Cannabis sativa L. as a traditional food source

16 October 2018

Novel Foods Working Group, Brussels, Belgium

President of EIHA
Board Member
Advisory Board
Advisory Board

www.eiha.org
PART 1

Introduction to the EIHA
EIHA – European Industrial Hemp Association

- The EIHA has been around for over 18 years and has a membership that extends across 25 EU member states, plus 11 additional countries including Australia, Canada, China, India, New Zealand, Russia, Thailand, Turkey, Ukraine, USA.

- Founded in 2000 informally, and formally est. in 2005

- EIHA represents the whole value chain; farmers, most major processors, manufacturers, brand owners, importers and all hemp related sectors.

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EIHA Memberships and International Collaborations

- The ASTM D37 Committee on Cannabis
- the “Expert Group on Bio-based Products” of the European Commission,
- the biomass supply Thematic Working Group of the “Bioeconomy Panel” of the European Commission,
- the Standing Committee on Agricultural Research (SCAR), working group “Sustainable Bioresources for a Growing Bioeconomy”.
- InterChanvre, France
- Hemp Industries Association (HIA), USA
- Canadian Hemp Trade Alliance (CHTA), Canada
- International Hemp Building Association (IHBA), Ireland
- British Hemp Association (BHA), UK
Total Hemp cultivation area in the EU: more than 42,500 ha (2018)

The European Industrial Hemp Association (EHA) has 27 regular members (hemp processors) and 138 associate members from 36 countries (2018)

One regular member each in the USA, Canada and China.
In the following three minutes, I will elaborate on the three main reasons why extracts of industrial hemp are traditional, rather than novel food.

**One**: Hemp is a different type of genus *Cannabis* species from those used in medicinal or recreational applications.

**Two**: If we understand emergence of agriculture to be connected with the development of species *Homo Sapiens*, then genus *Cannabis* has been humankind’s true companion ever since.

**Three**: Cannabidiol has been proven safe by WHO experts on drug dependence and has been a major driver behind unprecedented expansion of hemp cultivation areas worldwide.
Our first argument is that while botanical taxonomies may collide, the United Nations Office on Drug and Crime sets clear rules how to distinguish between a “drug type” and a “fiber type” cannabis plants by a formula where **Cannabidiol** is a denominator. In practice, countries rather mention maximum Tetrahydrocannabinol content in hemp. In general, the EU limit is 0.2% in upper third of the plant, while 0.3% applies in Canada, USA, Czechia and Austria and 1.0% THC applies in Switzerland and Australia for hemp.
Concerning our second argument:

Hemp is a true biorefinery: providing renewable and carbon-neutral, sometimes even carbon-negative intermediates. Examples are fiber for insulation, for plastic composites and fine papers, woody core for hemp concrete and animal bedding, seeds and foliage for foods and whole plant for feed silage.

With a widespread use of hemp in European area since middle-ages, it would be extremely bold to argue that most parts of the hemp plant had not been used as food or in food. Hemp extracts and tinctures were indeed made and sold in products which would be called nowadays “supplements” up to 80 years ago.
Hemp is a most useful plant

“The production of Hemp is carbon negative, which means it absorbs more carbon from the atmosphere during its growth than is emitted by the equipment used to harvest, process and transport it.”
Hemp was called a Billion Dollar Crop in 1930’s already. However, severe discrimination in the second half of the 20th century happened when many countries applied international anti-drug conventions in the unnecessarily strict way to hemp.

Hemp has almost disappeared from our daily life and from our kitchen cabinets. Luckily, countries like France and Lithuania, with highest acreage in Europe, have been a leading example of its ongoing use. Other evidence is at hand proving use of hemp green parts in applications such as beer brewing and teas which we will show later.
Environment and Agriculture

- **Protects the environment**: Hemp can be grown without the use of herbicides, pesticides or fungicides. Hemp is suitable for cultivation near surface water. Hemp is in the top 5 out of 23 crops for biodiversity friendliness, performing better than all major crops such as wheat, maize or rapeseed (Montford and Small, 1999).

- **Excellent carbon sequestration**: One hectare of industrial hemp can absorb 15 tonnes of CO2 per hectare. Hemp's rapid growth makes it one of the fastest CO2-to-biomass conversion tools available, more efficient than agro-forestry.

