OP-09- Determination of free and glucosidically-bound volatiles in plants.

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Abstract

Plant volatiles are in general isolated by submitting fresh or dried plant matrices to hydrodistillation to obtain the essential oil (EO). However, EO is not always representative of what the plants produce, because a part of the plant components are dissolved in the residual distillation water. Moreover, volatiles can be present in a plant in a glucosidically-bound form that are not recovered by hydrodistillation (Bruneton 2009).

This study aims i) to investigate exhaustively the volatile composition of two model plants peppermint aerial parts (*Mentha x piperita* L., Lamiaceae) and dried cloves (*Syzygium aromaticum* (L.) Merr. & L.M.Perry, Myrtaceae) ii) to evaluate the distribution of eugenol and L-menthol in aglycone form in the essential oils and in the residual distillation water and to compare their distributions to the total amounts in the original matrices, and iii) to analyze the two selected markers in their glucosidically-bound forms. L-Menthol and eugenol were selected because a) they are highly abundant markers in the plants investigated, b) they may be taken as representative of monoterpene alcohols and phenolic compounds, i.e. two of the groups of secondary metabolites often present in glycoside form in several species, c) they may be taken as representative of compounds with different water solubility, being their octanol/water partition coefficient (Ko/w) respectively 3.38 for L-menthol and 2.73 for eugenol (Episuite 2012), and d) the two plant matrices are known to provide widely differing essential oil yields. High-concentration-capacity sample preparation techniques (SBSE, and HS-SPME and in-solution SPME) to run quali-quantitative analysis without sample manipulation, in combination with GC-MS , and direct LC-MS glucoside analysis, have been employed to achieve this goal and to cross-validate the results.

The results showed that hydrodistillation is unable to isolate in full the aglycone in the essential oil and that about 23% of L-menthol and 8% of eugenol remained in the residual distillation water in the form of glucoside. The results are of great interest to achieve a better knowledge of the composition of aromatic plants and indicate the possibility to exploit residual hydrodistillation water as by-product in cosmetic, pharmaceutical and food fields.

Keywords: Essential oils; Residual distillation waters; glucosides; L-Menthol; Eugenol

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