

EDIBLE FLOWERS

ABSTRACT

This work was done to raise awareness of edible flowers. For the study a set of both printed and electronic material were examined and the findings were analyzed empirically.

Key words: Edible flowers

INTRODUCTION

Edible flowers have gained popularity in kitchen magazines, cookbooks and visual media in recent years (1; 2; 3; 4; 5; 6; 7; 8). Edible flowers have been used for centuries in many countries of the world in terms of nutritional value, medical effect, taste, shape, and aesthetic appearance (9). It is known that some flowers in ancient Greeks, Romans, Chinese, Middle East and Indian cultures were used in the kitchen (10). For example, the old Romans used flowers of many varieties of *Rosa spp.* in the kitchen, the *calendula officinalis* in salads in old France; *Taraxacum officinale* flowers and *Sambucus nigra* flowers in salads and drinks; the *Viola odorata* is used as a sugar coloring in the kitchens (11). Weed flowers and many edible flowers used for eating can be safely consumed, but some of the flowers are poisonous and inedible should not be forgotten. Like laurel (*laurus nobilis*), yarrow (*achillea millefolium*), and wolfberry (*Lyciumbarbarum*) flowers.

It is also important that these edible flowers to be used for consumption do not contain pesticides (12). Nevertheless, people have to know their allergic reactions to these flowers before they consume. A flower can either be consumed as its pedicel or just its petals. These flowers can be consumed fresh, dried or processed (as vinegar, liqueur, tea, candy) (13; 14). The source of the edible flowers can be vegetables, ornamental plants, flowers of some fruit trees as well as the flowers of some plants used for medical and aromatic purposes (Table 1; 12) (15; 7; 9).

It should be noted that edible flowers may be single or perennial depending on location, expected nutritional values, botanical characteristics, environmental wishes, growing wishes, and species of caterpillar.

For disease and pest control in edible flower breeding, organic solutions are recommended. Harvest in fresh edible flowers should be done with pedicel, receptacle, sepals, and petals, male and female organs in the morning at the time the flower is fully opened. The flower can be kept in cold weather at +1 or +4 °C for 2-14 days without losing time to protect the freshness of the flower (6).

Table 1. Some Edible Flowers

Name of the plant	Color of the petals
<i>Abelmoschus esculentus</i>	Yellow, Red
<i>Agastache foeniculum</i>	Lilac
<i>Alcea rosea</i>	In Various Colors
<i>Allium schoenoprasum</i>	Lilac, Red, Purple
<i>Allium tuberosum</i>	White
<i>Anethum graveolens</i>	Yellow
<i>Anthemis nobilis</i>	White
<i>Anthriscus cerefolium</i>	White
<i>Begonia</i>	White, Pink, Yellow, Red
<i>Bellis perennis</i>	White, Purple
<i>Borago officinalis</i>	Blue, Purple, Lilac
<i>Brassica spp.</i>	Green, White, Yellow
<i>Calendula officinalis</i>	Yellow, Orange
<i>Carthamus tinctorius</i>	Yellow, Red
<i>Centaurea cyanus</i>	Blue, White, Pink
<i>Cercis canadensis</i>	Pink
<i>Chrysanthemum</i>	Yellow, White, Purple, Pink
<i>Cichorium intybus</i>	Blue, Lilac
<i>Citrus limon</i>	White
<i>Citrus sinensis</i>	White

