CHEMICAL CONSTITUENTS THE FLOWERS OF ACHILLEA BIEBERSTEINII

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Abstract:

Medicinal plants used in folk medicine are being increasingly studied and used on pharmaceutical, food and nutraceutical fields. Herein, wild and commercial samples of Achillea biebersteinii were chemically characterized with respect to their macronutrients, free sugars, organic acids, fatty acids and tocopherols

Key words:

Teaching, biology, modern technologies, teaching problems, patterns of development, rational methods

Medicinal plants used in folk medicine are being increasingly studied and used on pharmaceutical, food and nutraceutical fields. Herein, wild and commercial samples of Achillea biebersteinii were chemically characterized with respect to their macronutrients, free sugars, organic acids, fatty acids and tocopherols. Furthermore, in vitro antioxidant properties (free radicals scavenging activity, reducing power and lipid peroxidation inhibition) and antitumour potential (against breast, lung, cervical and hepatocellular carcinoma cell lines) of their methanolic extract, infusion and decoction (the most consumed forms) was evaluated and compared to the corresponding phenolic profile obtained by high performance liquid chromatography and mass spectrometry The genus Achillea L (Asteraceae) comprises about 130 species of flowering and perennial plants distributed in Europe and temperate areas of Asia and a few grow in North America. Several species of the genus Achillea have been used traditionally to treat tonic, anti-inflammatory, anti-spasmodic, diaphoretic, diuretic and emmenagogic agents and have been used for treatment of hemorrhage, pneumonia, rheumatic pain and wounds healing in Uzbek traditional literature 1. The chemistry of the genus Achillea has been studied by many researchers, and it is well documented as being a good source of biologically active compounds such as flavonoids, phenolic acids, coumarins, terpenoids (monoterpenes, sesquiterpenes, diterpenes, triterpenes) and sterols.

The flower parts of Achillea santolina were collected in Jul 2020 from Namangan region, Republic of Uzbekistan. Dried powder (2 kg) was extracted at room temperature by EtOH (70%). The crude extract was suspended in water (1:1) and fractionated successively with petroleum ether, chloroform, ethyl acetate and n-butanol. The chloroform fraction presented terpenoids via TLC method using systems solvents (hexane: ethyl/acetate 2:1; 4:1) as a developer UV ligtht, NH_3, 5% $AlCl_3$, 5% H_2SO_4 in EtOH. The $CHCI_3$ fraction (10 g) was chromatographed over a column (2.5 × 150 cm) of SiO_2 (300 g) using a *n*-hexane–EtOAc gradient (25:1–1:1) to get 10 fractions and the resulting fractions were combined according to TLC profiles. The second fraction was subjected by silica-gel column chromatography (200-300 mesh) with hexane/ ethyl acetate (10:1, 8:1, 5:1, 2:1) to yield compound **1** (12 mg). The third and fourth fractions were purified over Sephadex LH-20 eluted with ($CHCl_3$: CH_3OH, 1:0.5), to obtain compounds **2** (4 mg) and **3** (20 mg). Fraction seventh was chromatographed via Sephadex LH-20 column eluting with ($CHCl_3$:CH_3OH, 1:1) to get compounds **4** (18 mg) and **5** (10 mg)

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