Orange Blossoms and the Holy Grail of Persian Jams

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ABSTRACT: Orange blossom jam, a coveted delicacy crafted from individual delicate white petals of orange blossoms, represents the pinnacle of Persian jam-making. Its revered status as the "holy grail of jams" stems from its laborious production process and demanding meticulous attention and patience. This paper delves into the rich history and cultural significance of orange blossoms, not only in Iran, but worldwide. It explores the time-honored techniques of orange blossom jam-making utilized for centuries within Persianate societies, contrasting them with other flower petal jams. Additionally, the paper examines the commercial industry's preference for orange blossoms in fragrance and distillate applications, highlighting the unique allure of this precious ingredient.

I spent my childhood living in Tehran, the capital city of Iran, which sits at the southern foot of the towering Alborz mountains. One of our family's annual summer rituals involved packing the car for a week-long vacation on the shores of the Caspian Sea. The adventure would start with a 5-hour drive on a beautiful mountainous – and at times dangerous – road over the Alborz range arriving on its lusciously green northern base. Once we reached the coastal area, the very first thing we would do – even before finding our planned lodging – was to stop at the very first roadside stand selling jars of that year's locally produced translucent pale golden colored orange blossom jam (Figures 1 and 2). We would buy enough to last us for breakfast on every day of the week-long vacation plus a couple of extra jars to take back home as the authentic versions were almost impossible to find in Tehran .

Orange blossom jam – made from the individual white petals of orange blossoms – is the most tedious and time-consuming of jams to make, and with a tiny yield. It is the pinnacle of jam-making endeavors, demanding meticulous attention and patience throughout, hence its revered status as the "holy grail" of jams. This paper delves into the rich history and cultural significance of orange blossoms, not only in Iran, but worldwide. It explores the time-honored techniques of orange blossom jam-making utilized for centuries within Persianate societies, contrasting them with other flower petal jams. Additionally, the paper examines the commercial industry's preference for orange blossoms in fragrance and distillate applications, highlighting the unique allure of this precious ingredient.

A Bit of Botany and Etymology

Traditionally, the blossoms from a very specific variety of orange tree, Citrus × aurantium, are used for making orange blossom jam, distilling them into orange blossom water, or using their essential oils in perfumery applications (Figures 3 and 4). In English speaking world, this is commonly known as bitter orange, Seville orange, sour orange, bigarade orange, or marmalade orange. In some languages, there are distinct single-word designations for bitter orange distinguishing it from other types of oranges. For example, in modern Greek, bitter orange is referred to as *nerantzi* and sweet orange as *portokal.* The same is true in Persian where the word

for bitter orange is نارنج [Romanized: nārenj] whereas the sweet orange is referred to as پرتغال [Roamanized: Porteghāl].

The bitter orange is a round, slightly flattened fruit. Typically, it is 2.5 to 3.5 inches (5.5-8.5 cm) wide. Its bumpy surface features a thick, aromatic peel with a bitter taste. As the fruit matures, the peel turns a vibrant reddish-orange and develops tiny, sunken oil glands. Inside, the fruit is divided into 10 to 12 segments. These segments have bitter walls and hold a highly acidic pulp – hence one of the fruit's common names being sour orange. It is also characterized by a large number of seeds – many more than other types of citrus fruit.

The blossoms of the bitter orange tree, which are the focus of this paper, begin as tiny, tightly closed white buds on the branches, no bigger than a pea. As these buds develop, the petals tucked inside unfurl, pushing the bud's shape from round to oval. Finally, the bud bursts open, revealing a beautiful star-shaped flower. Each blossom has five white to ivory petals surrounding a cluster of yellow stamens with orange tips. The delicate, slightly waxy petals, measuring around 1.5 to 2.5 centimeters (Figure 5).

The bitter orange blossoms release a captivating fragrance. This aroma blends sweet citrus notes with hints of floral scents like jasmine and tuberose, along with a touch of fresh grass and nutmeg. The raw blossoms are edible, have a strong floral flavor, and some bitterness. The level of bitterness in the raw petals depends on the specific variety and origin of the tree, and the growing region's soil and climate. After being treated with boiling water (whether for distilling or making jam), the petals develop a refreshingly floral and citrusy taste. Unlike many jam fruits, the petals remain whole even after extended cooking periods.