- **Restores soil health**: Due to its vigorous growth, hemp is known to be a pioneer plant that can be used for land reclamation and indeed phytoremediation; ‘cleaning’ land polluted by heavy metals. Hemp is a valuable preceding crop in rotations. After cultivation the soil is left in optimum condition.

The EU Reform of Common Agricultural Policy (CAP) provides a historic opportunity to re-establish large scale hemp farming as it meets all environmental criteria and will be a valuable cash crop to European farmers.
Last but not least, our third approach shows that CBD-containing extracts actually promote individual as well as public health and welfare. The safety profile will be discussed by Dr. Bernhard Beitzke, Catherine Wilson will demonstrate a plethora of evidence of traditional usage of ready-to-eat products with CBD concentrations considered natural within EU perspective. In conclusion, we will present our regulatory guidance proposal for hemp extracts containing Cannabidiol on the traditional food market.
Unprecedented demand makes hemp one of the most rapidly growing market segment this century.

This can be demonstrated by increase in cultivation areas in the western world, however small compared to other agricultural commodities.

Hemp foods are recognized as health promoting. General consumer patterns have shifted towards a healthier diet whilst at the same time people wanting more environmentally friendly products.

This provides an excellent opportunity to reinstate hemp in good faith acknowledging its traditional use.
PART 3

Hemp CBD Extracts are a Traditional Food
Hemp CBD Extracts are a Traditional Food

- Extracts and tinctures were sold in pharmacies still in the first decades of 20th century and resembled modern-day food supplements or OTC preparations.

- ___________ (Germany) have produced hemp extracts since 1994, also for the use in food.

- Hemp flowers and hemp extracts have been used for brewing “hemp beers” since 1996. e.g. Cannabis® has been sold since 1996 by ____________, and ____________ AG produced a hemp beer since 1996 with high demand from the very beginning.

- Letter of the European Commission, dated 03.02.1998, to ____________, confirms “that hemp flowers used for the production of beer-like beverages are considered to be food ingredients and not additives since they are used in the same manner as hop flowers. Secondly it was decided that foods containing parts of the hemp plant do not fall under the scope of the Regulation (EC) 258/97.”

- Letter of the European Commission to ____________, dated 03.03.1998, confirming that the Standing Committee on Food agreed on 18.12.1997 that “food containing parts of the hemp plant do not fall under Regulation (EC) No. 258/97 … on Novel Food and Novel Food ingredients.”

- Letter of National Institute of Public Health to ____________ s.r.o. dated August 12, 2015 “Cannabis sativa belongs to the category of traditional plant constituents of food supplements.”
The website states under "History" that hemp and hemp extracts have been produced since 1994 and the hemp extract has been used in foodstuffs.

**History**

Natural Products has tested itself in the production of 100% natural aromas and essential oils since 1989. After extensive work and successful handling of different natural products, the company decided to spend time on the most valuable, but untested raw material: hemp. Since 1994 we have produced and distributed hemp products at our manufactory. Cannabis is unique effective, rich and easy to grow. From beginning we have focused on the production of high-quality hemp oil and hemp extract to use in foodstuff. The long-term experiences while handling this raw material distinguish our company and our first-class products.

Since 1996 we have been concerned intensively with the difficult cultivation and the production of hemp. For almost 20 years we were allowed to implement the harvest of hemp for fiber as well as the distribution of officially certificated hemp seeds for farmers. Thereby, the legal gaining of hemp extract have always been a top priority on a contractual basis. We exclusively produce the extract as a flavor and use it in our precious products.
The entry on Cannabis sativa in the EU Novel Food catalogue still in Jan 2017 states "...Leaves are added to soups in southeast Asia." Bhang (buds and leaves) ground into a paste have been added to drinks and foods since 1,000 BC.

"This product was on the market as a food or food ingredient and consumed to a significant degree before 15 May 1997......" The Hemp plant contains CBD, CBDA, traces of other cannabinoids including THC and this proves that cannabinoid-containing parts of the hemp plant have been used as a traditional food.

