GRAPE SEED OIL EXTRACTION AND CHARACTERIZATION OF FATTY ACID BY GCMS

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Abstract

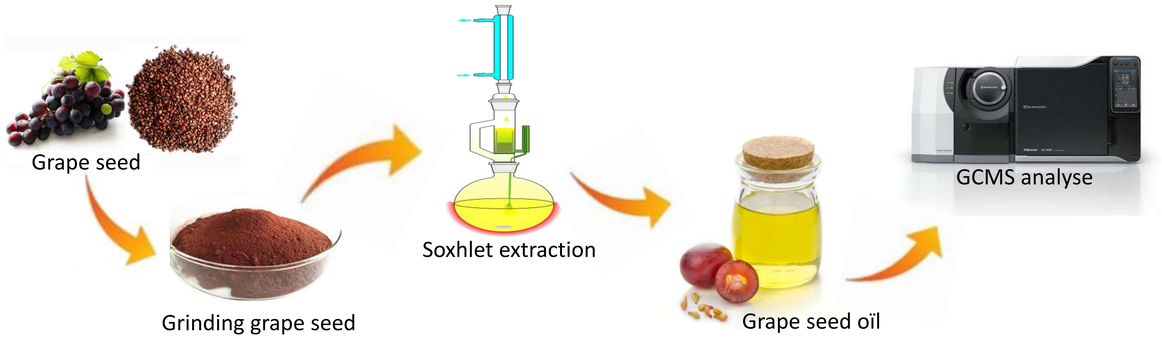
Grape seed oil is rich in phenolic compounds, fatty acids, and vitamins, with economic importance to pharmaceutical, cosmetic, and food industry Extraction of oil from grape seed by extraction with the Soxhlet. In Soxhlet apparatus using hexane 1:9 solid to solvent ratios and extraction time at 4h. The result oil yield of 10 % with Hexane. The aim of this article was to briefly review the composition and nutritional aspects of grape seed oil and the chemical compounds of the extracted grape seed oil were separated and identified by gas chromatography–mass spectrometry (GC–MS) and physic-chemical properties of date grape seed oil extracted. Keywords: grape seed oil, Soxhlet method, Extraction, Oil properties.

Introduction

Grapes are one of the most consumed fruits in the world, mostly in the form of juice and wine. Over 1000 species of red and white grapes are extensively cultivated around the world[1]. Generally, grapes have juice, pulp, skin, seeds, and stem. Regarding chemical components,[2] Grape seed oil is rich in phenolic compounds, fatty acids, and vitamins, with economic importance to pharmaceutical, cosmetic, and food industry.[3] Its use as an edible oil has also been suggested, especially due to its pleasant sensory characteristics. Grape seed oil has beneficial properties for health that are mainly detected by in vitro studies, such as anti-inflammatory, cardioprotective, antimicrobial, and anticancer properties, and may interact with cellular and molecular pathways[4] These effects have been related to seed oil constituents, mainly tocopherol, linolenic acid, resveratrol, quercetin, procyanidins, carotenoids, and phytosterols.[5] The aim of this study was to briefly review the composition and nutritional aspects of grape seed oil and the chemical compounds of the extracted grape seed oil were separated and identified by gas chromatography–mass spectrometry (GC–MS) and physic-chemical properties.

Methods and Materials

Oil from grape seed is extracted with the Soxhlet. In Soxhlet apparatus using hexane 1:9 solid to solvent ratios and extraction time at 4h. The fatty acid composition of grape seed oils was determined by GC-MS a Shimadzu GCMS-TQ8040 NX type equipment was used. The result oil yield of 10 % with n-Hexane solvent.



Results and Discussion

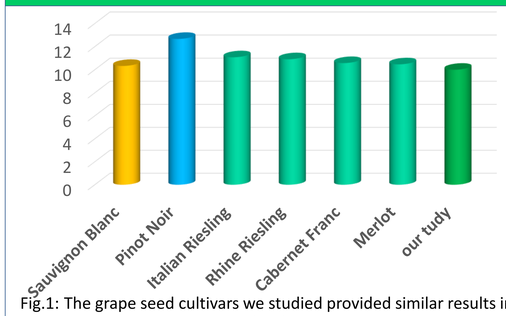


Fig.1: The grape seed cultivars we studied provided similar results in oil yield

As shown in Figure 1, the grape seed cultivars we studied provided similar results in oil yield. Among grape varieties, seeds of Sauvignon Blanc showed the lowest percentage yield (10.33%), while the oil yield from 3Pinot Noir" was the highest (12.67%). "Királyleányka" contained the second-highest yield of oil (12.02%), followed by "Italian Riesling" (11.08%), Rhine Riesling (10.91%),"Cabernet Franc" (10.58%), and "Merlot" (10.47%). These oil yields correspond to the 8–20% oil content reported in the literature.[6-9]

The results obtained of GC-MS analysis as shown the major fatty acids of grape seed oils were stearic acid (C18:0), palmitic acid (C16:0), oleic acid (C18:1), and linoleic acid (C12:2). Linoleic acid was the most abundant fatty acid in a sample, contributing 66.8% of total fatty acids. The next fatty acid in the row is oleic acid, ranging from 14.29%, the seeds also contained significant palmitic acid contributing (10.66%) and Grape seed oil samples contained small but significant amounts of stearic acid in the rate of (3.42%), The minor fatty acids included caprylic acid, capric acid, lauric acid, myristic acid, palmitoleic acid, pentadecanoic acid, linolenic acid, arachidic acid, heptadecanoic acid, eicosenoic acid, docosanoic acid, land ignoceric acid (all at < 0.4%).

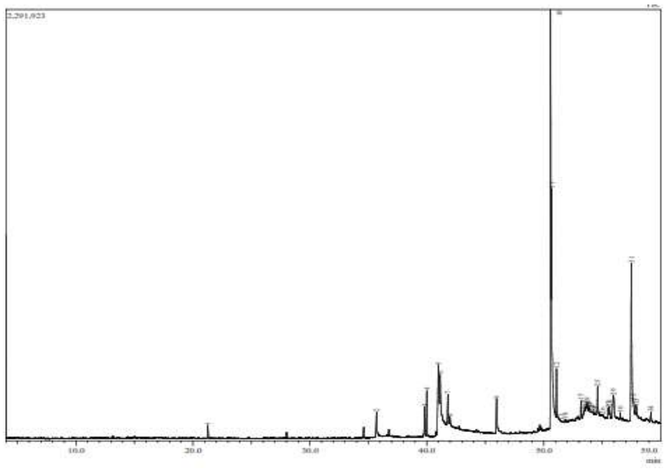


Fig.2:chromatogram of GCMS

Conclusions

In conclusion, The results of the study showed that Phytochemical and GC-MS analysis of Grape seed oil showed the grape seed oils often are a very good source of vitamin E and have an interest- ing fatty acid profile and high antioxidant potential, despite some differences between them. Their high amounts of tocopherols and linoleic acid could open important applications to those oils. Grape-seed oils have compounds with beneficial health effects, allowing the valorization of one waste product very common and usually not valorized . Moreover, as the different varieties originated seed-oils with different compositions, several types of grape-seed oils can be obtained, increasing the number of new products that can be developed from these

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