

PP38. Comparison of hydrodistillation (HD), microwave-assisted hydrodistillation (MHD) and supercritical fluid extraction (SFE) for the isolation of volatiles from chamomile flower

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Chamomile flower (*Matricariae flos*) is a herbal drug used mainly because of antiphlogistic, spasmolytic and antimicrobial properties, which are related to the presence of volatile essential-oil constituents (α -bisabolol and its oxides, chamazulene, spiroethers) and non-volatile compounds, such as sesquiterpene lactones, flavonoids, and coumarins.

In the present work, we used hydrodistillation (HD; sample-to-solvent ratio 1:20, 2 h), microwave-assisted HD (MHD; sample-to-solvent ratio 1:20, 2 h, microwave power 180 W) and supercritical CO₂ extraction (SFE; 40 °C, 100 bar, 3 h) to obtain isolates, from a commercially available chamomile flower tea. The composition of the isolates was analyzed using GC-MS. The obtained results of the relative content of the selected pharmacologically relevant constituents were as follows.

HD and MHD yielded 0.2% and 0.3% of isolates, respectively. A much higher yield was obtained in the case of SFE (3%). In HD and MHD isolates, which were qualitatively and quantitatively similar, oxygenated sesquiterpenes dominated (64.4-67.4%), with bisabolol oxides comprising 54.2-54.4% of the isolates. Among non-terpene constituents (17.0-19.9%), spiroethers were present with 10.0% and 11.7% of HD and MHD isolates, respectively. Chamazulene (4.8-4.9%) was the most abundant among sesquiterpene hydrocarbons (8.8-9.7%). On the other hand, non-terpene compounds (57.4%) were the most abundant class of constituents in SFE extract, and among them hydrocarbons comprised 45.0% of the extract, followed by 10.2% of spiroethers. Among the oxygenated sesquiterpenes (32.2%), SFE extract contained 25.8% of bisabolol oxides. In contrast to HD and MHD, SFE resulted in a low amount of chamazulene, but the extract contained 3.2% of valuable sesquiterpene lactones.

Having in mind that HD and MHD resulted in similar yields and compositions of the isolates, and that SFE gave a higher amount of the isolate with a unique composition, the choice of traditional vs modern technique for the preparation of chamomile isolates should be strongly dependent on the specific use of the final product and in that sense carefully evaluated.

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