



Solutions

Pall Solutions for Cannabis Oil

With the cannabis edibles market projected to quadruple in the U.S. and Canada, cannabis oil, the oil extracted from the cannabis sativa plant is on a fast track for growth. Rapid growth is occurring in Canada and some U.S. states due to its legalization. Earlier this year, accounting giant Deloitte predicted that the edibles market would reach \$1.6 billion CAD a year in Canada and a recent survey they conducted said that 59% of the people are interested in trying cannabis-infused edibles. Edibles have the highest interest among all other product types to which cannabis oil can be added.¹

In addition to consumer interest, the edibles segment is also key for manufacturers. Edibles enables companies to differentiate their products, allowing them to sell at higher prices and gain more margin.

To produce CBD oil, the compounds must first be extracted from the plant. There are several ways

to extract the oil, however, the two most common methods are CO₂ extraction and ethanol extraction. In CO₂ extraction, “supercritical” CO₂ acts like a solvent, to flush out the active ingredients from the plant matter. In ethanol extraction the cannabis flower is soaked in ethanol, agitated, and strained.

After extraction, the oil undergoes a “winterization” process where the oil is chilled to -40 °F to further purify and refine the extract to increase its quality and value. At the cold temperature, the plant waxes harden and can be more easily removed with subsequent filtration and decolorization steps. See the figures below for typical workflow diagrams for each extraction method.

To help cannabis oil and extraction equipment companies optimize operation and ensure product quality, Pall offers a portfolio of products for applications including clarification, color removal and microbial detection.

Cannabis Oil Process Workflow

Figure 1: Typical Workflow for Supercritical CO₂ Extraction

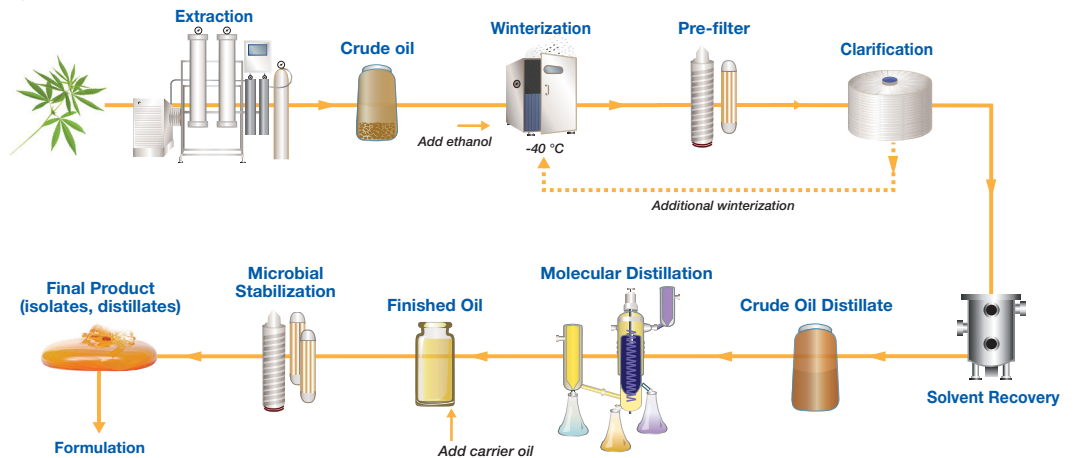
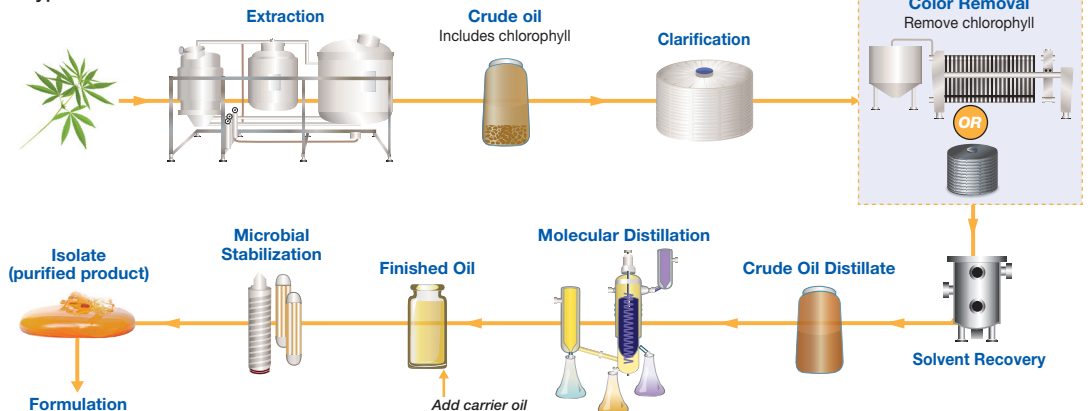


Figure 2: Typical Workflow for Ethanol Extraction



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Clarification

For cannabis oil clarification, Pall's SUPRA modules are the lead solution. Constructed of sheet media, these modules have a unique matrix of components that remove unwanted contaminants while maintaining the quality-enhancing components that result in a clear, bright product.

For removal of waxes that cause haze in the cannabis oil, SUPRA modules offer an excellent combination of adsorption, surface and depth filtration while the enclosed assembly minimizes product losses and oxidation.

Pall's **SUPRApak** modules are the latest development in sheet based filtration. The modules have a unique flow configuration that maximizes filtration and adsorption. Additionally, with filter area higher than most lenticular modules, they offer a compact configuration to maximize recovery of valuable oil.

For higher solids applications, Pall's **SUPRADisc** modules may offer a better solution. The dual drainage plate design of these modules enables a robust construction that can accommodate high particle loads as well as superior resistance to back pressure.

Color Removal

For processes utilizing ethanol extraction, after clarification, a carbon treatment step helps to achieve the desired golden hue by removing the green color resulting from chlorophyll in the sativa plant.

Pall's carbon impregnated **SUPRADisc AKS Series** filter modules make for easier handling and more hygienic carbon treatment with modules that fit directly into enclosed housings. In AKS modules, carbon is integrated into the filter matrix without the use of any binding agents. This maintains the adsorptive capacity and does not introduce any materials that might degrade or negatively impact the oil.

Pathogen Detection

For cannabis oil used as an ingredient in edibles, local regulations may require pathogen testing for the absence of pathogens prior to release. Pall's **GeneDisc PCR systems** enable rapid and simple assays for detection of key indicator microorganisms.

Each GeneDisc plate contains six sectors, with six wells per sector. Each of the six wells contains reagents to detect one or more microbial targets simultaneously including *Escherichia coli*, *Salmonella* spp., *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Candida albicans* and, *Burkholderia cepacia* complex.

For information about food contact compliance for Pall's filtration solutions, please contact your local Pall representative.

¹ <https://www2.deloitte.com/ca/en/pages/press-releases/articles/cannabis-legalization.html>

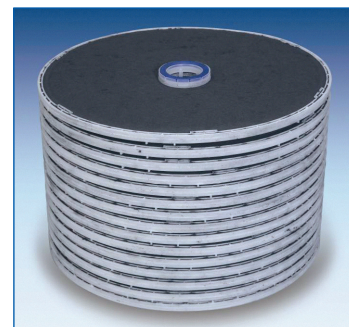
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SUPRADisc™ II Module



SUPRApak™ Module



SUPRADisc AKS Module



GeneDisc® Cyclor



GeneDisc Plate



Pall Corporation

Pall Food and Beverage

25 Harbor Park Drive
Port Washington NY 11050
+1 516 484 3600 telephone
+1 866 905 7255 toll free US

foodandbeverage@pall.com



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