The Finola Variety of Hemp in the EU: Sampling is Everything!

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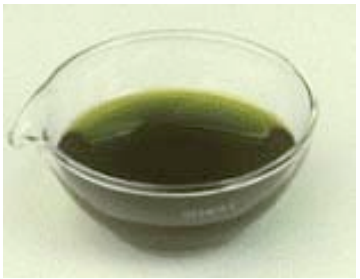

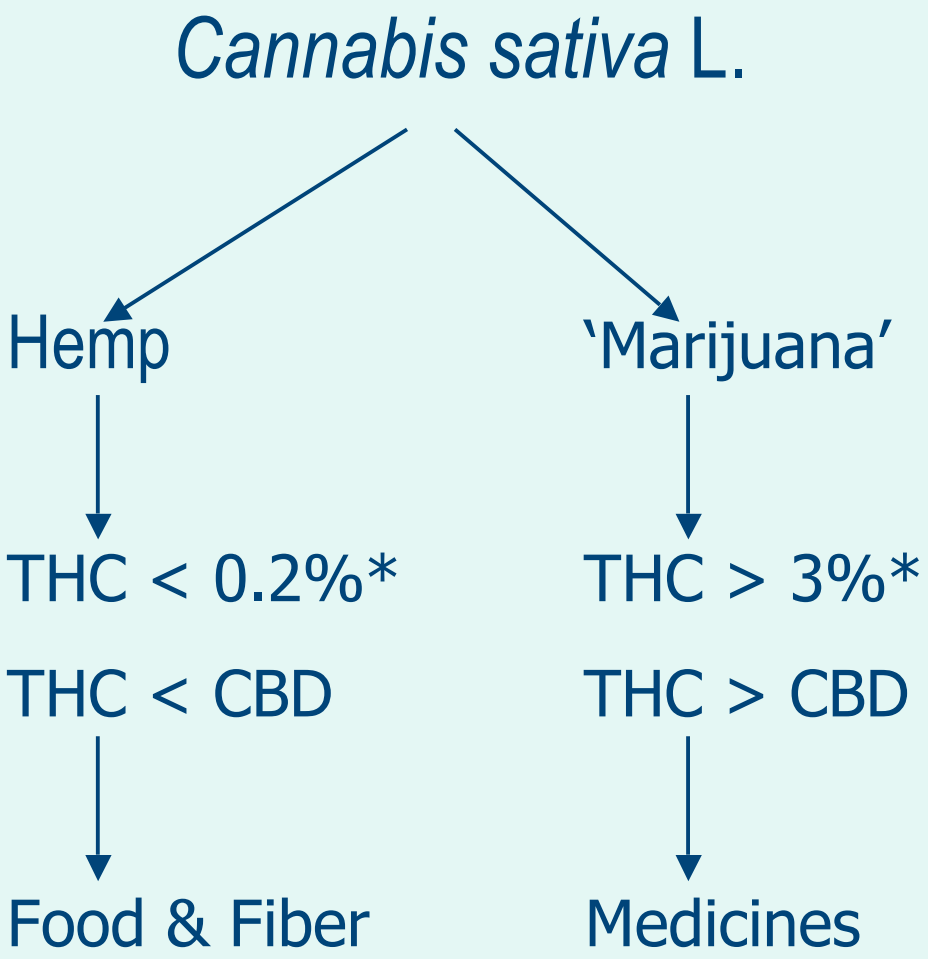

THC= *delta*-9-Tetrahydrocannibinol
CBD= Cannibidiol
***These limits are extremely low examples**

Hemp Cultivation in Finland at Latitude 62° N

MTT North Savo Agricultural Research Station, 2000-2003

Finola is mature and harvested for seed 135-140 days after sowing

Finola makes seed at high latitude, where Fedora does not flower

How are EU hemp sampling regulations applied in northern Europe, where some variaties do not even produce inflorescence?

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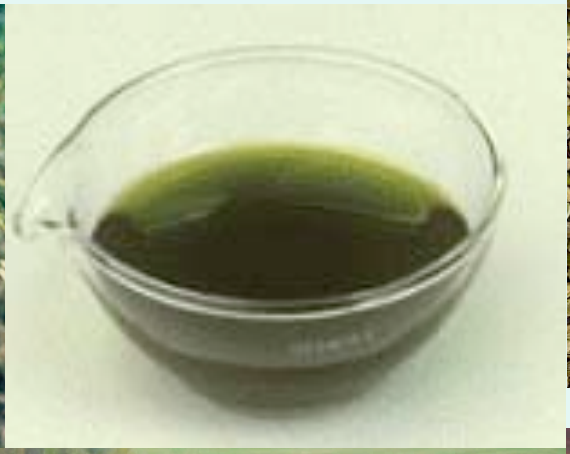

1-2 tons seed/hectare

2-4 tons straw/hectare

EU Regulation EC no 796/2004 Annex 1 Section 2
Field sampling methodologies

Procedure A	**Procedure B**
Monoecious	Dioecious
50 plants/field	200 plants/field
...30 cm part containing at least one inflorescent....	...upper third of each plant selected...
...20 days after the start of flowering to 10 days after the end of flowering...*	...only females shall be taken...
	...during the 10 days following the end of flowering...

