FACTA UNIVERSITATIS
Series: **Physics, Chemistry and Technology** Vol. 16, N° 1, Special Issue, 2018, p. 86
49th International Symposium on Essential Oils (ISEO2018) • Book of Abstracts

49th ISEO

PP22. Small changes in the distillation method result in variable quality of yarrow (*Achillea collina*) essential oil

Éva Zámboriné Németh[1]*, Klára Ruttner[1], Péter Radácsi[1]

Keywords: yarrow, extract, solvent, decantation, sesquiterpene

Achillea collina (Becker ex Rchb.f.) Heimerl (Asteraceae) is one of the yarrow species providing the chamazulene containing, characteristic blue essential oil by water distillation. The chamazulene content varies on a large scale [1,2]. Besides several other factors–like the determination of the species and taxon, geographical and ecological characteristics of the habitat, sampling, and GC analytical methods–which have been studied and discussed more frequently, the method of distillation and oil recovery might have a large influence on the quality of the oil, too. Unfortunately, the applied solvents, evaporation/drying methods and/or further dilution is almost never described accurately in manuscripts. Therefore, a well-established comparison and evaluation of the results is at least questionable. In our recent experiment, this aspect was investigated in detail. As plant material, a high chamazulene-containing strain of *A. collina* was used, selected and maintained at our experimental station. Dried flowering shoots were distilled in a Clevenger type apparatus: a) as in Pharmacopoeia Hungarica VII, b) as in Ph.Hg.VIII (=Ph.Eur.). For the second treatment, different solvents were applied for washing the sesquiterpene-rich oil of large viscosity: a) *n*-hexane, b) *n*-pentane, c) xylol, d) ethanol (96%), e) acetone. The recovered oil was analyzed a) immediately after the washing down, b) after the evaporation of the solvent–as for measuring the yield–diluted by different amounts of hexane again (resulting in 0.3, 1.0, 5.0, 10% concentrations) for the injection into the GC apparatus. The GC-MS analysis was carried out as in [3]. The results show that based on the above circumstances and factors, the number of GC peaks varied between 4 and 68. Chamazulene content of the oil samples changed between 45 and 78% of the total GC area percentage and a higher dilution rate of the extracts increased the ratio of chamazulene. Evaporation of the solvents resulted in a severe loss of volatile monoterpenes. At the same time, the proportion of α-bisabolol remained more constant (18-25%) but its ratio increased with the b-type of apparatus. Although internal standards might help quantification, however, the studied factors may influence severely the analytical results and any comparison. A well-established, standardized method of distillation and subsequent oil recovery process would be of high importance in the case of sesquiterpene-rich species.

References:
[1] Kindlovits, S., Németh, É., 2012. Acta Aliment. Hung. 41, 92–103.
[2] Németh, É., 2005. J. Essent. Oil Res. 17, 501–512.
[3] Huong, T.N. et al., 2018. Biochem. Syst. Ecol. 79, 1–7.

[1]Szent István University, Department of Medicinal and Aromatic Plants, H-1118 Budapest, Villányi str. 35-43, Hungary.
**Corresponding author*: Zamborine.Nemeth.Eva@kertk.szie.hu