

## **The genetic assessment of chemotypes - a fast method for the discrimination of agricultural *Cannabis* cultivars – and CANNDAT – an Austrian-German database surveying the distribution of chemotypes in European agricultural hemp**

Peterseil V<sup>1</sup>, Borroto Fernandez E<sup>1</sup>, Hackl G<sup>1</sup>, De Meijer E<sup>2</sup>, Staginnus C.<sup>3</sup>

<sup>1</sup> Österr. Agentur für Gesundheit und Ernährungssicherheit GmbH (AGES), Spargelfeldstraße 191, A-1220 Wien, Austria

<sup>2</sup> GW Pharmaceuticals plc., Porton Down Science Park, Salisbury, Wiltshire SP4 0QJ, U.K.

<sup>3</sup> Landeskriminalamt Rheinland-Pfalz, Valenciaplatz 1-7, D-55118 Mainz, Germany

In Europe, around 50 officially approved cultivars of *Cannabis* (hemp) are grown for agricultural production. Their content of psychoactive tetrahydrocannabinol (THC) is restricted to <0,2%. Besides, numerous strains with a THC content of >20% are grown illegally for drug production.

A differentiation of these two groups relies on the quantitative biochemical assessment of cannabinoid contents and ratios in mature floral material. For non-flowering material (e.g. very young seedlings) or material devoid of cannabinoids (seeds and roots) the genetic assessment of the chemical phenotype (chemotype), provides an alternative and fast way for differentiation<sup>4</sup>.

Depending on the ratio of THC and the non-psychoactive cannabidiol (CBD), three discrete chemotypes can be distinguished: a “THC-predominant” type, a “CBD-predominant” type and an intermediate chemotype. CBD/THC ratio is a qualitative aspect of chemotype, and under the control of simple inheritance mechanisms. In modern hemp cultivars it is man-made, i.e., mostly the result of plant breeding interventions.

Here we present the results of a systematic genetic determination of chemotypes in 62 agricultural hemp cultivars grown in Europe. The data collection is available for forensic experts and breeders of agricultural hemp cultivars.

<sup>4</sup> Staginnus C, Zörntlein S, de Meijer E. A PCR marker linked to a THCA synthase polymorphism is a reliable tool to discriminate potentially THC-rich plants of *Cannabis sativa* L. Journal of Forensic Science 2014, 59 (4), 919-926.