P23: COMPREHENSIVE CHARACTERIZATION OF COLD-PRESSING EXTRACTED HEMP SEED OIL

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In the last few years, there has been a strong, renewed attention toward hemp (*Cannabis sativa*) as an alternative crop to produce food ingredients endowed with health-promoting properties. Similarly, there is a strong interest in the introduction of non-conventional lipid sources with beneficial effects, especially for the prevention of metabolic disorders and cardiovascular diseases.

More or less recent investigations have associated hemp seed oil (HSO) to a range of health benefits.

We addressed a series of analytical strategies to comprehensively characterize the lipid classes of compounds in HSO extracted by cold-pressing.

The fatty acid profile as well as phytosterols and tocopherols were determined by gas chromatography (GC)-flame ionization detector (FID). Interestingly, HSO contained 14-15% of α-linolenic acid (C18:3, ω-3), which positively contributes todetermine the nutritional quality indexes of HSO (*i.e.* atherogenicity and thrombogenicity indexes). In the unsaponifiable fraction, β-sitosterol and γ-tocopherol were the predominant phytosterol and tocopherol, respectively.

Intact lipids were analyzed with high-resolution electrospray ionization-Orbitrap™-mass spectrometry using a "shotgun" lipidomic approach. The most abundant triacylglycerol of HSO was C54:6, as a consequence ofthe relatively high amount oflinoleic (C18:2) and linolenic (C18:3) fatty acids. Oxidized triacylglycerols were detected at a very low amount, confirming that cold-pressing minimizes the deterioration of polyunsaturated fatty acids and other susceptible compounds. Similarly, the level of diacylglycerols was low, indicating that cold-press HSO is marginally affected by hydrolytic processes. HSO also contained appreciable amounts of phospholipids (mainly phosphatidylcholine) and still uncharacterized glycerolipid components, probably glycolipids.

The distinctive compositional properties render HSO a candidate oil for specific nutraceutical applications, which await to be confirmed through dedicate structure-activity correlations. Further studies are required to complete the characterization of HSO at a molecular level, also including regioisomerism and the determination of minor polar non-lipid components.