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# Current Trends of Using Ornamental Plants in Culinary Arts

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**Abstract**

All over the world, from Roman times, flowers have been used to intensify the taste and flavor, add a splash of color, texture to soups, salads, desserts, beverages or just to complement a dish. Edible flowers uses are varied and numerous possibilities, but these can be produced only in organic culture without chemicals or pesticides, to not harm the environment and the people with come into contact. The quality and appearance of edible flowers are important, but the composition and nutritional value represent a reason enough for their consumption. Edible flowers are an excellent source of minerals, a cocktail of antioxidants.

*Keywords:* edible flowers, organic culture, health, nourishment, characteristics.

"Mankind will be saved by flowers"
- Maya prophecy -

## 1. Introduction

Besides flowers are beautiful and stylish, these can be also edible. From the earliest times flowers were traditionally used in culinary arts in many specialties from: Europe, Asia, India, Middle East and Victorian England. Flowers were used as decorations in culinary preparations for the nobility, especially for celebrations and banquets [5]. Today, there is a renewed interest in respect of edible flowers, both for their taste and for color, flavor, and aroma. These are commonly used in fresh form, dried, macerated, dried, in oil, liquor or honey. Edible flowers can be used fresh as a garnish or as part of a dish, giving it a unique character. Some flowers can be stuffed or used roasted, mixed in different dishes (figs. 1, and 2).

**Figure 1.** Filled nasturtiums [16]

**Figure 2.** Ravioli salad with nasturtiums [16]

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Edible flowers can be dried, frozen in ice cubes and added to beverages, offering a touch of elegance and style, used in jellies and jams, teas, wines or minced and added to cheese, butter, pancakes and waffles. But flowers can also be used to make vinegars for cooking, marinades, and salad dressings (figs. 3 - 7).

**Figure 3.** Candied flowers [17]

**Figure 4.** Hibiscus, as a garnish in Champagne [18]

**Figure 5.** Butter with nasturtiums [17]

**Figure 6.** Flowers in ice cubes [19]


**Figure 7.** Cream cheese with calendula [16]

## 2. Edible flowers – characteristics and posibilities of use

Aesthetic aspect is an important element that motivates the use of edible flowers in nourishment. Most flower species produce edible flowers (rosemary, basil, mint etc.) but with a taste like a milder version of the plant (rosemary flowers taste delicious, but equally flavorful and fragrant). Some of the tastiest edible flowering plants are presented in the following tables, along with their main characteristics (tables 1 – 3). Other edible flowers are: fuchsia (*Fuchsia arborescens*), gardenia (*Gardenia jasminoides*), hibiscus (*Hibiscus Rosasinensis*), hollyhock (*Alcea rosea, syn. Althaea rose* ), jasmine (*Jasminum Sambac*), stone flower (*Portulaca grandiflora*) flower bride (*Gypsophila*), california poppy (*Eschscholzia californica*), coriander (*Coriandrum sativum*), dill (*Anethum graveolens*), lavender (*Lavendula angustifolia*), fennel (*Foeniculum vulgare*), garland chrysanthemum (*Chrysanthemum coronarium*), nasturtium (*Tropaeolum majus*), etc. [2].

**Table 1.** Edible flower based on fruit, vegetables and oil crops

| Common name | Latin name | Color | Flavor | Notes | Edible part |
|---|---|---|---|---|---|
| Apple | *Malus spp.* | White - pink | Floral | Eat in moderation, contain cyanide precursors | Flowers, petals used in salads, ice cream, punch, tart |
| Bean | *Phaseolus coccineus* | Pink - red | Sweet as nectar | Annual, can be used in green salads, sandwiches or just garnish | Flowers, young pods and root |
| Okra | *Abelmoschus esculentus* | Yellow | Light | Annual, when cooked, okra taste like asparagus; can be fried or served in a cold salad. | Flowers |
| Pea | *Pisum sativum* | White to lavender | Sweet | Annual- ornamental sweet pea is poisonous | Flowers |
| Peach & Plum | *Prunus spp.* | White - pink | Mild sweet | Green, young , plum tree leaves are edible, but withered are poisonous | Flowers, leaves |
| Radish | *Raphanus sativus* | White - pink | Light, peppery | Annual - eaten in moderation because can trigger allergies; can be used as a spicy, crunchy, addition to salads or sautéed | Flowers, seeds, roots |
| Safflower | *Carthamus tinctorius* | Yellow to orange | Slightly spicy | Annual – recommended to eat in moderation | Petals, flowers |
| Zucchini Squash | *Cucurbita spp.* | Yellow | Sweet as nectar; mild aroma | Annual - can use any type of squash, used as decorations on cakes, fried or in soups | Flowers |
| Saffron | *Crocus sativus* | Purple | Bittersweet | Pistils can be left overnight in water, after which only uses the resulting water, which gives a pure and homogeneous color | Stigmas of the flowers are picked, dried and stored in sealed containers |