A Bit of History

Originating in Southeast Asia, the bitter orange embarked on a journey westward. By 700 CE, it had reached the Islamic world through India and Iran. Of the two kinds, bitter and sweet, it was the bitter oranges that reached Europe first, some five hundred years before the sweet oranges. Bitter oranges came to Sicily in the eleventh century and to Spain, brought by the Moors, in the twelfth century. From there, it continued its travels to Florida and the Bahamas.[1]

To the best of my knowledge, the first document citing the use of bitter orange blossoms is The Canon of Medicine published in 1025 CE by the Muslim Persian physician-philosopher-physicist-writer-scientist Ibn Sina commonly known in the west as Avicenna. The English translation of one of his four detailed prescriptions for dealing with symptoms of fever is:

> *Bitter Orange: 4 dessert spoons of bitter orange flower is boiled in 3 glasses of water. Then its extract is strained, and it is drunk in dose of one coffee cup 4 times a day.*[2]

The earliest references to orange blossom water are also associated with Ibn Sina. In the eighth century, the Iranian born Jabir ibn Hayyan, commonly known as the founder of modern pharmacy, invented a distiller called Allembic which he used for the chemical analysis of material (Figure 6). Ibn Sina improved the Allembic by inventing and adding cooling coils to it

which drastically improved the efficiency of distillation techniques of the era. Ibn Sina's improvement allowed the essence of some flowers to be captured in water, such as rosewater and orange blossom water.[3]

Rose water and orange-blossom water were initially used to make medicines taste more palatable. However, Persians, who had already been using rose petals in their cooking, started using rose water and orange blossom water in their confections. They were followed by the Arabs who adopted these practices after their invasion of Persia.

Uses of Orange Blossoms

The primary uses of orange blossoms are:

- Making jam from individual white petals.
- Making orange blossom water, a.k.a. orange blossom distillate.
- Perfumery and essential oil applications.
- Preserving by drying so they can later be rehydrated for the above three applications.
- Drying to be added to potpourris, naturally fragrant dried plant materials used to provide natural scent in residential settings.

Although bitter orange blossoms are by far the most preferred orange for all of above applications, it is feasible to use other highly fragrant citrus blossoms – in particular *Citrus x sinensis* commonly known as "sweet orange" which is a hybrid between pomelo (*Citrus maxima*) and mandarin (*Citrus reticulata*). Unless otherwise stated, however, all references to orange blossoms are assumed to be bitter orange blossoms.

While the focus of this paper is centered around the blossoms of the bitter orange tree, it should be noted that other parts of bitter orange trees are highly sought after as well. The fruit of bitter orange trees is a popuylar souring agent in the Persian cookery landscape. Its juice, with a pH of about 2.7, brings a highly aromatic and delicate sourish-orangish flavor to Persian cuisines that is sourer than regular orange juice (pH of about 3.5) and sweeter than lime or lemon juice (pH of about 2.2). This prized acid is especially important during Persian New Year celebrations, as it flavors the special dishes traditionally served then. The fruit's peel is preferred for making traditional orange marmalade. Petitgrain, an essential oil used in perfumery, is produced through the distillation of branches and leaves of the bitter orange tree.

Cultural Significance of Orange Blossoms

The delicate white petals and intoxicating aroma of orange blossoms have captivated people around the world for centuries. These beautiful flowers hold special meanings in many cultures, symbolizing purity, fertility, and good fortune. Their association with new beginnings is particularly strong, as seen in their use in wedding ceremonies. In fact, brides in ancient China wore orange blossoms to promote fertility, reflecting the unique nature of the orange tree – it blooms and bears fruit simultaneously. Similarly, Greek mythology links the orange tree to the goddess Hera, representing both purity and fertility.

