

Abstract

# Fatty Acid Nutritional Indices of Hemp Seed Oil †

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**Abstract:** Hemp seed oil, obtained via the cold pressing of hemp seeds, is widely represented on the market. The objective of this study was to evaluate the fatty acid (FA) composition of hemp seed oil by means of nutritional quality indices. The FA profiles (37 FA) of 20 hemp seed oils marketed in several European countries were obtained using GC-FID and used for the calculation of lipid quality indices. As expected, considering the same plant source, FA profiles and the corresponding quality indices showed great similarity. Polyunsaturated to saturated FA ratio (PUFA/SFA) ( $6.8 \pm 0.5$ ) is used to assess the impact of diet on cardiovascular health (CVH) as PUFA can depress low-density lipoprotein cholesterol (LDL-C) and lower serum cholesterol levels, as opposed to SFA. Therefore, the higher PUFA/SFA ratio, the more positive the effect. Compared with this ratio, the hypocholesterolemic/hypercholesterolemic index (HH) ( $12.7 \pm 0.8$ ) may more accurately reflect the effect of FA composition on CVH. The index of atherogenicity (IA) ( $0.08 \pm 0.005$ ) is characterized by the main classes of SFA (which are pro-atherogenic, with the exception of C18:0) and unsaturated FA (which are anti-atherogenic). Therefore, foods with a lower IA can reduce the levels of total cholesterol and LDL-C in blood plasma. The index of thrombogenicity (IT) ( $0.11 \pm 0.01$ ) indicates the tendency of FA to form clots in blood vessels and provides the relationship between the pro-thrombogenic FA (C12:0, C14:0 and C16:0) and the anti-thrombogenic FA (MUFA, omega-3 and omega-6 FA). Thus, foods with a lower IT are beneficial for CVH. The unsaturation index (UI) ( $183.8 \pm 5.1$ ) represents the degree of unsaturation in lipids. Hemp oil showed advantages over sunflower and olive oils regarding PUFA/SFA (5.1 and 0.5, respectively) and IT (0.23 and 0.24), along with comparable IA (0.08 and 0.14), and substantially higher HH than olive oil (6.8). High UI indicates that unsaturated fatty acids abundantly present in hemp oil could easily undergo thermal degradation. Quality indices should be regarded as a valuable foundation for the valorization of hemp seed oil in nutritional recommendations.

**Keywords:** hemp oil; quality index; fatty acid



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