellow-orange color; 2) picrocrocin; which imparts the characteristic bitter flavor; and 3) safranal, which is responsible for the smell. The goal of the drying process is to maximize on these three compounds, which involves several complex chemical processes.

Three basic dehydration methods are reported: high temperature, mild and low temperature (room temperature). Because we haven’t done research on this subject, we can’t provide recommendations at this time. Producers should experiment for themselves to determine which works best for them, given the equipment they have available and amount of saffron they have produced. During the first year of our University of Vermont research we conducted a preliminary experiment and found that safronal and crocin levels were not significantly different when we air dried the stigmas at room temperature or dried them in the oven at 95°F for 60 minutes. Since then we have reviewed the literature, and most research indicates that high temperature dehydration may be preferable. Below is a table describing the different methods.
Table 1. Saffron dehydration methods based on a review of the scientific literature

<table>
<thead>
<tr>
<th>Method</th>
<th>Production region</th>
<th>Procedure</th>
<th>Quality</th>
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<tbody>
<tr>
<td>Low Temperature</td>
<td>India, Iran &amp; Morocco</td>
<td>Stigmas are dehydrated in the sun or ventilated room at room temperature. In India stigmas are sun-dried for 3-5 days, when 8-10% moisture content is obtained. In Iran and Morocco, stigmas are placed on a cloth and exposed to the sun for several hours or placed in the shade for 7-10 days.</td>
<td>These methods yield moderate concentrations of crocin and picrocrocin, but relatively low levels of safronal.</td>
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<tr>
<td>Mild Temperature</td>
<td>Greece &amp; Italy</td>
<td>Two methods were reportedly used in Greece: stigmas were dried at room temperature of 64-122°F or at 113°F. The duration of dehydration was not provided. In Italy stigmas are dried in a sieve placed ~8 inches over oak charcoal until a 5-20% moisture content level is achieved.</td>
<td>These methods yield moderate concentrations of crocin and picrocrocin, but relatively low levels of safronal.</td>
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<tr>
<td>High Temperature</td>
<td>Spain</td>
<td>Stigmas are dried in a sieve heated over a gas stove, charcoal or electric hot plate at 122 - 176°F for 30-60 minutes until a moisture content of 5-15% is achieved.</td>
<td>These methods yielded high concentrations of crocin, picrocrocin, and safronal.</td>
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We have also heard that some growers dry the stigmas in a frying pan over moderate-high heat for a few minutes, until the stigmas appear to be dry and they are emitting a strong aroma. A commercial grower in Spain dries his saffron at 170°F for 20-25 minutes, and said the heat should not exceed 170°F. Based on these reports, there are many ways to dry saffron, and which is very best method has not yet been fully confirmed. If a grower has only a small number of stigmas to dry, it may be easier to air dry them, whereas it may be better to dry larger quantities in an oven. If drying in an oven, the trays should be placed in the center of the oven to obtain the most consistent temperature. When the drying process is finished, the dry stigmas should be allowed to cool and then placed in a glass container and held in the dark at room temperature. It has been reported, but not confirmed scientifically, that it is best to wait one month before using saffron, during which time the saffron flavor is enhanced.

![Dried saffron](image_url)

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