

Flowers for edible gardens: combinations of species and colours for northwestern Italy

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Abstract

Flowers have been used for centuries to flavour and garnish food in several ancient cultures, both in Europe (Romans and Greeks) and Asia (Chinese and Indians). After a period of abandonment, the recent growing interest towards nutraceutical and functional food has revived the consumption of edible flowers. Edible flowers represent an important source of biologically active compounds with positive effects on consumer health. Flowers are in fact a source of mineral elements and phytochemicals with remarkable antioxidant activity. The Alcotra Fr-It 2014-2020 ANTEA project aims at developing a transboundary supply chain (France-Italy) of edible flowers. The activities involve also the design and planning of new edible landscapes, i.e., multi-functional spaces with aesthetic value aimed to the production of edible flowers. In this report, we analysed and selected ornamental species with edible flowers suitable for garden design in northwestern Italy.

Keywords: nutraceutical, ornamentals, urban landscape, urban horticulture

INTRODUCTION

Flowers have been used in traditional cooking as decoration, relishes and flavour enhancers by several cultures and for several thousand years, from Asia to ancient Greece and Rome, from medieval France to Victorian England (Mlcek and Rop, 2011; Lu et al., 2016). In recent years, edible flowers are increasingly demanded worldwide due to their health benefits (Lu et al., 2016). Flowers have indeed nutritional compounds such as proteins, amino acids and carbohydrates, but above all phytochemicals, i.e., bioactive non-nutrient compounds mainly represented by carotenoids and phenolics, which strongly reduce the risk of major chronic diseases (Sandhya Deepika et al., 2014; Liu, 2003).

The ecological importance of urban landscapes can be deeply enhanced through the planning of gardens composed by edible flowers, in which the aesthetic value of ornamental plants is combined with the nutraceutical properties of their flowers. This approach of edible landscape was recently adopted to design a public garden situated in Cherasco (CN, Italy, 44°39'14.0"N; 7°51'25.9"E), in the framework of the Alcotra Fr-It 2014-2020 ANTEA project.

In this paper, we report the criteria and the characteristics of the species selected accordingly, which can be adopted in other sites with similar environmental conditions.

MATERIALS AND METHODS

Ornamental species were selected according to five main criteria: (I) the flower edibility, which was carefully verified by examining the scientific literature; (II) the adaptability to the site's environmental conditions (44°39'14.0"N; 7°51'25.9"E); (III) the low maintenance requirements, which have led to prefer perennial plants; (IV) flower colour assortment, and (V) bloom at different times of the year. For each species selected, the uses as food and the properties were then documented.

RESULTS AND DISCUSSION

The species selected to design and plan the public garden of Cherasco and their

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characteristics are reported and described in Table 1, grouped by flower colour. These species could be effectively combined to design an urban garden, fulfilling the growing interest of merging ornamental and edible plants in the same place.

Table 1. List of the species selected in the project, grouped by flower colour, with related flowering time, beneficial properties and food use.

Flower colour	Species	Flowering time	Flower properties	Eaten in/as
Rose	<i>Allium schoenoprasum</i> L.	June-August	Antioxidant, antibacterial, anticancer ^{1,2}	Flavouring of butter, oil, cooked vegetables, salads, cheeses, pasta and rice. Mild onion flavour and taste
	<i>Antirrhinum majus</i> L.	May-September	Antioxidant, antimicrobial ^{3,4}	Salads
	<i>Dianthus caryophyllus</i> L.	May-August	Antioxidants, antibacterial ^{3,5}	Flavouring of oil, vinegar, vegetable and fruit salads. Decoration of cakes and bakery products. Clove flavour
	<i>Hibiscus syriacus</i> L.	June-September	Antioxidant ⁶	Salads, soups and herb teas. Food colouring
	<i>Trifolium pratense</i> L.	January-December	Expectorant, antispasmodic ⁷	Salads and herb teas
Blue-Violet	<i>Borago officinalis</i> L.	April-August	Purifying, emollient, antitussive, diuretic, sudorific, anti-inflammatory ^{1,8,9,10}	Salads, soups, desserts, syrups and drinks. Cucumber taste
	<i>Crocus sativus</i> L.	September-November	Antioxidant, antidepressant, anti-inflammatory, sedative, carminative, eupeptic ^{1,8,9,10}	Salads. Stigmas are known as saffron
	<i>Cynara cardunculus</i> L.	June-August	Anticancer, antioxidant, antimicrobial, anti-inflammatory, eupeptic, diuretic, hepatoprotective ^{1,8,9,11,12}	Vegetable rennet is produced from dried flowers
	<i>Lamium purpureum</i> L.	March-October	Antioxidant ^{1,13}	Snacks or decoctions
	<i>Lavandula angustifolia</i> Mill.	June-September	Antispasmodic, antiseptic, sedative, carminative, cicatrizing ^{1,8,9}	Flavouring and decoration of cakes and bakery products. Essential oil to flavour food
	<i>Passiflora incarnata</i> L.	June-July	Antispasmodic, sedative, soothing, anxiolytic ^{1,8,9,14,15}	Herb teas and syrups
	<i>Rosmarinus officinalis</i> L.	April-August	Antibacterial, antispasmodic, antioxidant, anti-inflammatory, antiseptic, eupeptic ^{1,8,9,16}	Flavouring of butter, oil, salads, soups, broths, roasts. Essential oil to flavour food
	<i>Viola odorata</i> L.	February-April	Antitussive, diuretic, emollient, expectorant ^{8,9,17}	Salads, creams. Flavouring and decoration of herb teas, cakes and bakery products
White	<i>Allium ursinum</i> L.	May-June	Antioxidant, anti-inflammatory, antimycotic, cardio protective ^{1,18,19}	Garlic substitute
	<i>Bellis perennis</i> L.	January-December	Antispasmodic, anti-inflammatory, antidepressant, diuretic, expectorant ^{8,10}	Salads and soups
	<i>Crataegus monogyna</i> Jacq.	April-May	Antioxidant, antispasmodic, sedative, hypotensive ^{1,8,9,20}	Syrups, puddings and herb teas. Flower buds are eaten in salads
	<i>Magnolia denudata</i> Desr.	March-April	Antioxidant ¹⁵	Salads. Fried in batter. Pickled, to flavour rice
	<i>Osmanthus fragrans</i> Lour.	Spring and autumn	Antioxidant, anti-inflammatory, antitussive ²¹	Herb teas, decoctions and sweets. Apricot flavour
	<i>Sambucus nigra</i> L.	April-June	Antioxidant, anti-inflammatory, antibacterial, diuretic, emollient, sudorific, laxative ^{1,8,9}	Herb teas and drinks. Flavouring honey, jellies and jams