Queen Victoria defied tradition in a big way when she married Prince Albert in 1840. Not only did she break the mold by proposing (something unheard of for a noblewoman!), but she also opted for a white wedding gown instead of the customary deep-colored velvet dress. To top it all off, she chose a simple crown of orange blossoms over the traditional heavily jeweled tiara (Figure 7). Such traditions continue today in some Mediterranean countries as well as in Persianate societies, where orange blossoms symbolize purity and eternal love in weddings.[4]

According to the writings of the French historian and diplomat, Hyacinth Louis Rabino, who had lived in Rasht, the capital of the Iranian northern province of Gilan between 1906-1912, orange blossom jam was so highly valued that the citizens of the province sent jars as gifts to the royal court of the Fatʹh-Ali Shah Qajar, the 2nd monarch of the Iranian Qajar dynasty who had reigned between 1797-1834.[5]

Orange blossoms continue to be highly embedded in the traditional rituals of citrus growing regions of Iran such as the northern Gilan province on the shores of the Caspian Sea as well as in the central city of Shiraz, the city of flowers, poets, and wine. There is an annual festival dedicated to orange blossoms held in the Gilan province signifying the region's gratitude for the blessing of its fragrance to the region (Figure 8). In 2023, the festival was added to Iran's list of national intangible cultural heritage. In Shiraz, in early Spring, the whole city smells like orange blossoms as piles of freshly picked blossoms are offered for sale by street vendors (Figure 9).

Orange Blossom Water

Although not as popular as rose water, orange blossom water has had a key role as a liquid flavoring for baked good and sweets in Middle East and Mediterranean regions, and in the past, even in the Moorish regions of southern Europe.[6] There are explicit references to its popularity in making sweets in ancient Persia and in the Arab world as early as thirteenth century.[7] Most recently, orange blossom water has even found its way into bartenders' modern mixology ingredients.

Today, the distillate made from the blossoms, orange blossom water [Persian: عرق بهار نارنج, Romanized: Aragh-é-Bahār-Nārenj] is a popular liquid flavoring used in traditional Persian summer sweet beverages, sharbats, [Persian: شربت, Romanized: Sharbat], (not to be confused with sherbet or sorbet), and for some Persian sweets. Orange blossom water is also used in some Persian confections – sometimes as a substitute for rose water.

Perfumery and Essential Oils Applications of Orange Blossoms

The olfactory profile of orange blossoms is very rich. Along with rose and jasmine, orange blossoms from the triad that constitute the three most important floral sources for perfumery. In the perfumery industry, the essential oil produced from the blossoms of the bitter orange tree, through steam distillation, is referred to as the Neroli oil. The name "Neroli" has been used for a fragrant essence since the seventeenth century. It originated in Italy, where Anne Marie Orsini, Duchess of Bracciano and Princess of Nerola, popularized the use of bitter orange flower extract as a perfume for her gloves and bath. Because the yields are very low, it takes about 1000 kg of flowers to obtain about 1 to 1.3 kg of Neroli oil.[8]

The great majority of the worldwide production of orange blossoms is consumed by the perfumery industry. Along with Tunisia – which is the largest producer – Morocco, Egypt, Syria, Lebanon, and Spain are among the largest producers of orange blossoms that supply the worldwide perfumery industry.

Harvesting of Orange Blossom Buds and Petals

Sour orange trees start to bloom in early spring. Depending on the variety of the tree and growing climate, harvest from a given tree lasts no more than two weeks sometime between mid-March to late-April. In a large professional orchard, the harvesting could last three or four weeks across all the trees in the orchard.

The traditional strategy for collecting orange blossoms – both in large scale professional settings and small family settings – starts by spreading cloths or plastic tarps under the trees (Figures 10 and 11). The blossoms are either hand-plucked or naturally fall down onto the tarps along with unwanted material from the surrounding environment – falling leaves and twigs from the orange trees, wind-blown parts of other close by spring flowing trees, bodies of dead insects, and dust. While collecting the blossoms, care must be taken not to disturb the bees – or get stung by them – as they will be busy pollinating the blossoms still on the tree.

The next step is to separate the collected buds (partially opened, fully opened, fully intact, or in pieces) from all the unwanted materials including twigs, leaves, bodies of dead insets, etc. (Figure 12). The remaining blossoms can then directly be used in distillation processes to make orange blossom water and essential oils.

