

EXTRACTION OF PHENOLIC COMPOUNDS FROM WHITE AND RED GRAPE SKIN AND ROSEHIP FRUIT

Maša Knez Marevci^{*}, Taja Žitek¹, Vesna Postružnik¹, Željko Knez^{1,2}

¹Faculty of Chemistry and Chemical Engineering, University of Maribor, Smetanova 17, SI-2000 Maribor, Slovenia

²Faculty of Medicine, University of Maribor, Taborska ulica 8, SI-2000 Maribor, Slovenia

*e-mail: masa.knez@um.si

Abstract

Grape (*Vitis vinifera*) as one of the world's largest fruit crops. Grape skin is a source of large amounts of phenolic compounds which can act as antioxidants. Rosehip (*Rosa canina* L.) is among the most popular and widely used herbs worldwide which contains significant amounts of valuable bioactive substances. Rosehip, white and red grape skin are therefore potentially good sources of natural antioxidants as an alternative to the synthetic antioxidants used in the food industry to prolong the shelf life of food. Although, the content of total phenolics differs depending on the type of material, isolation method and applied solvent. Besides, anthocyanin content in plant material depends on the variety and the harvest year. The present investigation concerns solid liquid extraction from red and white grapes skin and the rosehip (*Rosa canina*) to attain extracts with a high content of phenolic compounds.

Conventional extraction techniques and extraction with supercritical fluids (SCFs) have been carried out and the impact of extraction technique and experimental parameters such as time, pressure, temperature, and solvent mixture were examined. The extracts have been analyzed for the total phenolic content by using Folin-Ciocalteu method. Proanthocyanins were determined by UV spectrophotometry method based on acid hydrolysis and colour formation, and the phenolic constituent profile has been examined by liquid chromatography with tandem mass spectrometry (LC-MS-MS) analysis. The qualitative parameter analyzed is antioxidant capacity; determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay.

The results demonstrate that the contents of the major constituents significantly varied among the different types of materials. The highest content of total phenolics was determined in the extract from the white grape skin, macerated with MeOH (26.7 mg GA/g extract), and similar, 25.6 mg GA/g extract in the MeOH extract attained by Soxhlet. Ellagic acid (0.650 mg/100 g extract), catechin (0.164 mg/100 g extract), gallic acid (0.133 mg/100 g extract) as well as caffeic acid (0.038 mg/100 g extract) are the major compounds present in the rosehip extracts attained by maceration using MeOH as solvent.

Modern technologies including supercritical fluids as processing media allow extraction of very pure, high-value products from materials which otherwise would be considered by-products or waste and sold cheaply, or simply disposed of. Such processing concepts promote reuse of residues from food industry. Extraction of plant materials for isolation of natural compounds and their inclusion in high value-added products with specific properties has been considered as a very promising application.

Key words: Phenolic compounds, Conventional extraction, Supercritical fluid extraction, LC-MS, DPPH.