<i>Coriandrum sativum</i>	White
<i>Cucurbita</i> spp.	Orange, Yellow
<i>Cynara scolymus</i>	Yellow
<i>Dianthus</i> spp.	Pink, White, Red
<i>Eruca vesicaria</i>	White
<i>Foeniculum vulgare</i>	Yellow
<i>Gladiolus</i> spp.	In Various Colors
<i>Hemerocallis fulva</i>	Orange
<i>Hibiscus rosa sinensis</i>	Red
<i>Hyssopus officinalis</i>	Blue, Pink, White
<i>Lavandula</i>	Lilac, Pink
<i>Levisticum officinale</i>	Yellow, White
<i>Malus</i> spp.	White, Pink
<i>Melissa officinalis</i>	White
<i>Mentha</i> spp.	Lilac, Pink, White
<i>Monarda didyma</i>	Red, Pink, White, Lilac
<i>Muscari atlanticum</i>	Pink, Blue
<i>Ocimum basilicum</i>	White, Pink
<i>Origanum</i> spp.	White
<i>Pelargonium</i> spp.	Red, Pink, White, Lilac
<i>Phaseolus coccineus</i>	Orange, Red, White
<i>Pisum sativum</i>	White Pink
<i>Prunus</i> spp.	Pink, White
<i>Raphanus sativus</i>	White, Pink, Yellow
<i>Rosa</i> spp.	White, Pink, Yellow, Purple
<i>Rosmarinus officinalis</i>	White, Pink, Dark Blue
<i>Salvia officinalis</i>	Lilac
<i>Syringa vulgaris</i>	White, Pink, Lilac
<i>Tagetes erecta</i>	White, Red, Gold
<i>Taraxacum officinale</i>	Yellow
<i>Trifolium pratense</i>	Pink, Lilac
<i>Tropaeolum majus</i>	Red, White, Yellow, Orange
<i>Viola odorata</i>	Lilac, White
<i>Yucca filamentosa</i>	White, Purple

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36 SOME STUDIES ON EDIBLE FLOWERS

37 The pollen content of the flowers is one of the most significant characteristics considering the
 38 chemical composition. It is an important source of protein, amino acid, carbohydrate, carotenoid, and
 39 flavonoid (16; 17; 18; 19; 20; 9). The flowers contain fructose, glucose, sucrose, inorganic oils, and
 40 phenolic materials. The colored petals of the flowers are rich in C, A, and E vitamins, antioxidants,
 41 and mineral substances (9). The authors found antioxidant activity in the range of 17,6 / 85,7 DPPH
 42 (%) in 12 different edible fresh flowers (21). The authors stated that rose (*Rosa hybrida* cv. Noblered)
 43 petals are an important source of C and E vitamins, anthocyanins, antioxidants, carotenes and
 44 phenols (22).

45 In their research on 12 different edible flowers (including begonia, chrysanthemum, violet, nasturtium
 46 flower, rose and velvet flower) on total antioxidant capacity, The authors determined that petals have
 47 4,21/6,89 (g ascorbic acid/kg Fresh weight), a total phenolic content of 2,53/5,28 (g gallic acid/kg
 48 fresh weight) and a total flavonoid content of 1,35/2,04 (g/kg fresh weight) (23). They also revealed
 49 the macro-micro elements with the amount of phosphorus expressed as g/kg in fresh weight
 50 215,46/534,48; potassium 1,96/3,80; calcium 239,10/491,89; magnesium 105,26/205,19; sodium
 51 74,28/131,97; iron 2,65 / 9,83; manganese 2,29 / 7,93; copper 0,89 / 2,70; zinc 4,90 / 13,29 and
 52 molybdenum 0,29 / 0,84 while the amount of dry matter in the same flowers was 9,57 / 14,75 % and
 53 crude protein was found as 2,41/6,89 (g/kg fresh weight).

54 The authors found significant content for antioxidant activity and phenolic compounds in the edible
 55 flowers in both fresh and processed material (24). The authors have investigated the nutritional

56 content, antioxidant and antimicrobial properties of edible flowers and found significant impact on
57 human health (25).

58 The authors have studied the phenolic components and antioxidant activity of Indian wild pear (*Pyrus*
59 *Pashia*) edible flowers and revealed importance on human health as well (26).

60 The authors mentioned phenolic substances content and antioxidant properties with analgesic,
61 antidiabetic, anti-inflammatory, antifungal, antioxidant, and antimicrobial activities of some edible
62 flowers of Thailand (21).

63 The authors examined the total phenolic and total flavonoid contents with antioxidant capacities of 23
64 edible flowers and found that 3 of them (i.e. *osmantus fragrans*, *Papaver rhoeas* and *rosa rugosa*) had
65 the strongest antioxidant capacity (27).

66 Rose petals have important effects on anti-inflammatory (28), antibacterial (29), antifungal (30) and
67 antiviral (31) for human health.

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69 CONCLUSION

70 Many researchers have revealed that these flowers play a vital role in human nutrition due to their
71 richness of antioxidant, anti-carcinogen, vitamin, and chemical composition along with the increasing
72 fresh use and even for decorative purposes in kitchens nowadays.

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