



## Review

## Wild food plants used in traditional vegetable mixtures in Italy

P.M. Guarrera<sup>a,\*</sup>, V. Savo<sup>b</sup><sup>a</sup> Istituto Centrale per la Demoetnoantropologia, MIBACt, Piazza Marconi, 8-10, 00144 Rome, Italy<sup>b</sup> Hakai Institute, Simon Fraser University, 8888 University Drive, Burnaby, BC, Canada V5A1S6

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## ABSTRACT

**Ethnopharmacological relevance:** Mixtures of wild food plants, part of the Mediterranean diet, have potential benefits for their content in bioactive compounds, minerals and fibers. In Italy, wild plants are still consumed in various ways, for their taste, effects on health and nutritional value. In this paper, we provide a list of wild plants used in vegetable mixtures, indicating their phytochemical and nutritional profile, highlighting those not yet studied.

**Aim of the study:** We provide a first complete review of traditional uses of wild food plants used as vegetables and their preparations (e.g., salads, soups, rustic pies). We also highlight their phytochemical constituents.

**Materials and methods:** We carried out an extensive literature review of ethnobotanical publications from 1894 to date for finding plants used in traditional vegetable mixtures. We also performed an online search for scientific papers providing the phytochemical profile of plants that were cited at least twice in recipes found in the literature.

**Results:** We list a total of 276 wild taxa used in traditional vegetable mixtures, belonging to 40 families. Among these, the most represented are Asteraceae (88), Brassicaceae (33), Apiaceae (21), Amaranthaceae (12). Many plants are cited in many recipes across several Italian regions. Among the most cited plant we note: *Reichardia picroides* (L.) Roth, *Sanguisorba minor* Scop., *Taraxacum campyloides* G. E. Haglund, *Urtica dioica* L. Tuscany is the region with the highest number of food recipes that incorporate wild plants used as vegetables. We also list the phytochemical constituents and some pharmacological activities of the plants cited at least twice. Finally, we discuss topics such as the taste of plants used in the recipes.

**Conclusions:** Nineteen edible wild plants, such as *Asparagus albus* L., *Campanula trachelium* L., *Hypochaeris laevigata* (L.) Benth. & Hook f., *Phyteuma spicatum* L., *Scolymus grandiflorus* Desf., are not yet studied as regards their phytochemical and nutritional profile. Some plants should be avoided due to the presence of toxic compounds such as *Adenostyles alliariae* (Gouan) A. Kern or *Ranunculus repens* L.

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\* Corresponding author.

E-mail address: [paolomaria.guarrera@beniculturali.it](mailto:paolomaria.guarrera@beniculturali.it) (P.M. Guarrera).

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## 1. Introduction

Wild food plants constitute a substantial part of the diet of many people across Europe. In Italy, many traditional dishes are still prepared mixing wild plants with cultivated vegetables and other ingredients. Wild food plants were especially important during famine periods in the past (e.g., Targioni-Tozzetti, 1767; Mattiolo, 1918). Today, these plant species have been revalued and are receiving considerable attention by ethnobotanists, nutritionists and food science scholars in general (e.g., Johns and Chapman, 1995; Johns, 1996; Guarrera, 2003; Pardo-De-Santayana et al., 2005; Luczaj and Szymański, 2007).

Many local and traditional dishes are part of the Mediterranean diet, which has recently been recognized as an “Intangible Cultural Heritage of Humanity” by UNESCO (2013). This diet is constituted by many different diets (Noah and Trunswell, 2001; Hadjichambis et al., 2008), which vary across the Mediterranean basin and within its countries, regions, and villages. This diet is generally rich in vegetables (including wild plants) that contain antioxidants and other compounds, which can reduce the incidence of cardiovascular diseases and cancer risk (Willett et al., 1995; Salvatore et al., 2005; Mohamed et al., 2007; La Vecchia, 2009; Vanzani et al., 2011).

Italy is rather famous for its food traditions and many scholars have carried out studies on wild food plants used in this country (e.g., Picchi and Pieroni, 2005; Taffetani, 2005). A recent study (Ghirardini et al., 2007) reported that the more commonly used species in Italy are *Asparagus acutifolius* L., *Cichorium intybus* L., *Foeniculum vulgare* Mill., *Reichardia picroides* (L.) Roth, *Silene vulgaris* (Moench) Garcke, *Sonchus* sp. pl., *Taraxacum campyloides* G. E.

Haglund, *Urtica dioica* L., *Valerianella* sp. pl. According to this study (Ghirardini et al., 2007), *Borago officinalis* is the most cited plant. Another study (Leonti et al., 2006), which compared data on food plants used in some areas of southern Italy, southern Spain, and Greece, established that several plants are recurrent in multiple areas (e.g., *Papaver rhoeas* L., *Silene vulgaris*, *Sonchus* sp. pl.).

In Italy, many wild plants (sometimes in combination with cultivated vegetables) are still used in various regional dishes. Nowadays, such dishes, but also typical local products, have gained popularity. In some cases, this attention is mostly focused on finding healthy alternatives to commercial foods (Colombo and Perego, 2009). However, we believe it could also be a way to rediscover our roots through food. Notably, the importance of food in the past, the present and the future was discussed at the EXPO 2015 in Milan (Italy). In fact, in many Italian regions, and especially in small villages and mountains areas, the local traditional uses of wild plants are still vivid.

Although several studies exist, there is still not a comprehensive review of the different combinations and mixtures of wild plants consumed as vegetables in traditional dishes. The aim of this paper is to fill this gap in research providing lists of wild plants used in mixtures and preparations in Italy along with the beneficial phytochemical constituents of these plants.

### 1.1. Brief historical background of Mediterranean plant-based foods

Since time immemorial, humans have experimented with nutritious as well as harmful foods from their environments. Over time, these experiences with taste, smell, texture of food plants

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