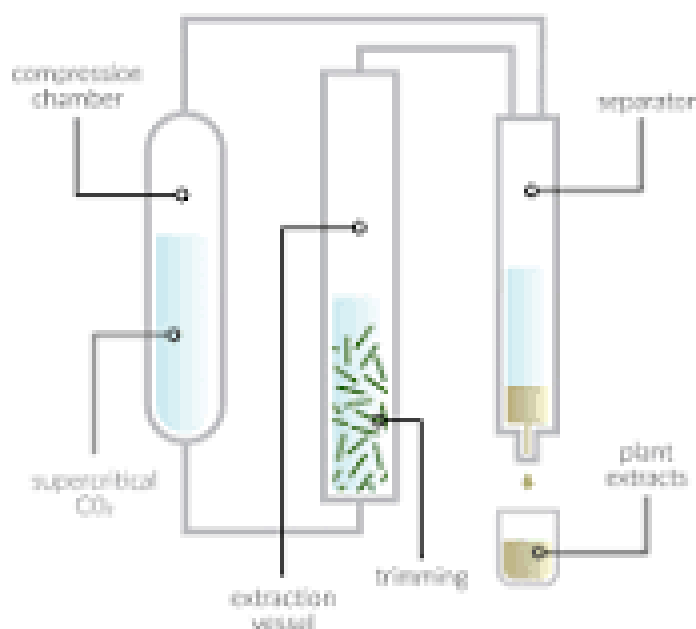


CO₂ Extraction



CBD oil extraction separates beneficial cannabinoids and terpenes from the raw hemp plant material using specialized solvents and physical processes.

Common Extraction Methods

- **Supercritical CO₂ Extraction:** Uses pressurized carbon dioxide in a liquid-gas state to pull compounds cleanly without toxic residues, widely considered the gold standard.

Ethanol Extraction: Soaks plant material in high-grade alcohol to dissolve cannabinoids, offering a cost-effective and scalable commercial method.

- **Olive Oil Extraction:** Heats raw hemp to activate compounds, then infuses them directly into a natural carrier oil, ideal for basic or at-home batch crafting.

Post-Processing and Refinement

- **Decarboxylation:** Applies controlled heat to convert non-active cannabinoid acids like CBDA into usable CBD.
- **Winterization:** Cools the crude oil and washes it with alcohol to strip away unwanted plant waxes, lipids, and chlorophyll.
- **Distillation:** Purifies and isolates target cannabinoids through vaporization stages to reach high potency levels.

Methods of Extracting CBD

So, what's the best CBD extraction method? There are several effective CBD extraction methods such as:

- Olive oil extraction
- Steam distillation
- Hydrocarbon extraction

However, these processes don't guarantee a high-quality product and could even result in toxic residue.

The top two extraction methods — ethanol extraction and supercritical CO2 extraction — are preferred by CBD manufacturers interested in retaining quality control, and both methods are safe and commonly used in the food industry as well as for extracting CBD.

#1 Super Cold Ethanol Extraction Method

Ethanol is used in a variety of food-grade products, including nutritional extracts, beer, wine and even whipping cream. It's also a natural solvent and the key ingredient in this form of CBD oil extraction.

Ethanol extraction is a great choice for CBD oils and gummies. The process produces an appealing-looking, great-tasting oil for connoisseurs who appreciate the natural taste of CBD oil.

Consider the following steps that go into this solvent extraction:

1. **Ethanol soak** – Plant material is fully submerged in an ethanol solution. Protective gear and safety protocols are essential during the early stages of the process to ensure a quality product and a safe environment.
2. **Filtration** – After the plant material has been soaked in ethanol, the solid plant material is slowly filtered out and removed.
3. **Cold factor** – The ethanol is chilled to a super-cold temperature (-40°C or below) to ensure that fats and lipids are removed from the hemp extract. Without the cold ethanol, the resulting extract would be noticeably less pure and potentially less effective.
4. **Ethanol evaporation** – In the final step of CBD oil extraction, nearly all of the ethanol is removed. The U.S. Food & Drug Administration recognizes ethanol to be **Generally Recognized As Safe (GRAS)** to consume, but most CBD extracts contain only trace levels of the substance.

