

QUANTITATIVE AND QUALITATIVE ANALYSIS OF MONOTERPENES AND SESQUITERPENES IN INDUSTRIAL HEMP BIOMASS

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Fibrous hemp essential oil is a complex mixture of many volatile organic compounds (VOCs). The main chemical components of essential oils are compounds belonging to monoterpenes and sesquiterpenes: myrcene, beta-caryophyllene, limonene, alpha-pinene, beta-pinene, alpha-humulene. Monoterpenes have antifungal, antibacterial, antiviral, antioxidant, anticancer, anti-inflammatory effects. Sesquiterpenes have anti-carcinogenic, anti-inflammatory, antiseptic and oxidative stress-reducing effects. VOCs can act both as direct inhibitors of bacterial growth by activating defense signaling pathways and thus making plants more resistant to pathogens, and as repellents that reduce the number of herbivores, especially insects and larvae. In order to implement the European Green Course strategy and achieve the goal of reducing the use of chemical plant protection products by 50 percent by 2030, it is necessary to look for alternative measures that ensure plant health and to study the chemical composition of plant essential oils, as it is believed that the organic compounds found in plant essential oils can at least to partially replace synthetic pesticides, which would reduce the use of chemical plant protection products.

In this study fibrous hemp essential oils were obtained by hydrodistillation method. Above Ground industrial hemp biomass excluding stems was collected, air-dried, homogenized and used to recover mono and sesquiterpenes. Different amounts of dried plant material (1, 2, 3, 4 and 5 grams) were hydrodistilled for different time periods (5, 10, 20, 30, 60, 90 and 120 minutes). Essential oils were examined using gas chromatography – mass spectrometry system.

Results show that most of the detected terpenes belonged to sesquiterpenes and quantity and quality varied depending on the amount of material and extraction time.

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[1] Picazo-Aragónés, J., et al. 2020. Plant Volatile Organic Compounds Evolution: Transcriptional Regulation, Epigenetics and Polyploidy. *International Journal of Molecular Sciences*. 21(23): 8956.