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Author: Nicola De Zordi Angelo Cortesi Ireneo Kikic
Marianrosa Moneghini Dario Solinas Gabbriella Innocenti
Alessandro Portolan Gianni Baratto Stefano Dall'Acqua



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The Supercritical carbon dioxide extraction of polyphenols from Propolis: a central composite design approach

Nicola De Zordi^{1*}, Angelo Cortesi¹, Ireneo Kikic¹, Mariarosa Moneghini², Dario Solinas¹,
Gabbriella Innocenti³, Alessandro Portolan⁴, Gianni Baratto⁴, Stefano Dall'Acqua³

¹ Department of Engineering and Architecture, University of Trieste, V. A. Valerio 6/a, 34127 Trieste (Italy)

² Department of Chemical and Pharmaceutical Sciences, University of Trieste, V. L. Giorgieri 1, 34127 Trieste (Italy)

³ Department of Pharmaceutical Sciences, University of Padova, Via Marzolo 5, 35131 Padova

⁴ UNIFARCO S.p.A., Via Cal Longa 62, 32035 Santa Giustina Bellunese, (Italy)

*E-mail: ndezordi@units.it Phone: +390405583756 Fax: +39040569823

Abstract

The influence of different parameters on the Supercritical Carbon Dioxide (SCO₂) extraction of Italian Propolis were studied with attention to extraction yield and chemical composition of obtained fractions. Operating parameters of SCO₂ were optimized using central composite design. Analysis by multiple regression indicated that pressure and time have a major linear effect on the extraction yield and extract composition.

Propolis SCO₂ extracts present different chemical content compared to the ethanolic extract obtained with ultrasound assisted extraction (UAE). SCO₂ extract can be used to perform further UAE ethanol extraction obtaining a flavonoid containing extract. These findings indicate two possible applications of supercritical carbon dioxide for Propolis extraction, one to obtain lipophilic fractions enriched in specific constituents, the other as pre-treatment of the crude material to facilitate the further extraction with ethanol.

Keywords: Propolis, supercritical fluids extraction, central composite design, HPLC, qualitative composition, flavonoids.

1. Introduction

Propolis is a resinous natural product, collected by *Apis mellifera* from exudates and plant buds, and mixed with wax and bee enzymes. Bee's salivary enzymes partially digested the material, which

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