**Table 2.** Edible flowers from aromatic plants

| Common name | Latin name | Color | Flavor | Notes | Edible part |
|---|---|---|---|---|---|
| *Hyssop* | *Agastache foeniculum* | Violet pink orange | Sweet, anise, liquorices flavor | Perennial self sowing, used like a substitute for mint; fresh leaves used for tea, green and fruit salads, or added in beverages, flowers used in salads, fruit salads, added in soup, desserts or to garnish meat and fish | Leaves and flowers |
| *Basil* | *Ocimum basilicum* | White to lavender | Strong | In salads and pasta, basil adds flavor and a cocktail of antioxidants | The leaves and flower buds |
| Cornflower | *Centaurea cyanus* | White pink, blue | Light like lettuce | The perennials are not considered edible, can trigger allergies | Leaves |
| Borage | *Borago officinalis* | Blue | Like cucumber flavor and a pleasant smell due to volatile oil. | Can be used with confidence in salads or vegetable dishes, soups and pies | Stems and leaves |

**Table 2.** Edible flowers from aromatic plants - continued

| Common name | Latin name | Color | Flavor | Notes | Edible part |
|---|---|---|---|---|---|
| Marigold | *Calendula officinalis* | Yellow orange | Slightly bitter, peppery | Generally used as a garnish, can trigger allergies, can be used as a substitute for saffron | Flowers |
| Chamomile | *Matricaria chamomilla L* | White | Mild apples flavor | Perennial, can trigger allergies | Flowers |
| Chervil | *Anthriscus cerefolium* | White | Herbal | Its leaves contain vitamins B and C, and minerals, volatile oil and bitter substances | Stems, leaves |
| *Chicory* | *Cichorium intybus* | Blue | Herbal | Perennial-could trigger allergies; | The leaves, flowers, petals, buds and roots |
| *Chive* | *Allium schoeonoprasum* | Lavender - Pink | Onion flavor | Perennial | Entirely plant |
| Dandelion | *Taraxacum officinale* | Yellow | Sweet | Perennial -using young flowers, in time get a bitter flavor | Plant roots are used for tea leaves in salads or cooked as vegetables and flowers are used for wines and syrups. |

**Table 3.** Edible flowers of ornamental plants

| Common name | Latin name | Color | Flavor | Notes | Edible part |
|---|---|---|---|---|---|
| Pansy | *Viola tricolor* | Violet and yellow | Mint, sweet | Annual - Include green sepals for a better flavor. The leaves are edible, containing vitamin C | The whole flower |
| Lilac | *Syringa vulgaris* | Lavender - White | Lemon flavor | Perennial-shrub with flavor ranging from the sweet to sour aroma | Flowers perfect for Italian salads that contain little cheese or chicken. |
| Passion-flower | *Passiflora spp.* | Purple | Light | Perennial best used as garnish | Fruits |
| Rose | *Rosa spp.* | Wide range of colors | Roses have a slight fruit flavor, may not have taste, or to be sweet, fragrant and a little pepper | Some of the tastiest rose varieties are *Rosa* X *damascena*, *Rosa gallica*, and *Rosa rugosa*; varieties: 'Double Delight', 'Mirandy', 'Tiffany'. | Rose petals are used in jams, tea, pastries and other specialties |
| Sage | *Salvia officinalis* | Purple | Fresh, spicy, slightly bitter | Blue-violet flowers grow for culinary variety. Appreciated in Italy for Saltimbocca | Leaves |
| Sweet violet | *Viola odorata* | Purple - white | Sweet | Perennial, best-dried | Flowers |
| Carnations | *Dianthus spp.* | Wide range | Spicy-sweet | Remove the narrow petals (bitter) | Petals |

Not all flowers are edible. The following list contains those flowers most frequently faced with toxicity. This list is by no means exhaustive, and some flowers, which are reported as non-toxic can cause allergic reactions to sensitive people.

Plants, noted from a variety of sources that are toxic include: clematis, hydrangea, lily Belladona, azaleas, daffodils, ranunculus, lily of the valley, red thimble, lady earrings, grape Canada, hemlock, rhododendron, lobelia, ivy, *Colocasia antiquorum, Colocasia esculenta*, wisteria, oleander, lupines, hyacinths, aster, cotoneaster and cyclamen [3].

## 3. Production of organic edible flowers

Edible flowers are recommended to be grown organically without chemicals or pesticides, because these substances used in conventional systems harm the environment and people with come into contact. It's not recommended to use edible flowers for those who suffer from asthma or different allergies because many of them are caused by sensitivity to pollen.

Growing edible flowers is essentially the same as in flowers grown for ornamental purposes. The emphasis of assorted plants to natural sites and growing conditions is very important.

Annual flowers are edible and when are choose to be cultivated, it is advisable to include also some perennials [4]. Their planting must be preceded by soil preparation and improvements necessary to ensure good fertility and good drainage. Most flowers require a well-drained soil with a pH among 5.5 - 6.

Irrigation is required to keep plants actively growing and flowering. Surface irrigation systems bring with it the possibility of physical deterioration of many delicate branches and, more importantly, wet leaves and stems are more susceptible to disease. Drip irrigation is the most suitable and recommended for edible flower crops. Water conservation is an important reason for using trickle irrigation and this type of irrigation keeps water from splashing soil and garbage flowers [9].