There remains, however, much more tedious and time-consuming sorting to be done to make orange blossom jam. The individual, tiny, white petals have to be painstakingly separated from all other parts of the blossoms including stamens, pistils, and sepals as well as any unmatured buds (Figure 13). For each day's harvest, the petals must then be washed with tap water to wash off any dust, soil, insect parts, and other very small unwanted debris.

Unless one has access to a large orchard of bitter oranges, there won't be enough petals to make jam from after one day's harvest. The best strategy for conserving each day's separated and washed petals is to put them in a container, cover them with water, and put them in the least cold part of the refrigerator (closest to the refrigerator's door or in the shelves in the door). The process gets repeated each day adding more petals to the same container that has been in the refrigerator. After few days, there should be enough petals to make a good size batch of the jam. This process allows one to collect the blossoms at the height of their maturity and fragrancy (i.e., early morning before the bees arrive) while keeping them fresh over a span of a few days.

In professional settings, assuming the trees are being grown solely for their blossoms and not for their fruit, a mature tree could produce 10 kilograms of flowers (i.e., full buds - stamen, pistil, sepals, and petals) utilizing experienced pickers. An experienced picker working in a commercial large orchard can collect 3-4 kilograms per day.[9] A mature tree in a small family-run garden –

typically grown both for their blossoms and their fruit – produces less than one third of that. Each kilogram of flowers results in about 400 to 450 grams of petals for jam making.

To get a better feel for the low volume and tediousness of the process, one can compare the orange blossom jam making with that of rose petal jam making. A typical damask rose, which is the preferred type of rose for Persian-style rose petal jams, provides at least 50 petals whereas each orange blossom provides at most 5 petals (Figure 14). Moreover, it takes about a tenth the time to harvest rose petals than orange blossom petals.

Orange Blossom Jam

Persian jams are somewhat different from western-style thick jams, where the fruit is crushed and/or cooked until fruit loses its shape or from jellies which are very firm and without fruit solids. Typically, in Persian jams, the fruit retains its shape during cooking. The surrounding syrup is translucent and has a honey-like viscosity at room temperature.

The annual supply of this jam's key ingredient, the white petals of orange blossoms, is significantly restricted due to three primary factors. First, harvesting of the petals has very low yield as each kilogram of harvested orange blossoms yields a mere 400-450 grams of cleaned petals. Second, the harvest of orange blossoms is confined to a brief window of one to two weeks during the early spring blooming season. Finally, harvesting the blossoms reduces the tree's capability for producing a significant orange harvest, impacting the small growers' financial gains.

The traditional recipe for Persian orange blossom jam calls for only cleaned fresh petals of Seville orange blossoms, sugar, water, and a bit of lemon juice. The resulting jam has a light pale golden color where semi-translucent cooked petals swim in an aromatic pourable syrup (Figure 2).

The jam making process itself does not require any special equipment other than what is required for any typical home jam making endeavors (Figure 15). Once the petals are ready, although time-consuming lasting 4-5 hours depending on the batch size, is not any more complicated than any other typical home jam making process. Sugar is dissolved in water, the mixture is brought to boil, petals are added, and the mixture is stirred every few minutes. A bit of lemon juice is added towards the end. The jam is ready when the mixture reaches a temperature of 220°F (at which point the sugar content of the mixture is about 63°Bx using a refractometer).

Pectin plays an important role in western style jams and jellies because these are much thicker and not as pourable as traditional Persian jams. Although there is plenty of natural pectin in the cell walls of citrus fruits, there is very little natural pectin in the cell walls of the petals of the orange blossom. Properly cooked Persian jams (patiently and gently cooked long enough for the syrup to thicken naturally) do not need added pectin. If one must add pectin (maybe for the jam to be much thicker than the traditional Persian style jams or to speed up the process – not recommended), one can either use some form of commercial pectin products from local grocery store, or alternatively, go with the traditional Persian natural pectin source, seeds of quince. Soak 1 teaspoon of dried quince seeds (available in Persian markets or on the Internet) in a ½ cup of

water for 15 minutes at which point the water will slightly gelatinize. Add this to the jam at the same time that the recipe calls for adding lemon juice.

