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Cannabinoids

- There are 483 identifiable chemical constituents known to exist in the cannabis plant, 104 different cannabinoids have been isolated from the plant
- The most common cannabinoids are:
Tetrahydrocannabinol (THC), cannabidiol (CBD), cannabinol (CBN), cannabichromene (CBC) and cannabigerol (CBG)
- The exploration of cannabinoids led to the discovery of the endocannabinoid system.
Phytocannabinoids are defined as the natural ingredients, while the term endocannabinoids describes the body's own natural active ingredients

Cannabidiol

- Cannabidiol (CBD) is the main cannabinoid in industrial hemp and the second most widely used cannabinoid in medicines from the cannabis plant
- In industrial hemp, CBD is found in a concentration range of about 0.5 to 2.5 % in the upper third of the plant (stalk, leaves, flowers)
- Acting as a mediator for the effects of THC, it is widely considered to be non-psychoactive in nature
- Basic research suggests a potential therapeutic use in a large number of diseases and symptoms, many of which are still undoubtedly waiting to be discovered

Mechanisms of action of CBD

CBD does not directly „fit“ the keyhole in the CB1 and CB2 receptors, but it has powerful indirect effects, still being studied

	Antioxidant	Vanilloid Receptor	Serotonin Receptor	GPR55	Adenosine 2A2	FAAH Inhibition
Agonist						
Antagonist						
Receptor-independent						
Regulates	Neuroprotection	Pain Inflammation Body-temperature	Depression Sleep Appetite	Bone density Blood-pressure Cancer cell proliferation	Cardiovascular functions other neurotransmitters	ECB tone

Therapeutic effects of CBD

- Antagonizes effects of THC in humans (Dalton et al., 1976)
- Analgesic (Davis et al., 1983)
- Treatment of schizophrenia (Zuardi et al. 1995)
- Anti-oxidant (Hampson et al., 1998)
- Antidepressant in rodents (Deyo et al., 2003)
- Anti-anxiety (Russo et al., 2005)
- Pro-apoptotic against breast cancer cell lines (Ligresti et al., 2006)
- Treatment of psychosis (Russo et al., 2007)
- Treatment of skin diseases (Biro et al., 2009)
- Anti-emetic (Rock et al., 2010)
- Anti-convulsant (Jones et al., 2010)
- Treatment of addiction (Xi et al., 2010)
- Anti-inflammatory (Booz et al., 2011)
- Treatment of Alzheimer's disease (Esposito et al., 2011)

Our vision



- Innovative and technology leading global company in the field of CBD extraction and production
- Up to 20 years of experience in the hemp industry and a highly qualified team of employees in the respective core competencies
- Our products and services conform to the highest quality standards, achieved by the best available production methods
- Cooperation with reputable institutions

Target groups

LOHAS	Lifestyle of health and sustainability
Naturalites	primarily concerned about personal health and wellness, use many natural products
Conventionals	practical, like to see the results of what they do; interested in green products that make sense

Future markets

- Nutritional supplements
- Pharmaceutical products
- Cosmetic products with added value (cosmecueticals)

➡ All these products target the endocannabinoid system

Business challenges

- Trend towards living consciously, green living and eco-friendly lifestyles (Health/Food)
- Need of conscious living people for natural agents and their therapeutic potential
- Legal framework (Narcotics act, CR(EC)1420/98, Health Claims)



Basic requirements are **state-of-the-art production standards** and the highest quality standards of raw materials used (natural controlled or even organic certified)

Extraction methods: Introduction

- The science of cannabis concentrate extraction functions on the solubility of the cannabinoids
- Cannabinoids are not water soluble, to extract them properly the cannabinoids must be dissolved in a solvent (ethanol, butane, CO₂, hexane, isopropanol)
- When cannabis flowers are submerged in these solvents, the cannabinoids, terpenes and other active ingredients are dissolved into the liquid solvent
- The remaining solid plant matter is filtered out and the liquid solvent and cannabinoid mixture is 'purged' to remove all solvents, leaving only cannabinoids and other active compounds of the Cannabis plant

List of extraction methods

<u>Non-hydrocarbons</u>		
	Dry sift	Single/series of silk screens in conjunction with agitation , separating trichomes from the plant material
	Water (Ice-o-later)	Combination of water, ice and agitation to separate trichomes from the plant material
	CO2	Pressurized CO2 extracts the cannabinoids
	Isopropyl Alcohol (QWISO) / Ethanol (QWET)	commonly used solvent for creating cannabis concentrates using a 'quick wash' method



List of extraction methods II

<u>Hydrocarbons</u>		
	Butan/Propan (BHO)	most commonly used solvent in cannabis extraction, butane and propane dissolve all cannabinoids/terpenes effectively
	Hexan	Washing method similar to butane/isopropanol, harder to purge



Benefits of CO2 extraction at a glance

- can convert large amounts of biomass (stalks, leaves and flowers)
- it's non-toxic (GRAS –Status)
- has the highest market acceptance
- used in food products without any restrictions (no dangerous residues)
- free of impurities
- it's antibacterial
- available in large quantities at affordable prices

Medical hemp GmbH offers

- High-quality hemp extract with various, specified CBD levels
- Certificate of Analysis of total CBD (CBD + CBDA*0,877) for each batch provided by an internal lab
- Each batch can get tested for microorganism, heavy metals and pesticides by an accredited lab
- Contract manufacturing of dried raw material from industrial hemp
- Consulting on all CBD related topics

Developments

- Expanding the cultivation area for raw material, with focus on organic
- Increasing production capacity up to several tons of extract per year
- Supplying high-grade primary products for the pharmaceutical industry in standardized form
- Meet customers demand for the markets in:
 - Cosmetics
 - Foods
 - Dietary supplements
- Research and investigations regarding current challenges
 - Legal issues
 - Market requirements
 - Production processes



**Thank you for you attention and
your attendance at the EIHA
conference!**

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