

**ANALYTICAL CHEMISTRY OF CANNABINOIDS
IN PLANT MATERIAL AND BODY FLUIDS,
AN UNRENOUNCEABLE TOOL FOR LAW ENFORCEMENT,
PROSECUTION AND JUDGEMENT**

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ABSTRACT: Under Swiss Federal Narcotic Law hemp can be cultivated both indoors and outdoor. This Law does not specify whether hemp can be cultivated if narcotic production is intended or whether hemp is suitable for narcotic production (hemp has a high THC-content). In this way, under Swiss Federal Narcotic Law the words “cultivation of hemp for the production of illicit drugs” can be interpreted quite loosely, which may lead to the complete liberalization of Cannabis use, whereas the number of incidents and accidents under the influence of Cannabis is increasing.

KEY WORDS: Cannabinoids; Plant material; Body fluids; Hemp; Narcotic Law regulations.

Problems of Forensic Sciences, vol. XLII, 2000, 59–63

Received 9 September 1999; accepted 16 May 2000

There are two types of hemp-plants:

1. A drug-type, which is THC-rich and has a THC-content of more – usually much more – than 0.5%. Those plants are named for instance: Super Skunk, White Widow etc. Many drug-type hemp plants have THC contents in the flowering parts between 4 and 8%, but sometimes up to 20% or more. We have seen these hemp-plants many times.
2. A fiber or industrial type, also called farmers hemp, which is THC-poor and should have a THC-content below 0.3–0.5%. Those plants are named for instance: Fedrina 74, or Futura.

The species *Cannabis sativa* belongs to the genus *Cannabis* (the old distinction between *Cannabis sativa* and *Cannabis indica* is outdated). According to the European Union Laws the cultivation of the fiber type is permitted for industrial production. It is often not possible to distinguish hemp-plants by botanical guidelines, even by an experienced person.

Based on Art. 19/1 of the Swiss Federal Narcotic Law hemp “for production of illicit drugs” must not be cultivated. Therefore, the outdoor and indoor cultivation of hemp is legal in Switzerland, if the hemp is not used – as stated in the law – “for the production of illicit drugs”.

This is the critical point. According to the exact wording in the law: Der Anbau von Hanf “zur Gewinnung von BM ist strafbar”, this point is currently not clearly specified. It is not specified, if this means that hemp must not be cultivated, if narcotic production is intended or if hemp suitable for narcotic production (which would be hemp with a high THC-content) must not be cultivated. Currently, the law is interpreted in a way that that hemp must not be cultivated, if narcotic production is intended.

It would be much easier, if the law is stated in a way, that hemp suitable for narcotic production (which would be hemp with a high THC-content) must not be cultivated. However, as I will show you it is not intended to change this wording of the law.

If an outdoor or indoor production is detected, the owner must demonstrate the exact purpose of the production and what orders he has for the delivery of the products. It must be decided in each case, if the production is suspicious or not suspicious, particularly if species of hemp are produced, which are THC-rich. The latter would suggest, that an illegal use may be attempted.

Hemp-seeds do not fall under the Swiss Federal Narcotic Law, because they do not contain THC. The selling of seeds, also of seeds for drug-hemp with very high THC-content is not forbidden in Switzerland. Sometimes one seed for a high THC species sells for 12.8 Swiss francs.

Since Article 8 of the Swiss Law says that hemp for the production of narcotics must not be cultivated, imported, produced, or sold, the offence would theoretically start with planting the seeds for cultivation. It is hard to believe that someone would pay 12.8 Swiss francs for one seed and use this seed for the production of industrial products. However, according to the text of the law, it must be proved, that the owner of a hemp cultivation uses the product for the production of illicit drugs. This is often very hard to prove, since the owner usually has a contract for the sale of the harvest. Particularly the refinement, the distribution to hemp-shops, and the use of the final products is not easy to trace.

Hemp cultivation used for industrial purposes, such as the production of fibers or oil and if there is no intention to produce illicit drugs, is legal in Switzerland.

In a part of our population it is now believed, that the cultivation of hemp is legalized. Also the investigative officer is confronted with such an opinion, when undertaking his duties.

However, if hemp is cultivated outdoor or indoor for the production of hashish, marijuana and hashish oil – the illicit drugs – per law this activity constitutes a criminal offence.

Official Information Sheet about Hemp Cultures: since the interest in producing hemp is steadily increasing in Switzerland and many farmers and pseudo-farmers want to begin the production of hemp, this information sheet for those interested in cultivation of hemp has been produced by the Federal Authorities of Agriculture, Public Health and the Federal Police.