**Cannabis sativa**

**Common Names**
Ksaee (Arabic), kasa (En), hemp (Fr), hemps (De), marijuana (Pt), hemp (K), Herf (De), hennep (Nl), charhua (Fr), chinchara (Pt), konpia saome (Pl), harafa kean (Fr), konapi eale (Cz), Marihuana (Es), aracan kanaer (Nl), ovina hennep (De), navadena de indiciana kapa (Sp), hennops (It)

**Common Names**
Without prejudice to other legal requirements concerning the consumption of hemp (Cannabis sativa) and hemp products, Regulation (EC) No 258/97 is not applicable to most foods and food ingredients from this plant.

It is an annual herb, usually erect belonging to the Cannabaceae Family. Native to Central Asia and long cultivated in Asia, Europe and China. It's a multi-use plant, furnishing fiber, oil, medicine and narcotics. Fibers are best produced from male plants. Leaves are added to soups southeast Asia. Most varieties contain cannabimide and cannabinol. See also Cannabidiol

**Status**

What does it mean?
Lachenmeier (2004, 2005) mentions in his publication that hemp leaves and hemp flowers have been and are used for teas in Germany and other European countries, and that the food character (not recreational purpose) prevails.

Official use of hemp leaves for making teas can also be demonstrated on a case of Slovak Republic below:

**SLOVAKIA - DECREE 09/2015 Z.z. of Ministry of Agriculture and Rural Development of Slovak Republic, of December 4, 2015, on spices, table salt, dehydrated food, soup preparations and on aromas contains item konopa siata - Cannabis sativa L. - leaf, seed in Annex III, Table 1:**

LIST OF PLANTS AND THEIR PARTS SUITABLE FOR PRODUCTION OF TEAS without recommending any restrictions on the amount [of herb] used.


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Use of hemp flowers and CO₂, hemp plant extracts since 1996 for brewing “hemp beers” may be demonstrated by, for example, *Cannabia*® which has been marketed since 1996 by [insert name], and which was also sold in kegs. The first Swiss hemp beer was brewed by Brewery [insert name] since 1996 and the demand was high from the very beginning.

In this context the letter of European Commission, dated 03.02.1998, to Mr [insert name] is important “that hemp flowers used for the production of beer-like beverages are considered to be food ingredients and not additives since they are used in the same manner as hop flowers.” While cannabinoids cannot be extracted well into water, it is to be expected that a certain part of cannabinoids is extracted into a 4-8% alcoholic brew.
continued:
“Secondly it was decided that foods containing parts of the hemp plant do not fall under the scope of the Regulation (EC) 258/97.”

Letter of the European Commission to Mr [name], dated 03.03.1998, saying the Standing Committee on Food agreed on 18.12.1997 that food containing parts of the hemp plant do not fall under Regulation (EC) No. 258/97 ... on Novel Food and Novel Food Ingredients.”
Historical Use of Botanical Hemp / Extract as Food (6)

STATE HEALTH INSTITUTE
Embarrasse 46
Praga 10
180 42

National Institute of Public Health
Czech Republic

Letter to: _______________________________
ref. [ ] ________________ dated
12/08/2015

Subject: TECHNICAL EXPERTISE on health safety of ______ preparations

DATE: 12 August 2015

You have requested us to give an expert's opinion on health safety of the following preparations:

TECHNICAL EXPERTISE:

Based on the submitted documentation, the main ingredient of the preparations is the extract of hemp (Cannabis sativa). Cannabis sativa belongs to the category of traditional plant constituents of food supplements. Your preparation contains the extract of the cannabis plant, made by various physical and chemical methods, as described in your manufacturing technology. According to the description of the manufacturing technology, it is an extract of Cannabis sativa which does not contain THC, and does not contain any other cannabinoid with psychoactive properties. In case of proving that it contains a cannabinoid extract containing a minimum of the stated substances, the preparation would be classified as a novel food ingredient. If a new type of the material is subject to EU Regulation No 258/97.

SUMMARY:

In summary, we classify the preparations as food supplements expressing that the cannabis plant extract, as described in your manufacturing technology, does not contain THC, and does not contain any other cannabinoid with psychoactive properties. The health claims in the product label must be in compliance with the applicable legislation, namely with EU Regulation No 432/2012.

"Based on the submitted documentation, the main ingredient of the preparations is the extract of hemp (Cannabis sativa)."

"Cannabis sativa belongs to the category of traditional plant constituents of food supplements."

