

Extracting active ingredients from cannabis plants

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The most common method to extract the active ingredients from the cannabis plant is supercritical CO₂ extraction. At a temperature above 31°C and with high pressure, the CO₂ gets into the supercritical state, where it acts as a solvent. Passed through a chamber containing the plant material, it still has the density of a liquid but can fill the entire chamber like a gas. The advantage: The CO₂ extracts the cannabinoids and terpenes from the plant without causing denaturation or damage to the product.

This produces a safe, high-quality, pure oil that can be processed for a variety of therapeutic uses. The big challenge: the highest possible yield of the ingredients in the shortest possible time. This requires optimum, homogeneous grinding of the cannabis plant.



Cannabis before grinding.



Cannabis after grinding.

Homogenisation and characterisation of CBD isolates

Solid isolates of CBD can be produced as a nonhomogeneous 'cake' of materials or as a mixture of loosely associated granules comprising a wide particle size distribution. Creating material suitable for consumption or subsequent formulation in other products typically requires particle size reduction and/or homogenisation. Confirmation of particle size distribution of a given sample may be achieved via traditional sieving methods or by using a particle size analyser. Primary considerations when selecting a milling system for CBD homogenisation include:

- batch size – throughput requirement per kg/batch or day
- minimising losses – physical and/or chemical
- the desired final particle size range
- easy cleaning to prevent batch cross-contamination
- the (residual) moisture content



The Universal Cutting Mill P-19 with high-performance Cyclone separator and 60-litre collecting vessel for CBD homogenisation on a production scale.



Perfect for CBD medium-scale homogenisation: the Variable Speed Rotor Mill P-14 classic line with high-performance stainless-steel Cyclone separator.



A-22 NeXT with wet and dry dispersion unit - The Laser Particle Sizer for wet and dry dispersion.

CBD homogenisation in small- and medium-scale

Small-scale homogenisation of CBD isolate may be achieved by low energy ball milling or by automated mortar grinding with pestle. Larger batches of CBD material can be quickly and continuously homogenised in a Variable Speed Rotor Mill with Cyclone separator down to the lower micron range to the fineness of talcum powder. The combination of extremely fast homogenisation with active removal of material from the rotor area in a fraction of seconds means there is no time for a temperature increase due to friction, which could cause chemical degradation. Another advantage: Product contact surfaces are made of stainless steel or food-grade plastic vacuum hoses for the Cyclone separator and can all be cleaned between batches to reduce the likelihood of cross-contamination. A variable speed motor and a wide range of sieve rings provides precise control of particle size output.

CBD homogenisation in large-scale

We recommend a Universal Cutting Mill for homogenising CBD isolate to produce a uniform powder on a production-level scale. A precision milling solution for preparing cannabis biomass for extractions or pre-rolls, it can be configured just as effectively as a homogeniser.

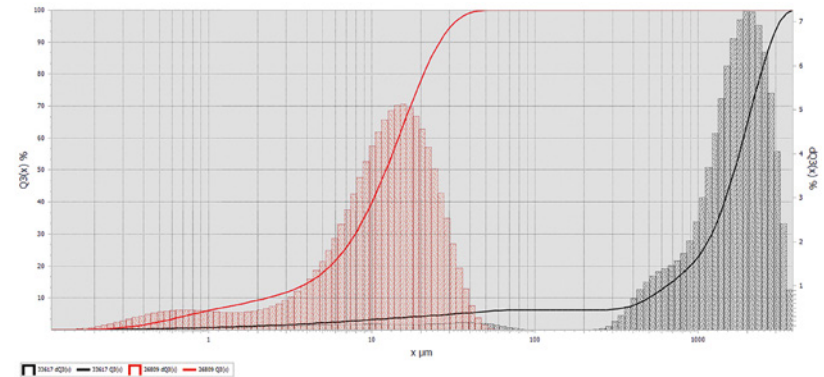
We recommend the following system settings for this purpose:

- Speed between 2000 – 3000 rpm
- Rotor with notched edges and fixed knives

- Gap setting 1 – 2 mm between the cutting rotor and fixed knives
- Sieve cassette: 1, 2 or 4 mm – depending on the nature of sample material and the desired final fineness
- High-performance stainless-steel Cyclone separator
- Powerful vacuum cleaner

Quality control through analysis of CBD particle size

Characterising the particle size distribution of a CBD sample confirms that the milling system used has achieved particles within an acceptable range, has met important criteria for release into the manufacturing process or for product sale, or the efficacy of a compound is based on its particle size. Laser particle size analysers with Reverse-Fourier design offer enormous advantages and greater flexibility compared to conventional sieving. Above all, the Fritsch Laser Particle Sizer A-22 NeXT has proven its capability in characterising CBD isolates in wet or dry dispersion.



Result of particle sizing of CBD isolate.

Result of particle sizing of CBD isolate using the Fritsch A-22 NeXT before and after homogenisation: The initial sample (black) contained a mixture of loose granules with a wide particle size distribution. The material homogenised using the Fritsch Variable Speed Rotor Mill P-14 classic line (red) resulted in a particle size consistency similar to talcum powder.

Get into contact with our Application Consultants

Finding the perfect solution for your cannabis application is absolutely easy:

Contact our application consultants and let them answer all your questions regarding sample preparation and particles sizing.

You can also experience the FRITSCH instrument virtually directly at your workplace.

Make your appointment now under www.fritsch-international.com/appointment or contact directly our application consultant team on **+49 6784 70-0** or by email consultation@fritsch.de

The FRITSCH instruments will be presented at **Pittcon - Booth 2721**