

## Evaluation of phenolic and flavonoid compounds in inflorescence organs of three Iranian *Achillea* species

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**Background and Aims:** *Achillea* is a genus belongs to Asteraceae with 19 reported species in Iran. *Achillea* plants have long been used in traditional medicine as an anti-inflammatory agent for treatment of rheumatic pain. Phenolics and flavonoid compounds are the most important medicinal metabolites of *Achillea* species. Flavonoids have been reported to exert a wide range of biological activities including: anti-inflammatory, antibacterial, antiviral, anti-tumor effects. Because of wide spread of *Achillea* species in Iran and pharmaceutical importance of their metabolites, the aim of this study was determination of total phenolic and flavonoid contents and characterization of some flavonoids in inflorescence of three Iranian *Achillea* species.

**Methods:** Flowering samples of *A. kellalensis*, *A. wilhelmsii* and *A. vermicularis* were collected from different natural regions. Samples were extracted in ethanol and total phenolic and flavonoid contents of extracts were determined spectrophotometrically. The existence of some flavonoids in samples was demonstrated by thin layer chromatography (TLC) method and their contents were determined by high performance liquid chromatography (HPLC) technique.

**Results:** The highest total content ( $75.08 \pm 2.40$  mg/g DW) of phenolic compounds was obtained for inflorescence sample of *A. kellalensis* (Boein Zahra population) and the highest amount ( $4.55 \pm 0.33$  mg/g DW) of total flavonoids was determined for inflorescence sample of *A. kellalensis* (Qazvin population). On the basis of HPLC data the amounts of quercetin, apigenin and rutin flavonoids in the samples ranged 0-0.32, 0-0.3 and 0-0.8 mg/g DW, respectively. The highest content of quercetin and apigenin was calculated in inflorescence of *A. kellalensis* (Boein Zahra population) and the highest amount for rutin was obtained in inflorescence of *A. wilhelmsii* (Shiraz population).

**Conclusions:** It is suggested that inflorescence organs of some populations of *Achillea* species growing wild in Iran are potent natural sources for phenolic and flavonoid compounds.

**Keywords:** *Achillea*; Flavonoids; Phenolic compounds; Spectrophotometry; TLC; HPLC