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THE PRODUCTION OF ESSENTIAL HEMP OIL IN SWITZERLAND

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ABSTRACT

Essential hemp oil is an interesting product, which may be obtained from hemp. This concentrate of the typical hemp aroma is utilised in cosmetics, additives to food, aroma therapy and perfume. Since 1995 a couple of Swiss farmers produced with very high labour input high quality oils. Their sale potential is not clear yet and at present it is a niche product. Hemp regulations in some countries (e.g. USA) limit its import. We assessed the factors influencing yield and quality in some experiments. Recommendations about variety choice, harvest time, weather influence, seed density, harvest techniques and prevention of pollination in function to yield and smell scent are discussed. For a broader propagation of essential hemp oil additional information about medical (pharmaceutical and dermatological) use is needed.

WHAT ARE ESSENTIAL HEMP OILS ?

Essential hemp oil - not to confuse with hemp seed oil - contains the most volatile compounds of hemp aroma. According to Turner et al. (1980) essential hemp oil consists of 58 monoterpenes and 38 sesquiterpenes. It is extracted from hemp inflorescences using steam distillation. Its THC concentration is, even in drug varieties, very low and can reach 0.08% (Mediavilla and Steinemann 1997). Possible uses of essential oils are cosmetics, additives to foods, aroma therapy and perfume. Its use as a pest controlling substance against bacterias (Fournier et al. 1978, McPartland 1997), insects (McPartland 1997) and even against some plants (Pate 1994, McPartland 1997) was reported.

THE SWISS PRODUCTION

In 1995 some Swiss farmers started to produce limited amounts of essential hemp oils. In 1997 the Swiss production was around 200 litres, which corresponds to about 20 hectares of cultivation. The sale potential is not clear yet it is a niche product. Depending on smell quality prices varied between 1500 and 3500 US\$ per kilogram essential hemp oil. Because of its potency minute amounts are required and the world market is not big. In addition hemp regulations in some lands limit the import of this substance (e.g. USA).

Steam distillation is done mostly in two installations. One is a fix installed steam distillation machinery for processing many aromatic plants. The other is a mobile machinery, which allows processing on field. Both work with the same system. Steam water takes the volatile compounds from inflorescences. After condensation, separation between water (hydrolat) and essential oil is done by a separating funnel.

TRIAL RESULTS AND EXPERIENCES

Under normal conditions about 10 litres of essential oil per hectare may be harvested. To assess the factors influencing yield and quality of the essential oils we carried out some trials (Mediavilla and Steinemann 1997, Meier and Mediavilla 1998). The results can be summarised as follows.

Hemp variety. Good smell qualities were reached with Bialobrzeskie, Féline 34, Futura 77, Kompolti, Kompolti hybrid TC, Moldovan (landrace) and Novosadska. No correlation between THC (fibre or drugs variety) and smell was observed.

Harvest time. Highest yield of essential oils was gained when about 50% of the seeds had reached maturity. The ideal harvest time for best quality (scent scores) was somewhere between female flowering and seed maturity. Unfortunately the yield and the quality never have been highest at the same time. Therefore the optimal harvest time depends on whether the farmer or his customer is more interested in yield or quality. The time interval when both yield and quality are high is rather small.

Weather. Because essential oil is water soluble, rain and high humidity have negative consequences for the production. Geographical situation is a possibility to take influence on.

Seed density. Highest inflorescence yield was measured at 5 kg seeds per hectare (about 15 plants per square metre).

Prevention of pollination. Although pollination prevention in greenhouse experiments showed significant higher yields, this strategy is not applicable to fields. Scent quality was not influenced.

Harvest techniques. Best quality is gained when only inflorescences, harvested by hand, are used for distillation. Before distillation inflorescences may be dried. Hand harvest and distillation with a mobile apparatus required a high labour input (about 700 hours per hectare). Harvest by machine, whereby the whole plants (in inflorescences and stems) are chopped, required less work (about 10 hours per hectare) and lead to lower quality.

CONCLUSION

The Swiss production shows that by managing factors like variety, harvest time and weather it is possible to harvest relative big amounts of high qualitative essential hemp oils. For a broad propagation additional information about medical (pharmaceutical and dermatological) use is needed.

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