In this information sheet, it is stated that:

1. THC, which is available in every species of hemp, is a hallucinogen and is considered by the Swiss Federal Narcotics Law, Paragraph 1, as a narcotic substance.

- Article 8 of this law says that: “Hemp for the production of narcotics as well as the resin of the hair glands must not be cultivated, imported, produced, or sold”.
2. Person, who cultivate hemp for other reasons than producing narcotics, do not need a permission for the cultivation. However, the owner of a outdoor or indoor production must permit the analysis of his products by investigative authorities. In this context, investigative authorities are obligated to bring a charge against the owner if they detect an offence. In other words, every person cultivating hemp must be aware that investigative authorities can undertake at any time an analysis of the plants, require from the owner the exact purpose of the production and information to whom the products will be delivered. The investigative authorities can at any time order the necessary procedures to clarify these questions.
 3. Information is given on different species of hemp differentiating between the drug type and the fiber type.
 4. To avoid conflicts with the Swiss Narcotic Law, the interested farmers are strongly advised to choose a hemp-type for cultivation, whose THC content is less than 0.5%. A catalogue of suitable hemp-plants is available from the Federal Department of Agriculture and published also in the Internet. The official catalogue only contents hemp-plants with a low THC-content. These suggestions also apply for the cultivation of hemp for the production of hemp-products for nutrition, such as hemp-seed-oil. The farmers are advised that, if other plants are cultivated without an plausible reason, a risk is taken to be prosecuted under the Narcotic Law regulations.
 5. To avoid problems and to simplify the control-procedures, the farmers are strongly advised to provide the following information on request:
 - a certificate about the source of the seeds and their authenticity;
 - the amount of seeds purchased by presenting a delivery note or invoice;
 - informations about the purpose of the harvest;
 - additional informations, such as the size of the cultivation, the date of the planting and the date of the harvest.

For outdoor (and indoor) productions sampling guidelines have been developed by a Section committee of the Swiss forensic chemist group in the fall of 1998.

The same group created standard analytical procedures for sample preparation and the determination of THC and THC-acid content in the plant materiel. The forensic laboratories adapted these procedures to their routine. The quality was checked with 4 external quality control procedures.

Especially in regard to the intended implementation of a new Federal regulation it was necessary to establish a standard analytical procedure. Of particular interest is, if the “THC-content” refers to:

- the whole plant or parts of the plant;
- how many plants should be analyzed;
- the psychoactive substance THC;
- the non-psychoactive precursor THC-acid;

– both.

In the EU method, the THC-content is determined by GC under optimal decarboxylation conditions. For THC-acid, it takes place in the injector port at temperatures between 260–280°C.

In Bern, we used until three years ago an instrumental TLC method after a decarboxylation step, which was performed in a test tube. However, the reproducibility of this method was not satisfactory if the pyrolysis conditions were not strictly followed. For instance if the temperature was slightly too high or the pyrolysis time was too long, conversion from THC to cannabidiol took place.

Therefore, we use now the proposed HPLC method, which determines the THC, the THC-acid, the cannabinol and the cannabidiol separately. This method is reproducible and gives good results.

In conclusion, we demonstrated sampling and analysis guidelines for cases, where outdoor or indoor production of hemp has been detected and the question has been raised, if the hemp is THC-rich (so called drug hemp) or THC-poor (so called fiber hemp).

In the third part of my talk I will briefly show you the recent political discussion in Switzerland. This is a newspaper from last Thursday, where 5 variants for a new Federal Narcotic Law are discussed.

The first variant is to legalize the use of all narcotic substances as well as so called “preceding acts”.

The second variant is to legalize only the use of *Cannabis*. In “minor cases” there will be no prosecution.

The third variant proposes different degrees of legalization, for instance: “the use of all narcotic substances is legal for personal consumption”.

A fourth variant legalizes the use of *Cannabis*, but does not legalize the use of so called hard drugs.

In the fifth variant in all “minor cases” there will be no prosecution.

In the question of the cultivation and trade of hemp, a proposition is, that there will be no prosecution in minor cases and that the cultivation of hemp for the production of narcotic drugs is possible but needs a permission.

In conclusion, one can see that the Federal narcotic law in Switzerland gives room to interpretation what “cultivation of hemp for the production of illicit drugs” means, which makes the situation for the prosecution very difficult if THC-rich hemp fields are detected. Further a discussion has started, which may lead to a complete liberalization of *Cannabis*. In contrast to this, in the daily casework we see more and more incidents and accidents under the influence of *Cannabis*.

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