



(RESEARCH ARTICLE)



## Compilation on the medicinal uses *Calendula officinalis* and *Calendula arvensis* species distributed in the flora of Turkey

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### Abstract

Turkey has an important position in the world in terms of the richness of plant species. It contains about 9,000 plant species and 11,500 taxa. In addition, more than 1000 plant species are used as medicinal and aromatic plants in our country. Medicinal plants are mostly collected from nature and evaluated. Recent studies have shown that these plants can be evaluated in many ways both in agriculture and in various industrial areas. *Calendula* genus is represented by over 60 taxa in the world and 4 taxa in Turkey. Especially from these taxa; The medicinal and economic values of *Calendula officinalis* and *Calendula arvensis* species are quite high. In this study, the medicinal uses of *Calendula officinalis* and *Calendula arvensis* plants, which are distributed in the flora of Turkey, were examined in detail based on the literature.

**Keywords:** *Calendula officinalis*; *Calendula arvensis*; Asteraceae; Medicinal; Turkey

### 1. Introduction

Asteraceae (Compositae) is a family known for being the largest family of flowering plants, constituting approximately 10% of Angiosperms. Members of this family are represented by approximately 1,700 genera and 25,000 species worldwide, excluding Antarctica (Barroso, 1986). It has been stated that there are 1,209 species belonging to the Asteraceae family in the Flora of Turkey. In Turkey, *Calendula arvensis* L. (Orange daffodil), *Calendula suffruticosa* Vahl. (Öküzgözü) and *Calendula officinalis* L. (Calendar) are distributed in 3 species (Güner et al., 2012).

*Calendula* species have traditionally been used as food and medicinal plants among the people. The leaves are used fresh in salads as well as dried. It is also used to color cheese, such as saffron. It has traditionally been used for abdominal cramps and constipation. It is known to cause allergic reactions and their use during pregnancy should be avoided (Miraj 2016).

### 2. *Calendula officinalis* L.

The genus *Calendula* (Asteraceae) has been included in the composition of foods since ancient times due to its therapeutic properties. *Calendula officinalis* L. is a species that has come to the fore among other *Calendula* species (Goncalves et al. 2018). Herbal and cosmetic products are made from the *Calendula officinalis* species (Okoh 2008).

*Calendula officinalis* is an annual or biennial herb that can grow to 30-60 cm in height. Its body is herbaceous or only woody at the base, the leaves are whole or slightly fragmented, the achene bill is strongly incurved, the flowers are

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yellow-orange colored (Bisset and Wichtl 2001; Milss 1992). Powdered *Calendula officinalis* is yellowish-brown with a characteristic, aromatic odor and has a slightly bitter taste (Jackson and Snowdon 1992; Arora et al. 2013).

Chemical components of this species include triterpene glycosides, triterpene alcohols, flavonol glycosides, essential oils and polysaccharides (Gantait and Chattopadhyay 2005). The oil of the *Calendula officinalis* species is used as an anti-inflammatory, an antitumor agent and a remedy to heal wounds (Miraj 2016).

There is 0.2% essential oil in *Calendula officinalis* plant. Alpha-cadinol and T-cadinol constitute the main components of the essential oil (Gruenwald et al., 2000). *C. officinalis* plant is available in various pharmaceutical and cosmetic products. These products can be in the form of powder, gel, cream, ophthalmic solution, tincture, tea, shampoo, soap, after-sun lotion (Bruneton et al., 1995).

*Calendula officinalis*, which is popularly known as calendula, is one of the most frequently used medicinal plants since ancient times. The smell of this species is weak and aromatic, and the taste is bitter (Kalasa 2019). Calendula plant in folk medicine; It is used in the treatment of skin inflammations, in the healing of burns, bruises and cuts on the skin, in the treatment of herpes, in the treatment of liver and biliary tract diseases (Grieve 1931; Kirtikar and Basu, 1993; Khare, 2004; Baydar, 2006). In ethnobotanical studies conducted in Turkey, it has been noted that *Calendula officinalis* is used in the treatment of psoriasis among the people. It has been stated that *Calendula officinalis* flowers are used externally in the form of cream in the treatment of eczema and psoriasis, the above-ground parts in the form of ointments externally in eczema and psoriasis, and the above-ground parts in the form of decoction internally in the treatment of psoriasis (Deniz et al. 2010, Uğulu 2012; Erarslan et al. 2020).

