

CLASSICAL EXTRACTION OF POLYPHENOLIC COMPOUNDS FROM
INDUSTRIAL HEMP (*CANNABIS SATIVA* L.)

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Abstract

Hemp (*Cannabis sativa* L.) is an herbaceous annual dioecious plant recognizable for their characteristic spiky leaves from the Cannabaceae family. *C. sativa* L. is a complex plant with more than 480 compounds which can be divided into diverse phytochemical classes such as cannabinoids, terpenoids, flavonoids, noncannabinoid phenols, hydrocarbons, nitrogen-containing compounds, carbohydrates. The most studied class is the cannabinoids, but *C. sativa*

is a significant source of polyphenols, also.

The effect of different water/ethanol mixtures (30, 50, 70, and 90%) and pure water on the polyphenol content and antioxidant activity of *C. sativa* L. extracts obtained by classical extraction at room temperature for 24 h was investigated. Two different samples were used, aerial parts of young hemp and aerial parts of mature hemp. Young hemp present stage of plant growth before the plant has a reproductive organ, and a mature plant is one which is an incomplete stage of growth with flowers as reproductive organs. The extraction yield, qualitative and quantitative phenolic profiles, total phenols content, total flavonoids content, antioxidant activity, and reductive capacity were determinate in the obtained extracts. TP was from 5.76 to 17.05 mg GAE/g dw for aerial parts of young hemp, and from 5.00 to 10.48 mg GAE/g dw for aerial parts of mature hemp. TF content was from 2.37 to 4.82 mg CE/g dw and from 1.67 to 3.58 mg CE/g dw for aerial parts of young hemp and aerial parts of mature hemp, respectively. Sinapic acid, protocatechin acid, vanillic acid, syringic acid, epicatechin acid, ferulic acid, isovitexin, rutin, cinnamic acid, naringenin, and apigenin were detected in hemp extracts. Antioxidant activity in obtained extracts was determined by the DPPH assay. IC₅₀ values were from 0.1600 to 0.6700 mg/mL and from 0.2500 to 1.7900 mg/mL for aerial parts of young and mature hemp, respectively. Reductive capacity was expressed by EC₅₀ values. EC₅₀ were in the range from 0.5800 to 0.9700 mg/mL for young hemp extracts, while for mature hemp extracts were from 0.7200 to 1.5800 mg/mL.