

The effect of mechanical treatment on the cannabinoid content of hemp samples

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Introduction

Hemp (*Cannabis sativa* L.) is a traditional and important raw material for the textile industry (Ranalli & Venturi 2004) and is currently of interest as a therapeutic agent of medical products (Clark & Pate 1994) thanks to the valuable natural compounds, the cannabinoids (Clarke & Watson 2007; Parmar et al. 2016). Cannabinoid synthesis and cumulation is different in leaves from various plant parts (Bócsa et al. 1997). Cannabinoids are concentrated in the secretory cavity (Kim & Mahlberg 2003) and abundant in glands isolated from bracts or leaves of pistillate plants (Hammond & Mahlberg, 1977; Kassai 1994; Mahlberg & Kim, 2004).

Materials and methods

An EU listed variety was used. In the followings the samples are signed with numbers 1-4. The THC content of the varieties should be measured according to the standardised test (162/2003. (X. 16.) Krm. r.) and its content in sample should not exceed the limit of 0.2%. As the accumulation of any kind of cannabinoids is not homogeneous in plant tissues, either in stages of the vegetation; the unfertilized female plants were sampled with hypothesis of determination of higher cannabinoid content. The flower samples were first manually smashed and grinded afterwards. In consequence of grinding several fractions of sample appeared. The upper fraction of powder was measured separately, before mixing it with the other fractions. The testing of three fractions “smashed”, “powder” and “grinded” was repeated four times with GC. The recorded results were evaluated by MS Excel software package.

Results and discussion

In our experiment we gained the following results (Table 1). For better understanding, it is shown on a diagram (Figure 1 and 2).

Table 1: THC and CBD content (%) in the measured samples

	sample 1		sample 2		sample 3		sample 4	
	THC %	CBD %						
smashed	0.407	1.199	0.576	1.646	0.198	0.576	0.068	0.195
grinded	0.385	1.134	0.395	1.128	0.095	0.280	0.056	0.161
powder	0.893	2.628	1.631	4.753	0.434	1.264	0.255	0.735

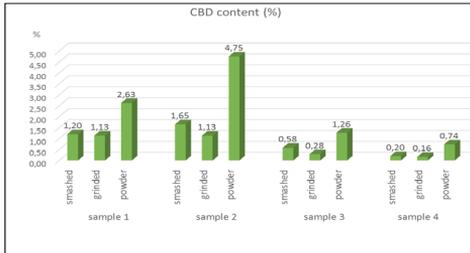


Figure 1: CBD content (%) in the measured samples

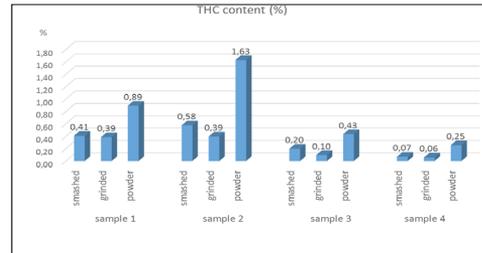


Figure 2: THC content (%) in the measured samples

Conclusions

Big differences in measured values can be observed between samples belonging to the different plants as well as between powder fraction and the two remaining ones. So called powder fraction (supposedly consisted of epidermal glands) contains much more of each cannabinoid. This method can provide a simple physical purification of natural cannabinoids from the plant tissues. After the fractions are mixed together, it makes no difference comparing to the „smashed” one, respectively decreasing tendency can be observed. Results of this study can suggest, that GC method has low, or even non sensitivity to the size of particles in samples. The decreasing tendency can be the consequence of measuring in the powder as well.

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