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A Comprehensive Review of Cannabis Potency in the United States in the Last Decade

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Abstract

This review examines the concentration of seven major cannabinoids, including Δ^9-tetrahydrocannabinol (THC) and cannabidiol (CBD), in illicit herbal cannabis products seized by the Drug Enforcement Administration (DEA) over the last 10 years in the United States. Cannabis samples received from DEA regional laboratories were analyzed by a validated gas chromatography with flame ionization detection method, and the results are given in the report. A total of 14,234 samples of herbal cannabis have been analyzed over the last 10 years (between January 1, 2009, and December 31, 2019). The number of samples received over the last 5 to 6 years has decreased dramatically owing to the legalization of marijuana for either medical or recreational purposes in many U.S. states. The results showed that the mean Δ^9-THC concentration has increased over the last 10 years, from 9.75% in 2009 to 14.88% in 2018 and 13.88% in 2019. The mean Δ^9-THC:CBD ratio rose substantially from 24.81 in 2009 to 103.48 in 2017. A decrease in THC:CBD ratio was recorded in the last 2 years, 54.39 in 2018 and 24.58 in 2019, indicating the trend in the production of more high-CBD-containing products. Our results showed an overall increase in potency of illicit cannabis, from approximately 10% in 2009 to approximately 14% in 2019. These results are in agreement with other potency monitoring

programs in several European countries. There appears to be a recent trend of the inclusion of higher CBD levels containing chemovars in illicit cannabis.

Keywords: CBD; Cannabidiol; Cannabinoids; Cannabis sativa L.; GC/FID; Gas chromatography–flame ionization detection; Marijuana; Potency; Δ(9)-tetrahydrocannabinol.

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