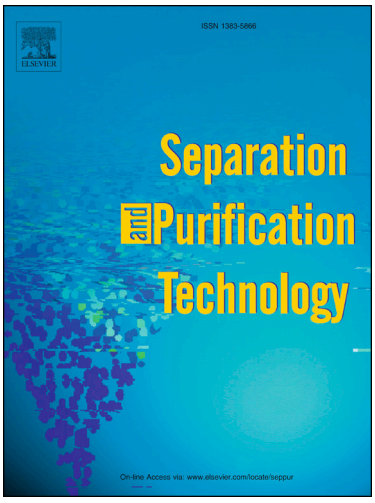

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Potentiality of polymeric membranes in aromatherapy: application to bergamot essential oil

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Abstract

Aromatherapy is a form of complementary and alternative therapy that uses essential oils extracted from different organs of aromatic plants. BEO, extracted from Citrus bergamia Risso et Poiteau (Rutaceae family, genus Citrus) fruit, represents one of the most used aromatherapy oil in the industrialized countries.

Biological effects of BEO are due to a synergistic action of the components present in the phytocomplex but it is not yet known which components are crucial for the biological activity. In this work three polymeric lab-made and two commercials dense membranes were tested for concentrating and isolating BEO volatile compounds. Lab-made membranes, composed of poly PVDF-HFP, PSU and SBS, were prepared via EIPS. Commercial investigated membranes were made of cellulose and polyamide. The membranes have been also characterized to determine morphological and surface properties. Volatile aroma compounds were isolated from BEO by means of a vapor permeation system. For this purpose, a membrane prototype which allowed to vaporize BEO and to separate specific components by their passage through the membrane, was developed. HS-SPME coupled with GC/MS was employed for the analysis of BEO volatile components both in feed and permeate. Hand-made PSU and commercial cellulose membranes were able to reject a greater number of volatile components than the other tested membranes. In particular, all cyclic and acyclic oxygenated monoterpenes (linalool, linalyl acetate, terpinen-4-ol, α-terpineol) were not detected in the permeate. The results showed that with the dense PSU membrane limonene (53.121%) and *p*-cymene (2.070%) contents were lower than the relative contents registered with the commercial cellulose membrane (63.440% and 3.325%, respectively), indicating a higher membrane selectivity of M3 towards these components. Contrarily, the rejection of both α- and β-pinene was higher when cellulose membrane was used (6.401% and 22.740%,