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CANNABIS AND SUPERCRITICAL TECHNOLOGY: BENEFITS AND ADVANTAGES

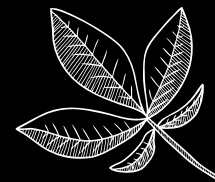
**FOCUS ON SUPERCRITICAL CARBON DIOXIDE
EXTRACTION FOR CANNABIS**

Why to choose supercritical CO2 technology?

Supercritical extraction: process and advantages?

Supercritical extraction: Hemp extraction?

For industries financial advantages and productivity



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CANNABIS AND SUPERCRITICAL TECHNOLOGY

Cannabis

The value of cannabis product in the next few years is estimated to reach \$60 billion within a decade. We can even talk about a big boom in industrial hemp. This rapidly growing market of therapeutic product is driven by growing acceptance of their benefits. Many countries are legalizing culture and medical and recreational cannabis. Medical application: Some molecules of this plant can help patients in various ways of cures. In medical vision and medical industry, the extract of hemp plant known as CBD has few, if any intoxicating properties. Many benefits of CBD are reported: relieving pain, insomnia, spasticity, relaxing muscles in Parkinson's disease. In US, Canada and other countries it is yet used in pain control, effective for chronic and severe pain. CBD is safer than opiate derivatives (morphine...), non-addictive, and gives no feeling of mind disengagement.

Moreover, Cannabis fits in agribusiness sector and food industries: infused drinks, cannabis savoured foods already are on supermarkets shelves. International investors bets billion dollars in this increasing market in order to capture Cannabis business and additional market share. PepsiCo is having a hard look on cannabis business, and some have already taken this step such as Constellation brands (owner of Corona beer) put \$4 billion into Canopy Growth, Canadian cannabis producer and gained a foot in the door of this growing market.

In EU, industrial hemp culture is allowed but is regulated by strict statutory laws and a restricted list of allowed species plants must be respected with a permit and authorizations. States oversees the market.

Why to choose supercritical CO2 technology?

In this dynamic growth pattern supercritical fluid technology plays a significant role as it produces concentrate and purest extracts. One of the advantage of using supercritical fluids is the tuneable selectively for specific components and the possibility of fractionation and chromatography.

Supercritical extraction: process and advantages?

During supercritical extraction process, liquid carbon dioxide is pressurized with a pump and heated up in a heat exchanger. This supercritical solvent flows through the extractor, charged with hemp extract. At the end of the extraction, the homogeneous mix of extract and Co2 enter in extract phase. During this phase vapour CO2 separates the two elements. The pure extract can be removed and the supercritical CO2 is recycled in a continuous loop. The natural product is gently treated; no pollutant waste is produced. The supercritical process keep natural properties (originally contained in the product) in the final extract. This characteristic of the process is used in different application fields. In nutraceutical, cosmetic, hemp, pharmacy and perfume it is a very sought particularity. When essentials oils are recovered by steam distillation, it has some disadvantages: only volatile component can be isolated and may have the consequence of instability of oil, the natural heat instability of essential oil. Furthermore, synthetic compounds tend to be replaced by natural ones by market demand and industries.

Supercritical extraction: Hemp extraction?

Super Critical Fluid Extraction generates a pure extract and it enables to gain high end hemp extract and hemp oil. Many different contents of CBD can be created in different purposes and for various applications. Contrary to classical solvent extractions, the extract collected with SFE has no trace of contaminant or solvent residues. Thus, this process requires less steps with no post processing steps and is easier and faster. Supercritical extraction provides big amount of high end extract with enhanced productivity. Supercritical extraction offers high extraction yields. A certain orchestration of operating conditions depending on pressure and temperature must be made, to get the best combination with particle size and superficial velocity. In industrial applications, supercritical extraction of compound of vegetable matter (and especially cannabis) represents many advantages. Supercritical carbon dioxide has specific features such as an excellent mass transfer property, ease of control of variability of compounds with pressure and temperature variability. Carbon dioxide is used in supercritical state because its critical temperature is near ambient air temperature, there is no trace of residual issues in the final product, no waste, and carbon dioxide is naturally not corrosive, is inexpensive, odourless, colourless, non-flammable and non-toxic. This natural makes a continuous loop in the equipment. Thanks to SFF super critical fluid fractionation, oil is gathered and a dewaxing is made. Fractionation allows an extraction from a liquid with fractionation column, permitting purification and fractionation. With supercritical chromatography, molecule analysis is made and it is possible to selectively separate and collect the desired molecule. In the cannabis field THC molecule responsible of psychotropic effect and CBD which is used in medical purpose can be separated and the exact composition of the extract examined. SFE Process helps industries progress by providing equipment to extract CBD from hemp.

For industries financial advantages and productivity

This process is economical since it enables a fast and efficient ROI.

Firstly, the carbon dioxide is not expensive; not subject to variation of financial flows such as classic solvent.

With our equipment, it is possible to produce continuously and automatically with very low idle and turnaround time.

Supercritical extraction offers high yields, and the post treatment is reduced and with no solvent thanks to ScCO₂ purification, or non-existent, which makes the product even more profitable.

This process has been known since the last century, and for several decades has grown considerably. The years of research and the development of this process make it today a high-performance and secured technology. The experience of SFE Process has allowed to further develop the equipment: the equipment can run continuously with very little maintenance. Investment in supercritical is a very low risky investment that will significantly increase productivity.

Lastly, in order to guarantee this profitability, the financial capacity of SFE Process makes it possible to guarantee a permanent support to its customers: a certainty on the delivery of the equipment, their operation and the support to the production and the development, but also to its ability to track the rapid growth of these companies by being able to provide ever larger equipment with the same technical and financial guarantees.