*...from the start of flowering to 20 days after the start of flowering...

Improvement suggestion: devise a simple, uniform sampling method that can be applied equally to both forms, dioecious and monoecious, such as “...from the start of flowering to 20 days after the start of flowering...”, which is clear and easy to determine for both.

Appendix 1 Section 3.0 **Determination of THC content**

- 3.2 *Reagents and extraction solvent*

  Reagents

  - Δ^9-tetrahydrocannabinol, **pure for chromatographic purposes...**

  Improvement suggestion: The true concentration of the THC standard, which is typically some number less than the label's stated value, must be verifed on periodic basis by a standardized method, due to the instability of THC in solution.

Section 3.4. *Gas Chromatography*

- (a) Apparatus
- - gas chromatograph with flame ionisation detector and a split/splitless injector.
- - column allowing good separation of cannabinoids...
- (b) Calibration ranges
- At least three point for procedure A and five points for procedure B, including points 0.04 and 0.50 mg/ml THC.

Why should the A procedure require fewer concentration points than procedure B? To improve both accuracy and precision in the analysis of samples that have lower levels of THC, more concentration points should be included, not fewer points. Also, this method still calls for flame ionization detection (FID), while most labs now use mass spectrometric identification (MS), which is much more accurate and precise.

Applied to Finola

- 20 days after flowering begins:

  Finola flowers at 30-34 days, depending on temperature

  30 days after sowing + 20 = 50 days

  10 days after ‘end of flowering’ (at 50 days)

  50 days after sowing + 10= 60 days

- thus 50-60 days after sowing

- Unusually hot and dry weather in 2006, both EU and Canada, thus decreasing days until sampling

Application of Results

- Analysis of dried plant samples for THC by national crime labs
- These labs may or may not have much experience in measuring low THC levels in plant material with both accuracy and precision (crime lab Cannabis samples may contain up to 20% THC, and the standard test is only positive or negative for THC).
- Hemp THC results are reported to the state level agricultural ministry
- Individual state ministries report results to the EU Commission
- EU Commission makes decisions on subsidized crops
- Some countries (like Sweden) use the EU list of subsidized hemp varieties to serve as their own national list of allowed hemp varieties, and now do not allow Finola
- Finland and most other countries keep their own list of nationally recognized crops, and Finola remains on the national list of recognized plant cultivars in both Finland and in the EU Common Catalogue of agricultural crops, but as of 2007 Finola was removed from the list of subsidized hemp cultivars, due to the ‘high’ THC values reported from some countries, which were due to late sampling in every case.

Reported Finola THC values for 2006

	Number of countries	Number of samples	THC Avg. %	% THC Range
EU	5	24	0.24 %	0.05-0.58
Canada	1	159	0.17 %	0.04-0.73
New Zealand	1	7	0.04%	0.03-0.08

Finola EU THC Results for 2006

Country	Sampling date	THC Avg. %	Number of samples
Finland	29.9.06	0.32	1
Sweden	20.7-20.9	0.40	15
UK	31.7	0.36	6
Estonia	?	0.09	1
France	?	0.05	1

Finola THC Results from Sweden 2006

Method	Sampling date	THC, %
B	20.7.2006	0,19
B	24.8.2006	0,32
B	1.9.2006	0,29
A	1.9.2006	0,09
B	5.9.2006	0,40
B	5.9.2006	0,50
B	6.9.2006	0,36
B	6.9.2006	0,37
B	7.9.2006	0,42
B	11.9.2006	0,41
B	12.9.2006	0,58
B	12.9.2006	0,50
B	14.9.2006	0,54
B	14.9.2006	0,38
B	20.9.2006	0,58

Concluding Remarks and Suggestions

-No evidence for the use of Finola or other hemp for drug purposes

-A uniform understanding and application of **EU Regulation EC no 796/2004** sampling and analytical methodologies are lacking.

-A fair, comprehensible field sampling method is needed to ensure a uniform procedure that evaluates all varieties throughout the EU with fairness, accuracy and precision.

-A updated analytical methodology is needed. This must include an appropriate method for validating the THC standard sample, which can be universally applied by numerous laboratories, throughout the EU, according to GLP. The use of flame ionization detection (FID) should be replaced by mass spectrometric identification (MS).