

Characterization of Polyphenols and Evaluation of Antioxidant Activity of Finola Hemp (*Cannabis sativa* L.) Seed Oil

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Industrial hemp (non-drug *Cannabis sativa* L.) is a versatile plant that can be grown for its fiber, seed, or oil. The Finola cultivar of industrial hemp is designed specifically as oilseed variety. Hemp seed oil (HSO) has been used as a food/medicine in China for at least 3000 years (Callaway, 2004). It is considered to be one of the few seed oils that contains about 80% polyunsaturated fatty acids in a perfect 3:1 ratio of Omega-6 to Omega-3, which is suggested as optimal for human nutrition (Scorletti et al., 2013). Hemp seed oil, in addition to its nutritional value, has demonstrated positive health benefits (Prociuk et al., 2008; Kaul et al., 2008). Differences of stability between highly unsaturated oils, can be observed and are at least partially attributable to the proportions of ancillary components within their seeds (Parker et al., 2003), which are co-expressed with the oil. These components may include phenolic pigments that act as anti-oxidants, or specific anti-oxidants such as the tocopherols. HSO shows excellent oxidative stability (Abuzaytoun et al., 2006) suggesting the possible presence in the cold-pressed seed oil of polyphenols that act as antioxidants. The present study was conducted to determine the phenolic profile of edible cold-pressed Finola seed oil (FSO) and investigate its antioxidant activity. The antioxidant activity was evaluated by radical-scavenging activities against ABTS⁺ and DPPH[•], oxygen radical absorbing capacity (ORAC), ferric reducing/antioxidant power (FRAP). Total phenolic contents (TPC) was determined using the Folin–Ciocalteu reagent assay. High-performance liquid chromatography (HPLC) coupled with diode-array detection was used to identify and quantify the phenolic compounds in cold-pressed seed oil extract. Finola oil has shown significant antioxidant activities. The DPPH[•] scavenging capacity was both time and dose dependent. The SE₅₀ value was 24.9 mg oil. ABTS radical scavenging activity expressed in TEAC (Trolox equivalent antioxidant capacity) was 6.95 ± 0.45 µmol/g oil, whereas the ORAC value was 33.87 ± 3.01 µmol TE/g oil, FRAP was 36.91 ± 0.15 µmol TE/g oil. Total phenolic content (TPC) was 2.67 ± 0.08 mg gallic acid equivalent (GAE)/g oil. In addition, the total tocopherol content, including α-, γ-, and δ-tocopherols, was 114.04 mg/kg oil. Polyphenols characterization by means HPLC/DAD has revealed that FSO contains different types of flavonoids, mainly isoflavones, flavonols, flavones and small amounts of phenolic acids. The total content of polyphenols was 298.6 mg/kg oil. These results suggest that the significant levels of natural antioxidants in the cold-pressed Finola seed oil may provide health benefits to the consumers in reducing the risk of chronic diseases.

References

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