Many traditional orange blossom jam recipes start by blanching the petals in boiling water for a few minutes, then immediately rinsing them with cold tap water, and repeating the blanching process two or three more times. The blanching process is intended to remove some (not all) of the natural bitterness that comes from some varieties of orange blossom petals. There is a negative side to this blanching practice. Each time the petals are blanched, they lose some of their aroma and essence prized in the jam.

I have experimented making the jam with and without blanching the petals. My personal preference now is not to blanch the petals, preserving more of the flavor of the petals. The jam may have a delicate bitterness that, in my opinion, adds to its complexity. My recommendation for the first time that you make this jam: chew on a couple of the freshly picked petals. If you taste a lot of bitterness, then consider blanching the petals. If not, skip the blanching process. This recommendation is based on the fact that the level of bitterness in the petals highly depends on a wide range of parameters including the specific variety of Seville orange (there are many), age of the tree, the growing climate, etc.

I have seen some recipes for the Persian orange blossom jam that add other flavorings such cardamom or saffron. I do not recommend adding any flavorings. They will mask the natural aroma of the orange blossoms.

Closing

Orange blossom jam stands as a crown jewel of Persian jam-making. Its delicate floral fragrance and subtle citrus notes are a testament to the meticulous process involved, from the brief window of harvesting the blossoms in early spring, the time-consuming and tedious of separating the petals, to the patient simmering that brings out their essence. While the annual yield is limited by the short blooming season and the low petal-to-blossom ratio, orange blossom jam remains a cherished cultural experience in Iran. Each spoonful offers a glimpse into the rich heritage of Persian cuisine, where time-honored techniques and a deep appreciation for nature combine to create a truly unique and evocative flavor. Furthermore, the jam's significance extends beyond the culinary realm. Its association with weddings and national festivals underscores its role in weaving together the cultural fabric of many lands beyond Iran. As orange blossom jam continues to be passed down through generations, it serves as a reminder of the enduring connection between people, place, and the fragrant blossoms that herald spring.

Illustrations

Figure 1 - A Jar of Orange Blossom Jam (Photo by Nader Mehravari)

Figure 2 - Pale Golden Color of Orange Blossom Jam (Photo by Nader Mehravari)

Figure 3 - Citrus × aurantium a.k.a. Bitter Orange, Seville Orange, Sour Orange, Bigarade Orange, and Marmalade Orange (Photo by Nader Mehravari)

Figure 4 - Citrus × aurantium Tree Showing Previous Year's Not-Yet-Harvest Fruit and Current Year's New Blossoms (Photo by Zeynel Cebeci, used under the Creative Commons Attribution-Share Alike 4.0 International license)

Figure 5 - Lifecyle and Parts of Orange Blossom (Photo by Nader Mehravari)

Figure 6 - Drawing and description of Alembic by Jābir ibn Ḥayyān from eighth century (Photo sourced from Wikimedia and is in public domain)

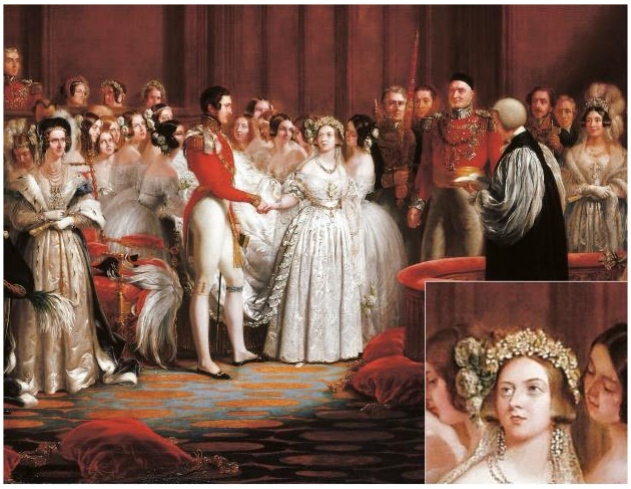

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Figure 8 - Orange Blossom Festival in the Iranian Northern Province of Gilan on the Shores of the Caspian Sea (Photo Courtesy of Tehran Times)

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Figure 15 – Typical Home Setup for Making Orange Blossom Jam (Photo by Nader Mehravari)

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