From Plan to Patient

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Scientific Solutions

Processing process for API

Growing

Raw Material

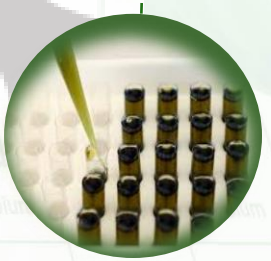
Drying

Milling

Extraction

Ethanol Remover (recycle)

Separation



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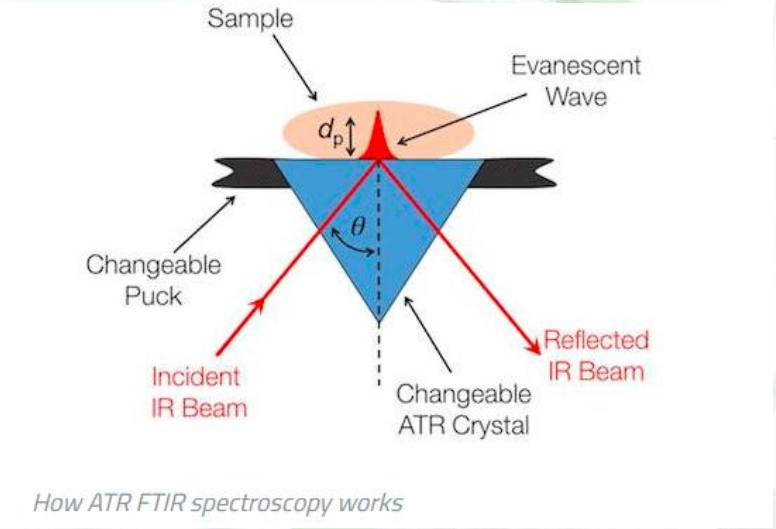
Growing

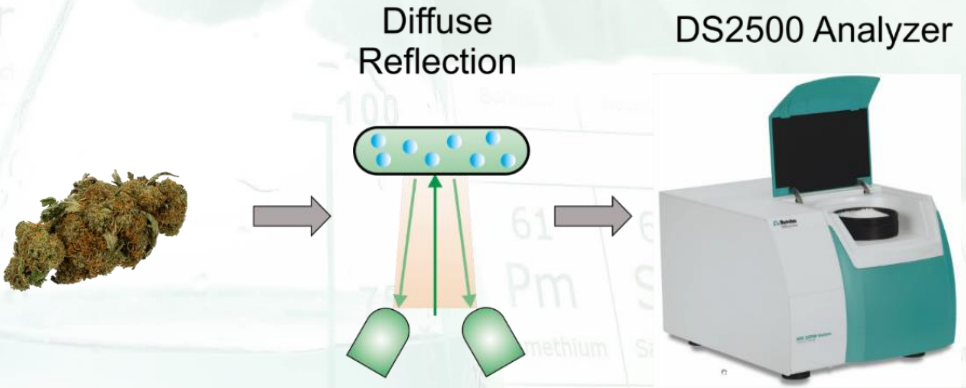
Fertilizers are the building blocks of all the tissues in the plant, so it is important and necessary to check the amount of minerals and fertilizers in the water and soil of the plant. During growth, we also want to monitor the composition of the active ingredient in the growth process.

IC **Ion Chromatography**	**ICP** **Inductively Coupled Plasma**	**NIR** **Near-Infrared Spectroscopy**	**FTIR** **Fourier-Transform Infrared Spectroscopy**	**LightLab Analyzer**
Direct measurement of fertilizer concentrations in the **Water for irrigation** The sample is taken in liquid phase For testing nitrogen N_2, Potassium K, Phosphorus P and more. %-PPM range Measurement is 10-30 minutes	Direct measurement of fertilizer concentrations in the **soil** for testing nitrogen N_2, potassium K, phosphorus P and more. %-PPM range Measurement is 3-5 minutes	Method Of Measurement at 800-2500nm Characterizes the seeds And the plant In measurement **fat% ,protein% humidity%** **THC Δ9, THCα , THC,CBD,CBDA** Measurement time less than a minute!	Alternative measuring method for HPLC qualitative and quantitative, Characterizes **THCA** and **CBDA** in various growth stages, Immediate result. Portable and easy to carry, without solvents and operating costs.	A selective separation system for cannabis. Quantitative measurement of **THC Δ9, THCα , CBN,CBD,CBD-A CBG-A** Portable kit Identification threshold range **100-0%**

Basic principles of spectroscopy



How ATR FTIR spectroscopy works



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Raw Material

Receipt of raw material, important to:
1. Weighting of the Plant
2. Testing of humidity in the plant
3. Evaluation of plant composition

Industrial and Analytical balance	Humidity		NIR Near-Infrared Spectroscopy
	Karl Fisher Titration	LOD Loss on Drying	
Wide range of weights: Micro-analytical scales with **0.01 mg** accuracy. Industrial up to 5000 kg. For laboratory analytical needs.	Test the **total** water concentration in the sample. The water concentration is measured in an especially wide range from **0.001 to 100%**	Measuring weight change as a result of loss of water during heating. up to 0.01% for Percentage of water the amount between **50-200 grams**	Characterizes the seeds And the plant In measurement **humidity% fat% ,protein% THC Δ9, THCα , THC,CBD,CBDA** Measurement time less than a minute!