Table 1. Continued.

Flower colour	Species	Flowering time	Flower properties	Eaten in/as
Yellow-Orange	<i>Calendula officinalis</i> L.	June-December	Anti-inflammatory, antispasmodic, antiseptic, hepatoprotective, emollient, refreshing, cicatrizing ^{1,8,9,22}	Flavouring and decoration of salted dishes, bakery products and herb teas. Food colouring
	<i>Helianthus tuberosus</i> L.	August-October	Antibacterial, antimycotic ²³	Decoration of soups and rice
	<i>Helichrysum italicum</i> G.Don	May-September	Anti-inflammatory, antibacterial, emollient, antitussive, expectorant ^{1,9,24}	Herb teas and drinks. Essential oil to flavour food
	<i>Hemerocallis fulva</i> L.	May-June	Antioxidant, anticancer ²⁵	After drying, flavouring of salted and sweet dishes. Flower buds have peas flavour
	<i>Mahonia aquifolium</i> Nutt.	April-May	Antioxidant ²⁶	Herb teas and drinks
	<i>Primula vulgaris</i> Hudson	February-May	Antioxidant ²⁷	Flavouring and decoration of cakes, bakery products and salads. Frozen, to flavour drinks and sorbets
	<i>Taraxacum officinale</i> Weber	February-May	Antioxidant, anti-inflammatory, hepatoprotective, diuretic, laxative, depurative, analgesic ^{1,8,9,28}	Salads and soups
	<i>Tilia cordata</i> Mill.	May-June	Antispasmodic, antitussive, diuretic, emollient, refreshing, sedative, anxiolytic ^{1,8,9,29}	Herb teas and decoctions
Various	<i>Mentha</i> spp.	April-October	Antioxidant, antimicrobial, antispasmodic, antitussive, anaesthetic, tonic, carminative ^{1,8,9}	Decoration. Essential oil to flavour food
	<i>Prunus</i> spp.	March-April	Antioxidant, anticancer ^{30,31}	Flavouring and decoration of soups, salads and sweets. Pickled
	<i>Rosa</i> spp.	May-July	Antioxidant, inflammatory, antibacterial, neurotonic ^{1,8,9,32}	Salads. Dried, flavouring and decoration of herb teas, drinks and sweets
	<i>Salvia</i> spp.	March-August	Inflammatory, antibacterial, antiseptic, eupeptic ^{1,8,9}	Flavouring of butter, vinegar, oil, salads and creams. Essential oil to flavour food
	<i>Thymus</i> spp.	April-August	Antioxidant, antiseptic, antimicrobial, antispasmodic, eupeptic, diuretic, sedative, anti-rheumatic ^{1,8,9,33}	Flavouring of butter, oil, cooked vegetables, salads, soups, pasta and drinks. Essential oil to flavour food

¹Marzi and De Mastro, 2008; ²Kucekova et al., 2011; ³Rop et al., 2012; ⁴Riaz et al., 2013; ⁵Mohammed and Al-Bayati, 2009; ⁶Geng et al., 2012; ⁷Lin et al., 2000; ⁸Maugini et al., 2006; ⁹Corbetta et al., 2001; ¹⁰Grzeszczuk et al., 2016; ¹¹Velez et al., 2012; ¹²Christaki et al., 2012; ¹³Budzianowski and Budzianowska, 2006; ¹⁴Dhawan et al., 2001; ¹⁵Lu et al., 2016; ¹⁶Kontogianni et al., 2013; ¹⁷Vishal et al., 2009; ¹⁸Sobolewska et al., 2015; ¹⁹Sendl, 1995; ²⁰Barros et al., 2011; ²¹Wu et al., 2009; ²²Muley et al., 2009; ²³Denoroy, 1996; ²⁴Sala et al., 2002; ²⁵Fu et al., 2009; ²⁶Gunduz, 2013; ²⁷Demir et al., 2014; ²⁸Schütz et al., 2006; ²⁹Anesini et al., 1999; ³⁰Shi et al., 2009; ³¹Lee et al., 2007; ³²Ochir et al., 2013; ³³Nikolić et al., 2014.

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