"...it will be necessary to assess [pure cannabidiol] as a potential novel food ingredient in accordance with Regulation EC/258/1997."

"we classify ______ preparation as food supplements."

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"...it will be necessary to assess [pure cannabidiol] as a potential novel food ingredient in accordance with Regulation EC/258/1997."

"we classify ______ preparation as food supplements."

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PART 4

Safety Profile of CBD and Hemp Extracts
Summary – Safety of Use

Confidential – Unpublished Data

- There are no case reports of abuse or dependence relating to the use of pure CBD.
- No public health problems have been associated with CBD use.

(Excerpts from a letter of WHO Director General to Secretary-General of the United Nations, July 23, 2018)
Toxicity profile of CBD - Details

- “CBD exhibits very low toxicity in humans and other species...”
  Rosenkranztz et al. (1981) showed that an oral dose 20-50 times larger than the intravenous route [212 mg/kg b.w. rhesus monkeys] is required to initiate severe intoxication. “CBD does not cause relevant CNS alterations.”

- “Chronic intake and high doses of up to 1500 mg Cannabidiol per day are well tolerated.”
Hemp Seeds and Oil - Safety of Use

“Hemp seeds possess an extremely high nutritional value due to a high content of unsaturated fatty acids (about 80% of fatty acids) and proteins (about 25%). It is not to be ruled out that other minor components, such as terpenes and cannabinoids, could contribute to the surprising beneficial effects of hemp seeds.”

“Hemp seed oils are widely sold for human food and, depending on national regulatory, appropriate label with chemical composition should be reported.”

“Hemp seed oils are unlikely to have any significant toxicity and are accepted as foods and animal feed in many countries around the world with strict caps on low concentrations of Δ9-THC (e.g. 10 μg of Δ9-THC/gram of hemp seeds (10 ppm))”

“Hemp seed oil contains traces of CBD and CBDA as well, the ratio of which may be used to determine the freshness of the oil.”

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WHO on CBD and Extracts

“There are no case reports of abuse or dependence relating to the use of pure CBD. No public health problems have been associated with CBD use.”

“CBD has been found to be generally well tolerated with a good safety profile. Adverse effects of CBD include loss of appetite, diarrhoea, and fatigue.”

“The [Expert] Committee [on Drug Dependence] recommended that preparations considered to be pure CBD should not be scheduled.”

“The Committee noted that the category “extract and tinctures of cannabis” encompasses a variety of very diverse formulations with varying ratios of cannabis components, in particular THC, and with or without psychoactive properties.”

-Excerpts from a letter of WHO Director General to Secretary-General of the United Nations, July 23, 2018
## Clarifying Confusions in WHO Reviews

<table>
<thead>
<tr>
<th>Extract of cannabis</th>
<th>Cannabis sativa, ext. (Hemp Extract)</th>
<th>Cannabidiol</th>
<th>Hempseed/ Hemp oil</th>
<th>Hemp Essential oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.: 6465-30-1</td>
<td>CAS-No.: 89958-21-4</td>
<td>CAS-No.: 13956-29-1</td>
<td>CAS-No.: 8016-24-8</td>
<td>CAS-No.: none partic.</td>
</tr>
<tr>
<td>HS Code: N/A</td>
<td>HS Code: 1302.19</td>
<td>HS Code: 2907.29</td>
<td>HS Code: 1515.90</td>
<td>HS Code: 3301.90</td>
</tr>
<tr>
<td>IDS Code: NC008</td>
<td>IDS Code: N/A</td>
<td>IDS Code: N/A</td>
<td>IDS Code: N/A</td>
<td>IDS Code: N/A</td>
</tr>
</tbody>
</table>

For Extract of Cannabis WHO uses a much too broad definition, that comprises the whole plant Cannabis sativa. For instance, it is to be noted that CAS-No. 89958-21-4 is not the CAS-No. of Cannabis extract but it is the CAS-No. of “Cannabis sativa, ext.”, as listed in the European Inventory of Chemicals: [https://echa.europa.eu/de/information-on-chemicals/ec-inventory](https://echa.europa.eu/de/information-on-chemicals/ec-inventory)

Therefore, this CAS-No. is that of an extract from the whole plant Cannabis sativa, and not from cannabis as such.

