

## Hemp (*Cannabis sativa* L.) seed oil obtained by extraction process with supercritical and liquid CO<sub>2</sub>

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### Abstract

**Introduction and Aim:** Hemp seeds contain up to 35% of oil that can be extracted with solvents or cold pressure. The aim of this study was to evaluate and compare two innovative and environmentally friendly oil extraction techniques using supercritical and liquid CO<sub>2</sub>.

**Methods:** The supercritical CO<sub>2</sub> extraction was performed at a temperature of 40 °C and a pressure of 300 bar, while the liquid CO<sub>2</sub> extraction at a temperature of 20 °C and a pressure of 150 bar. Both extractions were carried out with a CO<sub>2</sub> flow of 10 ml/min and for a time of 195 min. Peroxides value, spectrophotometric indices (K232; K270), polyphenols, chlorophylls and carotenoids content, fatty acids and triglycerides composition, phytosterols composition,  $\alpha$  and  $\gamma$  tocopherols content, cannabidiol (CBD) and cannabinol (CBN) content, DPPH radical scavenging activity and volatile compounds were determined in by means of high-performance liquid chromatography, gas-chromatography and spectrophotometry the extracted oils.

**Results:** The oil yield obtained with supercritical CO<sub>2</sub> ( $30.98 \pm 1.02$  g oil/100g seeds) was higher than that obtained with liquid CO<sub>2</sub> ( $16.99 \pm 0.10$  g oil/100g seeds). The CO<sub>2</sub> showed greater selectivity towards compounds such as polyphenols and cannabinoids compared to the hexane. The hemp seed oil obtained with carbon dioxide showed a higher content of polyphenols and cannabinoids, lower values of peroxides and spectrophotometric indices and a good antioxidant activity compared to oil extracted with hexane. At the end, aldehydes which give the characteristic aroma of green, spicy and dried fruit, have been found only in the oils extracted with CO<sub>2</sub>.

### Biography:

Raffaele Romano is an Associate Professor at University Of Napoli Federico II, where he teaches food processing at the Dept. of Agricultural Sciences. He has completed his graduation in Food Sciences and Technologies at the Univ. of Napoli, and has received a Postgraduate Specialitation in Agro-Food Biotechnology from the same University in 1995. Since 1996, he started his academic career as a researcher in food chemistry and processing. He has nowadays more than 150 publications in many food fields. The main research area of interests include thermal and non-thermal processing, benefits of antioxidants/ phytochemicals in vegetables, fruits and cereals, processing effects on quality product.