It has been reported that *Calendula officinalis* can be used in the treatment of chronic infections due to its cleansing and detoxifying properties (Blumenthal et al. 2001). The dried flowers of the plant have been used for its antipyretic, anti-tumor and cicatrizing effects (Ukiya et al. 2006). Its flowers are used as an infusion as an antifungal and antiseptic in wounds, scars, freckles, sprains and conjunctivitis (Rehecho et al. 2011). Tea is used in eye wash, mouthwash, diaper rash, and other inflammatory conditions of the skin and mucous membranes (Safdar et al. 2010). It has been determined that it is used as a tincture in the treatment of mental tension and insomnia (Boericke, 1998). Due to the polyphenols they contain, they can also be used in the treatment of inflammation, cancer prevention, cardiovascular disorders and neurodegenerative diseases (Laughton et al. 1991; El-Mostafa et al. 2014; Mansuco et al. 2019; Messina et al. 2019). Plant pharmacological studies have shown that calendula extracts have antiviral, antigenotoxic and anti-inflammatory properties in vitro (Miraj 2016). It is used as an antiseptic, stimulant, diaphoretic, antispasmodic and antipyretic (Kirtikar and Basu, 1993; Weiner 1990). In vitro studies have shown that extracts of *Calendula officinalis* show anticancerous activity in various tumor cell lines derived from leukemias, fibrosarcomas, melanomas, breast, cervix, prostate, pancreas and lung (Medina et al. 2006). It has also been used internally in the treatment of gastritis, colitis, and duodenal ulcer bleeding (Bone 2003). The flowers of the plant are used as ear drops in the treatment of otitis media in children (Sarrell et al. 2001; Sarrell et al. 2003). It is also included as part of bee sting and foot ulcer treatment (Wynn and Fougere 2007).

*Calendula officinalis* is traditionally used as a diuretic and diaphoretic in the treatment of visceral inflammations, gastrointestinal ulcers, dysmenorrhea, and convulsions. It is also used in inflammation of the oral and pharyngeal mucosa, wounds and burns (Yoshikawa et al. 2001).

### 3. *Calendula arvensis* L.

*Calendula arvensis* is widely distributed in Central and Southern Europe, North Africa, Southwest Asia and the region of Macaronesia (Azores, Madeira Islands, Rescue Islands, Canary Islands and Cape Verde). This species is an annual species that can grow to about 15 cm. Its leaves are lanceolate, its body is thin hairy and monoecious (Paolini et al. 2010, Ruiz 2005).

It was determined that the main components of the essential oil in *Calendula arvensis* plant are  $\delta$ -cadinene and high concentration of sesquiterpene, which is  $\alpha$ -cadinol (Poalini et al. 2010). *Calendula arvensis* is traditionally used as a food coloring, spice, and tea, as well as tinctures, ointments, and creams for cosmetics (Ruiz 2005). *Calendula arvensis* has been used as a disinfectant, antispasmodic and diuretic (Tiwari 2008). In Italy, it is used as an anti-inflammatory, anti-cancer and antipyretic among the people (Anon. 2000) and in Spain, the leaves of the plant are used as a sweat enhancer. Traditionally, it is used as a menstrual enhancer, diaphoretic and soothing (Dall Acqua et al. 2008). Due to its wound healing properties, crushed leaves are applied topically to wounds (Abbasi et al. 2010). The flowers of the plant are boiled and used in the treatment of burns (Passalacqua 2007). In addition, the plant is used for the healing of colds, coughs, calluses and warts (Lanfranco, 1993; Penza, 1969).

In Italy, the flowers of the plant have traditionally been used for making vegetables and the leaves have been used for soup preparation for years (Motti et al. 2020, Licata et al. 2016). The tea of the plant is antiseptic and its flowers are used to maintain skin firmness and repair damaged skin (Passalacqua et al. 2007; Addis et al. 2020). The flower extracts of the plant have antioxidant, antifungal, anticandidal and antimicrobial activities (Abudunia 2017). It was also emphasized that it has cytotoxic effects against human myeloid cells (Abudunia 2017) and breast cancer lines (Abutaha et al. 2019).

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#### 4. Conclusion

*Calendula* species have been used in the treatment of many diseases in folklore since ancient times. *Calendula* plant in folk medicine; It is used in the treatment of skin inflammations, in the healing of burns, bruises and cuts on the skin, in the treatment of herpes, in the treatment of liver and biliary tract diseases (Grieve 1931; Kirtikar and Basu, 1993; Khare, 2004; Baydar, 2006). In studies conducted in Turkey, it has been noted that *Calendula officinalis* is used in the treatment of psoriasis among the people. Tea made from *Calendula officinalis* and *Calendula arvensis* species has antiseptic properties and is also used in skin repair, healing and wound treatment.

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#### Compliance with ethical standards

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