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Raw Material

Metrohm

ADAM

Near-Infrared Spectroscopy
NIR

Karl Fisher
Titration

Industrial and
Analytical balance

LOD
Loss on Drying

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Drying

The drying process currently practiced in the cannabis industry is usually uncontrolled, takes a long time and is unnecessary. We offer a solution that includes control, control, full monitoring of the process (according to regulatory requirements) and drastic reduction during the drying.

Laboratory and Piot Freeze Drying	**Industrial Freeze Drying**
To dry from 2.5 to 500 kg The shelf temperature is -75°C to 60°C Resistance sensor Rx Wireless temperature sensor Control software and documentation that stand in **CFR 21 part 11**	**To dry from 1500 kg in 24 hours!** The shelf temperature is -20°C to 70°C Automatic cleaning and disinfection

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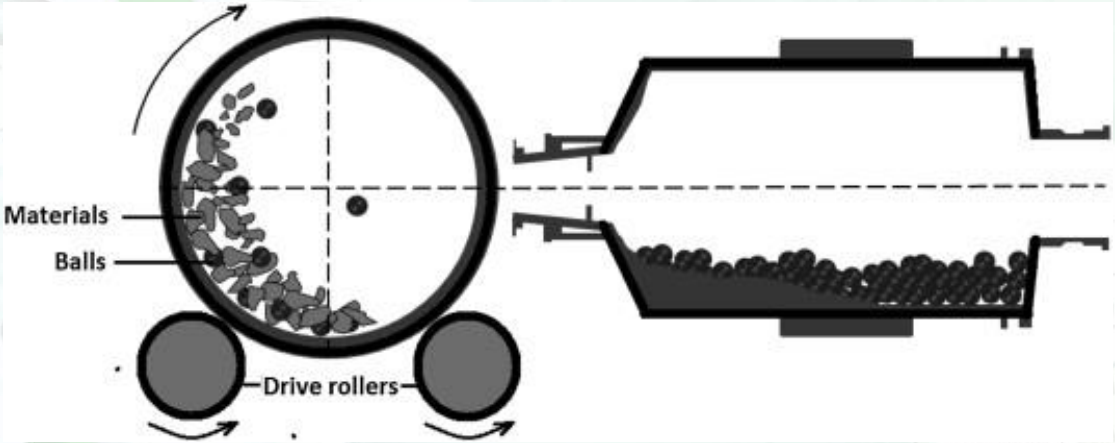
Drying

CHRIST
Freeze Dryers
Vacuum Concentrators

GUDDON
FREEZE DRY

Milling

Flowering grinding increases the area of the surface and thus makes the process more efficient.



Extraction

The cannabis extract is made after the grinding stage and is intended to extract all the cannabinoids and predators from the plant.

Ethanol Extraction	CO2 Extraction
Maximum capacity 36 kg Running time is 1.5 hours Cold / hot wash in ethanol	Maximum capacity 9 kg Running time is 4-6 hours can run 6 cycles a day! Daily output 10 Kg of pure material

Extraction

Ethanol Extraction

CO2 Extraction

CO2 Removal

After the extraction process, CO2 should be Evaporate by drying and get rid of impurities with vacuum oven.

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Ethanol removal and recycle

After the extraction stage in the solvent we must concentrate the material and evaporate the solvent (ethanol / chloroform ...) In order to obtain clean material. We will refine the solvent, reduce operating costs and become environmentally friendly.

