THE EFFECT OF OSMOTIC TREATMENT ON CANNABIDIOL (CBD) AND TETRAHYDROCANNABINOL (THC) CONTENT IN INDUSTRIAL HEMP

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Abstract

Two major cannabinoids are present in *Cannabis* plants. The first one is a psychoactive cannabinoid substance (-)-trans-Δ9-tetrahydrocannabinol, well-known as THC, based on which medicinal cannabis is categorized as a prohibited narcotic. The other one is cannabidiol (CBD), presented specifically in hemp. CBD is familiar as a pharmacologically active substance, and its application is becoming increasingly important in medicine. Many studies testify to osmotic treatment's success in removing water from different plant and other materials. Sugar beet molasses has proven to be an efficient osmotic solution in water removal, nutritional enrichment, food safety and quality aspects. The use of a mild temperature regime to preserve plant tissue and nutritional values is one of this process's advantages. This work is concerned with determining the effect of the drying temperature on CBD and THC content after the osmotic treatment (OT) compared to the natural drying at ambient temperature.

Osmotic treatment of three different industrial hemp types (DZ1, DZ2 and DZ3) was performed in sugar beet molasses solution (80%), under atmospheric pressure, for 1.5 hours, at 20, 35 and 50 ^{0}C with the sample to solution ratio 1 : 20. The principal component analysis (PCA) has been used operatively for better visualization and the samples' differentiation. The optimization of OT was performed using artificial neural networks (ANN). The optimization of the output variables was based on the ANN model.

The reduction in CBD and THC content is to a greater extent during osmotic treatment than in natural drying, mainly decreased with increasing solution temperature. However, the positive aspect is a more significant reduction in psychoactive substance in comparison to natural drying. The temperature of 35 ^{0}C and sample DZ2 gave optimal experimental results of 4.266 ± 0.168 and 0.138 ± 0.006 μg/g for CBD and THC, respectfully.

It can be concluded that OT of all hemp samples resulted in a decrease of both CBD and THC content, although the positive aspect is a more significant reduction in psychoactive substance than after natural drying.

Key words: *Osmotic treatment, CBD, THC, Industrial hemp, Sugar beet molasses.*