Extract of cannabis itself has CAS-No 6465-30-1. The International Narcotics Control Board (INCB) acknowledges it in its last version of the “yellow” List of Narcotic Drugs under International Control (see July 2017 edition): under the entry IDS Code NC008, Cannabis (“the flowering or fruiting tops of the cannabis plant (resin not extracted)”) is listed together with the CAS-No. 6465-30-1. This is what the WHO should have used!
PART 5

Proposal on Regulatory Framework for CBD-containing Extracts
Why are Hemp CBD Extracts Beneficial to Health?

Perhaps the most important botanical food in recent decades.

- Cannabidiol or CBD was first isolated by a team of chemists at the University of Illinois back in 1940 (Adams).
- Its structure was elucidated in 1963 (Mechoulam et al.).
- CBD is the most abundant cannabinoid present in industrial hemp and is non-psychotropic and non-intoxicating, neither is CBDA.

Hemp CBD extracts provide important substances with physiological effect to our body, attributes could potentially include:

- Contribute to the protection of cells from oxidative stress
  (as for example, Vitamin C, Vitamin E or Olive Oil Polyphenols)
- Contribute to the normal functioning of the nervous system
- Contributes to the normal function of the immune system

*Cannabinoids, (poly)unsaturated fatty acids (as triglycerides), terpenes, bioflavonoids, phytosterols, chlorophyll (w/o limitation, depending on process of preparation, inter alia)
**Finding Recommended Daily Intake for Food Use**

**Apply Homeostasis approach:**

<table>
<thead>
<tr>
<th>Food Supplements</th>
<th>Medicinal Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain</td>
<td>Restore</td>
</tr>
<tr>
<td>Support</td>
<td>Correct</td>
</tr>
<tr>
<td>Optimize</td>
<td>Modify</td>
</tr>
</tbody>
</table>

**Apply proper recommended daily intake:**

Based on the available high quality clinical studies the minimum dosage to induce a well defined therapeutic effect on a well defined pathology is then derived. This is called the minimum therapeutic dosage. In case of new clinical evidence, it is possible that this dosage has to be reviewed.

To fix the maximum amount for food supplements, from the minimal therapeutic dosage one goes down 10% due to analytical uncertainties plus an extra 10% (minimum) to make the distance. Whenever the observed effect change is strong with small dosage changes, an extra % is brought in to increase the distance with the minimal therapeutic dosage. However, this has to be done carefully as to avoid the product has no longer any physiological effect which then should come in conflict with the requirements of the Food Supplement directive.

- *Homeostasis..., Public Health Committee, Council of Europe, 07.02.2008*

Minimum therapeutic dose of CBD = 200 mg / day
Minus 10% analytical uncertainties = 180 mg / day
Minus 10% to make the distance = 150 mg / day = maximum daily intake of "CBD equivalent" in food / supplements for an average adult.

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Hemp extracts are prepared by using extraction solvents allowed for food.

Attachment I of Directive 2009/32/EC gives us a clear understanding on extraction solvents used in the production of foodstuffs and which solvents may be used in processing foods:

- Propane
- Butane
- Ethyl acetate
- Ethanol
- Carbon dioxide
- Acetone
- Nitrous oxide

- Therefore solvent extraction processes (including CO₂) are approved for food stuffs.
- The use of Ethanol or Carbon dioxide was already allowed for all uses before 1997 under Council Directive 88/344 EEC.
- The solvent extraction process is a traditional food preparation process.
Extract Preparation: Processing

Traditional food preparation processes are used for hemp extracts.

After extraction of plant matter a further removal of unwanted residuals such as waxes may be done by Refrigeration/Freezing, and removal of other contaminants may be done by Distillation/rectification which are considered traditional food preparation processes as per Annex II of Regulation (EC) No. 1334/2008.