Laboratory Rotavapor	Industrial Rotavapor
Volumes 1-5L	**Volumes up to 50L**
Quick heating of the bath	Convenient and easy to operate
Control and monitoring	High % of product
Convenient and user friendly	Ecological environment

Ethanol removal and recycle

Separation

Quality separation of CBD, THC and cannabinoids
from the extraction mixture

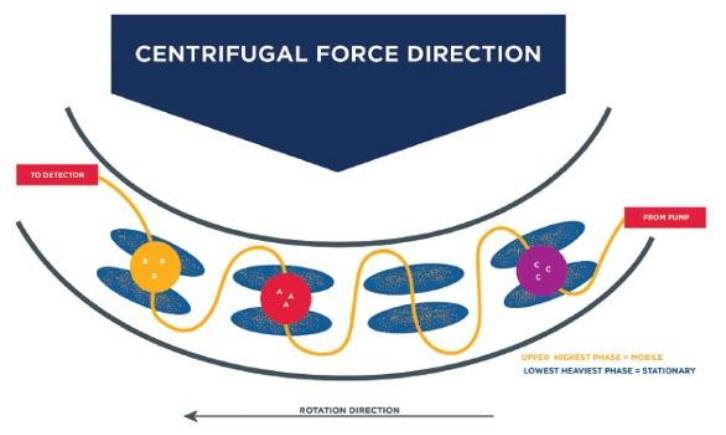
MPLC Medium Pressure Liquid Chromatography	CPC Centrifugal Partition Chromatography	Cannabis Distillation System	
Liquid pressure chromatography	Partially centrifugal chromatography	Distillation system Continuous process or batch process	Separation method
99.9%	99.9%	96%	Degree of cleanliness
1-12 L/hour	Rotors volume 250ml up to 18L	3.8-380 L/hour	Flow rate
1. With one click transition between Normal phase to Reversed-phase 2. Small amounts can be separated (mg)	1. Control of temperature, Pressure and vibration 2.Fast method 3. No solvents are used	Clean product and clear color	Advantages of the system

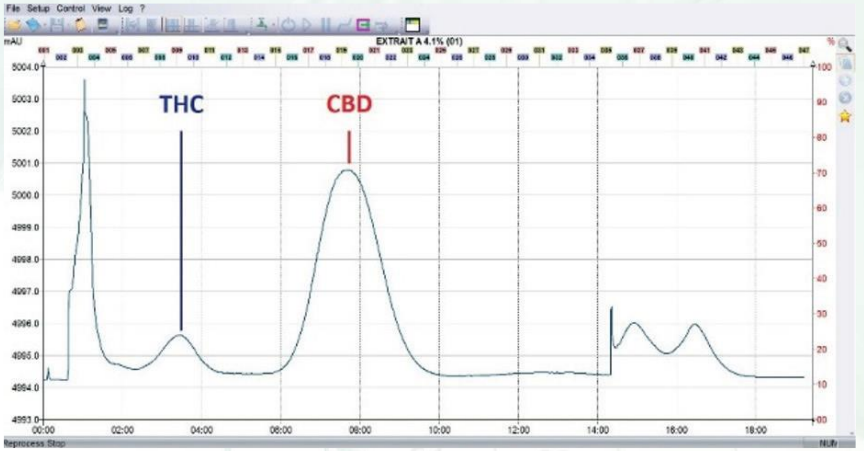
Separation

Medium Pressure Liquid Chromatography

Separation

Centrifugal Partition Chromatography (CPC)





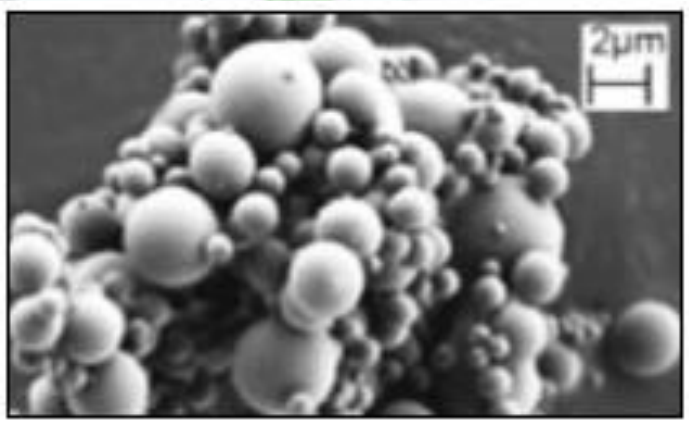
Separation

Cannabis Distillation System

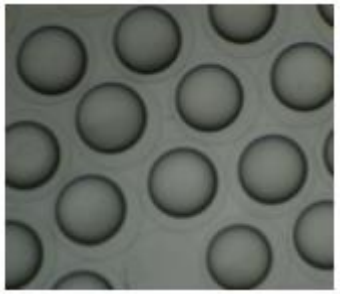
Cannabis products & drug delivery methods

- cigarettes
- inhalers- MDI (Metered Doze Inhaler)
- DPI (Dry Powder Inhaler)
- CBD/THC products- oil, capsules
- Creams, cosmetics products/ointments
- Edible products- cookies and corrugated candy

Spray dryer



Encapsulator



Vaporizer, MDI, DPI

Spraytec - Droplet size

Rheometer/Viscometer

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Thank You!