

Poster 45

Analysis of terpenes in cannabis by GC-MS: method development and its application to *Cannabis sativa* L extracts

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Abstract

Background: In addition to cannabinoids, key bioactive compounds in cannabis, terpenes and terpenoids, also have therapeutic importance, potentially working synergistically through their entourage effect for the medicinal efficacy of this plant [1,2]. Besides their therapeutic advantages, they are also responsible for the characteristic aroma of numerous varieties of cannabis, ranging from citrus to woody aromas [3]. Gas Chromatography-Mass Spectrometry (GC-MS) has become a powerful and reliable analytical tool for precisely identifying and quantifying terpenes in cannabis. Understanding the terpene profile is essential for optimizing strain selection, which may enable the development of targeted therapies for specific medical conditions [4]. **Objective:** This study aims to develop a GC-MS-based analytical method for the separation and quantification of terpenes in cannabis extract. **Methods:** Dried cannabis flowers were pulverized in a Retsch MM 400 ball mill and extracted using a modified European Pharmacopoeia method [5]. 40 mL of ethyl acetate was added to the ground cannabis sample, and the mixture was stirred for 15 minutes at room temperature and centrifuged at 4500 rpm for 5 minutes. The supernatant was transferred to a volumetric flask and extraction was repeated twice with 25 mL. The final volume was adjusted to 100 mL followed by filtration. The extract was diluted to 1:10 in ethyl acetate and analyzed by GC-MS. For the chromatographic separation, a capillary column containing 5% diphenyl 95% dimethylpolysiloxane (30 m × 0.25 mm × 0.25 µm) was used, and the injector temperature was programmed to 280 °C. A typical run started at a temperature of 60 °C, raising to 280 °C at a helium flow of 1 mL/min with a total run time of 42 min. **Results:** Several chromatographic parameters were studied to enhance the separation of terpenes, namely the starting run temperature, ramp profile, and running times. The extraction from cannabis flowers was performed using two solvents, dichloromethane and ethyl acetate, to evaluate the efficiency of the extraction. The chromatographic conditions established made it possible to separate and identify the nine compounds in the same run, both in a mixture of standards and in the extracts. **Conclusions:** A GC-MS analytical method was developed, allowing the separation, identification, and quantification of 9 terpenes simultaneously.

Keywords: medicinal cannabis; phytochemistry; mass spectrometry; gas chromatography

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