### ANNEX II

List of traditional food preparation processes

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chopping</td>
<td>Cutting</td>
</tr>
<tr>
<td>Heating, cooking, baking, frying (up to 240 °C at atmospheric pressure) and pressure cooking (up to 120 °C)</td>
<td>Cooling</td>
</tr>
<tr>
<td>Cutting</td>
<td>Distillation/rectification</td>
</tr>
<tr>
<td>Drying</td>
<td>Emulsification</td>
</tr>
<tr>
<td>Evaporation</td>
<td>Extraction, incl. solvent extraction in accordance with Directive 88/344/EEC</td>
</tr>
<tr>
<td>Fermentation</td>
<td>Filtration</td>
</tr>
<tr>
<td>Grinding</td>
<td></td>
</tr>
<tr>
<td>Infusion</td>
<td>Maceration</td>
</tr>
<tr>
<td>Microbiological processes</td>
<td>Mixing</td>
</tr>
<tr>
<td>Peeling</td>
<td>Percolation</td>
</tr>
<tr>
<td>Penetrating</td>
<td>Refrigeration/Freezing</td>
</tr>
<tr>
<td>Roasting/Grilling</td>
<td>Squeezing</td>
</tr>
<tr>
<td>Sleeping</td>
<td></td>
</tr>
</tbody>
</table>

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ELHA's Three-tier Regulatory Proposal

Scientific literature shows that pharmacological activity for a wide variety of effects of CBD in clinical studies is not observed under approx. 200 mg oral/d for an average adult.

(Devinsky et al., 2014; dos Santos et al., 2014; Food Standards Australia P1042; Friedman et al., 2015; Hill et al., 2012; Issand et al., 2016; Schubert et al., 2013)

Proposed use of Cannabidiol and/or CBD-rich hemp extracts based on daily oral dose of CBD equivalent for an average adult.

<table>
<thead>
<tr>
<th>Daily dose per average adult</th>
<th>Proposed use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 200 mg</td>
<td>As active ingredient in medicinal products with or without prescription.</td>
</tr>
<tr>
<td>Between 20 – 160 mg</td>
<td>Should be freely available as food supplements (such as valerian or hop pills, silymarin, glucosamine or Gingko Biloba). Extract to be standardised to CBD content.</td>
</tr>
<tr>
<td>Less than 20 mg</td>
<td>Should be allowed in food products without any restrictions.</td>
</tr>
</tbody>
</table>
What levels of CBD do hemp and extracts contain?

- Total-CBD-content in raw biomass of EU-registered varieties is between 1 and 5% depending the variety and climate. This is the naturally occurring level of total CBD. This has been obviously used traditionally for hemp beer brewing, teas, etc.

- In preparing an extract, this level is, of course, increased by loss of insoluble plant matter.

- This raw extract is usually not sold to the consumer (it is an isolated intermediate).

- This intermediate is optionally purified by traditional food preparation processes and then diluted with some edible oil to get it standardised to a max. 5% CBD formulation
  (See for example traditional extract from [ ] which was a CO₂-extract with CBD and CBDA in it since 1994).

- Such an diluted extract with up to 5% total-CBD may be sold as food ingredient or food supplement with all necessary labelling and consumer information as required by Regulation (EU) No 1169/2011 or Directive 2002/46/EC, respectively.
What about the Daily Dose of CBD?

Based on a 5% extract dilution, a person would need to take 30 drops to consume 50 mg of CBD.

That would equal approximately one full standard-size dropper (pipette) of a 10 ml bottle.

<table>
<thead>
<tr>
<th>% w/w CBD in Tincture Oil</th>
<th>1ml = 30 drops</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>50 mg</td>
</tr>
<tr>
<td>10%</td>
<td>100 mg</td>
</tr>
<tr>
<td>15%</td>
<td>150 mg</td>
</tr>
</tbody>
</table>
Novel Food Catalogue – Cannabidiol and Cannabis sativa L

Current status (of entries) on 16 October 2018

Cannabidiol & Cannabis sativa L

The naturally occurring level of total CBD in the source Cannabis sativa L. (EU-registered varieties) is between 1 and 5% depending on the variety and climate.
EIHA hereby asks the European Commission to recognise that green parts of the hemp plant and hemp extracts and their tinctures with up to 5% CBD are traditional food in EU.

EIHA would also like to make available our extensive stakeholder knowledge and scientific expertise in the development of an operational framework that satisfies both industry and compliance & regulatory requirements.
Thank you!

Questions & Answers

Expert Panel and area of expertise:

- President – Farming & Retail
- Board – Extraction Processes
- Advisory Board – Chemist / Biochemist
- Advisory Board – Retail & Compliance

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