



ABSTRACT

Cannabis products are the most frequently abused illegal substance worldwide. Cannabidiol, Tetrahydrocannabinol and Cannabinol are the major components of *Cannabis sativa*. Delta-9-tetrahydrocannabinol is the main psychoactive component of the plant. Present study has been conducted to identify and quantify the major contents in flower and leaves of the *Cannabis sativa* plants collected from different regions of Pakistan. A “Gas Chromatography coupled with Flame Ionization Detector” method was used, for the analysis and method validation. Value of Tetrahydrocannabinol contents is helpful to determine phenotype of the plant and evaluation of psychoactive potency. This method can also be used for the identification and quantification of a particular cannabinoid from the cannabis products. The results of validation parameters are within the acceptance range of method validation. The concentration of cannabinoids was found to be higher in flowers than the leaves of *Cannabis sativa*. The concentration of cannabidiol, tetrahydrocannabinol and cannabinol in leaves was found to be in the range from 15.26 to 5739.84 $\mu\text{g/g}$, 25.70 to 9307.4 $\mu\text{g/g}$ and 3.46 to 712.14 $\mu\text{g/g}$, respectively. However, the concentration of cannabidiol, tetrahydrocannabinol and cannabinol in flowers was found to be in the range from 34.60 to 10866.68 $\mu\text{g/g}$, 115.60 to 7160.72 $\mu\text{g/g}$ and 32.00 to 717.08 $\mu\text{g/g}$ respectively. According to their geographical origin, the cannabinoids content of cannabis plants can be used for their profiling and classification.