Protection against weeds can be best achieved with mulch. A wide range of purchased mulch is available, including also plastics.

Natural mulching, such as grass, leaves, mulch, bark chips, and similar materials are acceptable, but do not forget that adding some of these can lead to low pH and nitrogen deprivation [6]. Irrigation system should be installed before the mulch is placed.

The major benefit of mulch in combination with drip irrigation is that flowers are cleaner.

## 4. Organic edible flowers collection and storage

Aroma of flowers may vary according to growing conditions and varieties used. Harvesting should take place when flowers are cooler, early in the morning, but after the dew has evaporated, or in the evening. The heat will continue to affect crop quality till the end of use. Higher amounts of sugars are in the morning before atmospheric warming and photosynthesis converts the starch in an annual cycle of twenty-four hours. The same it's available for many volatile oils which are the basis for aroma and flavor.

To maintain the maximum of freshness, flowers are kept cool after harvest. High-stemmed flowers should be placed in a container with water. The short-stemmed, such as borage and orange flowers should be harvested within 3 to 4 hours before use, placed in a plastic bag and stored in a refrigerator. Wet paper towels placed in plastic bag will help maintain high humidity. Before being consumed, should be removed pistil and stamens. Pollen may cause allergic reaction to some people. Flowers can be used in a range of products to add aesthetic value in addition to flavor.

## 5. Current market outlook

Currently, sales of fresh and high quality flowers, for human consumption are increasing worldwide. These products are properly packaged or sold directly from the farm or through specialized stores [15].

There are several reasons which explain why the interest of edible flowers is growing. Globalization has not only contributed to a greater awareness of consumers, but also to return to previous lifestyle, where the edible flowers have played an important role [13]. Moreover, new technologies of food processing, and new methods of logistics and rapid distribution of chilled food and well preserved, allowed use of flowers as food resources. Edible flowers can supplement a business with cut flowers and aromatic plants, providing additional opportunities for value-added products. Nevertheless, edible flowers require a particular market niche. Flowers for human consumption must be grown without pesticides, giving producers an advantage for organic production. Flowers can be marketed fresh, candied, dried, or in pre-packaged salads. Market research conducted in Michigan indicates that packaging of different colors and varieties of edible fresh flowers in the same container attract more consumers.

Including flavored varieties more attractive mix also encourages positive response of consumers

[1]. Perceived sensory characteristics by our senses (size, shape, taste, flavor and color) are the most important quality criteria of edible flowers. Consumers usually prefer yellow, orange and blue colors and other color combinations are less preferred [8].

Chopped flowers give a splash of color and flavor for cheese spreads, jellies, herbal butter and jams. Dried flowers can be used in teas, actually may be included in cooking oil, vinegar, salad dressings and marinades or to add flavor to the wine. Potential farmers could get in touch with up-scale restaurant chefs and catering. Due to the fact that edible flowers are highly perishable, growers must be disposed to deliver frequently (maybe daily) smaller quantities to restaurants. Fine bakeries should be more interested of diverse palette offered by edible flowers such as: dried, confined or chopped. Producers will have to be able to demonstrate the ability to supply a reliable source of consistently high quality product to meet buyer demand. Producing diverse and colorful edible flowers, variety is a way for a manufacturer to expand its offerings to existing customers.

In addition to their aesthetic appearance, it is also preferred their quality and, not least, suitability for efficient economic use [13].

## 6. Conclusions

There are more and more voices that say that "we need a whole new vision of how we eat". Not only the quality and appearance, but also the composition and nutritional value of edible flowers are also important and represent a reason enough for their consumption. Edible flowers are an excellent source of minerals, especially phosphorus and potassium [8]. Scientists and nutritionists agree with the benefits of a natural diet with plants because are our source of vitamin C and different antioxidants helping the body to eliminate toxins. In terms of human nutrition relationship between total phenolic content and antioxidant efficiency of edible flowers similar correlation was found for fruit by various authors [4]. Furthermore plants have a lower energy density than the rest of the food, so it consumes fewer calories which protect us against many chronic diseases. In this sense reducing calories slows cell division, preventing the production of free radicals; reduce inflammation and incidence of most diseases.

Regarding edible flowers of ornamental plants, not only show antioxidant and ROS scavenging activities (reactive oxygen species) [14], but also important anti-inflammatory effects in humans. Rose ornamental flowers are also mentioned as a source of anti-inflammatory substances, anti-bacterial, anti-fungal and anti-viral [12]. It should be noted that after a week of cold storage of flowers with antioxidant activity values do not change much. From the nutritional point of view, a large advantage of teas made from edible flowers is that, in contrast with fruit tea does not contain caffeine, which causes a transient increase in blood pressure [11]. A high nutritional value, antioxidant capacity and attractive aspect of edible flowers predetermine to be a perspective for gastronomy, food and a promising object for human nutrition [7]. But clean plants can be produced only in organic culture that exists because of people who are dedicated to such activities. Organic culture does not return to the past but is a solution for the future.

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