Notably, ethanol extraction may offer a safer and more pure CBD product in comparison to hydrocarbon solvent extraction.

Chlorophyll, the compound that gives all plants — including cannabis — their green color, is also removed through both the ethanol and supercritical CO2 extraction processes to improve the taste.

Other reasons to consider ethanol-extracted CBD include:

- **Environmentally friendly** – With efficient ethanol recovery systems, ethanol from extraction systems can be cleaned, cleared and reused, leaving a smaller environmental footprint. Ethanol is derived from plant material and is considered a renewable resource.
- **Retain cannabinoids** – The extraction process minimizes fats, lipids and waxes while keeping in all the beneficial cannabinoids and terpenes.
- **Consistency** – By utilizing super-cooled ethanol, you can expect a standard of quality among CBD products. So long as the CBD is sourced from quality plants, consumers should expect a reliable product.

#2 Supercritical CO2 Extraction Method

This clean, safe and environmentally friendly method has been around for decades and is used to extract CBD from hemp grown on farms across the country, from Oregon to Kentucky. CO2 extraction isn't just for cannabis products, it's also used to extract hops to make beer.

The **supercritical CO2 extraction** method has long been the preferred method for extracting CBD for several reasons, including:

- **Safety** – Chemical compounds can cause complications. Fortunately, CO2 leaves little worry for manufacturers and consumers alike. Carbon dioxide is a nontoxic and nonflammable gas that has no impact on human health at normal concentrations.

- **High concentration** – This extraction process may yield a stronger or more potent CBD or cannabis extraction. This may be ideal for consumers interested in a full-spectrum product.

How does this CBD extraction process work? Consider the following:

- **Pressurization** – The CBD is placed into a pressurized chamber and carbon dioxide is pumped into the extraction chamber. The pressurized carbon dioxide begins to extract the desired phytochemicals from the plant. The term “supercritical” signifies that when solvents are exposed to extreme pressures and temperatures, they fluctuate between intermediate states of solid, liquid and gas.
- **Separation** – CO₂ extraction separates individual compounds in the cannabis plant during the extraction process, eliminating the need for additional purification.
- **Condensation** – Once the extraction is complete, the CO₂ is condensed into a liquid form and may be reused for further processing in the future.

Additionally, both ethanol and supercritical CO₂ separate cannabis oil into its individual components and make it possible to extract more of a specific cannabinoid.

So, for example, you could extract 70 percent cannabigerol (CBG), with the remaining mixture containing other cannabinoids, terpenes, etc.

What Happens After CBD Extraction?

The extraction process may take some time, but once the oils have cooled, you're left with high-quality pure CBD extract.

CBD extract is highly versatile and can be used in the following ways:

- **Concentrated oil** – Once the pure CBD is isolated and extracted from the hemp plant, it can be mixed with a carrier like coconut oil, making CBD oil. This oil can be ingested in a variety of ways and offers a convenient and portable option for those looking for CBD on the go. A few drops and you may begin to experience a health and wellness boost.
- **Gummies** – CBD extract can be turned into chewy, delicious gummies that provide a fun and casual way to enjoy the effects of CBD.
- **Chewables and tablets** – For a quick and simple way to chew up your CBD, you can explore tablets. Think of them as a way to find daily benefits from CBD quickly and simply.
- **Topicals** – When combined with various topical ingredients, CBD extract can form a relieving balm that may be applied to your skin to assist with various discomforts or to encourage energy and stamina.

Additionally, CBD extracts may come in three distinct forms, including:

- **Full-spectrum** – For those interested in ingesting all the cannabinoids (THC, CBD, terpene) and other natural compounds

in the hemp plant, full-spectrum CBD is your best choice. All of these components may work together to provide an “entourage effect” — a powerful synergistic experience for some CBD users.

- **Broad-spectrum** – Broad-spectrum CBD is further refined in the CBD extraction process to remove all THC. Broad-spectrum contains 80% to 90% CBD, no THC and a reduced level of other cannabinoids. A great choice for those concerned about THC levels.
- **CBD Isolate** – This THC-free alternative is made by isolating CBD and then refining it into a single compound, which results in a nearly 100% pure CBD compound. CBD isolates are mostly found in a tasteless crystalline form.