MEDXtractor

The six most important aspects of efficient CO2 cannabinoid extraction:

1. *Decarbing* - this is a method of significantly enhancing the solubility of cannabinoids in CO2;

2. *Ratio of bud to trim* - cannabis can be very "oily" and can clog the system faster than other types of extract. Trim is mixed with bud to minimize clogging;

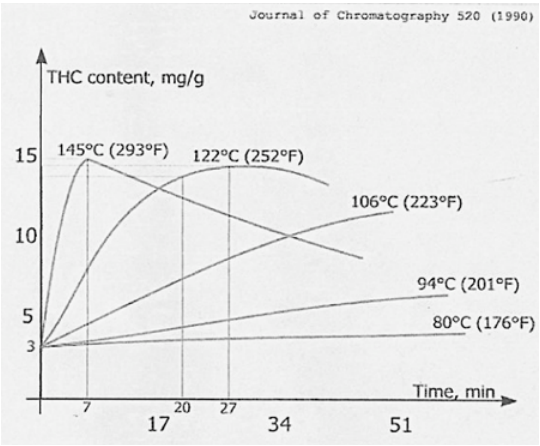
3. *Grind* - CO2 needs the right amount of porosity (holes between particles) and permeability (connection of holes to other holes) to maximize extraction efficiency;

4. *Column Loading* - flowing CO2 will take the easiest way through the raw material. It will find a "channel" and follow it and this reduces contact with potential extract. All CO2 extractors have this issue. To minimize this, the extractor column needs to be loaded in such a manner as to minimize voids;

5. *CO2 Density* - CO2 has certain solvent properties that must be addressed and the amount of CO2 present in the extraction chamber is one of the most important; and

6. *System Cleaning* - oily extracts can clog things up. It is important to keep the system clean.

DECARBING: THC-A and CBD-A are the most commonly existing natural form of cannabinoids. When in the acidic "A" form, they are inactive and you will get little or no effect from them. When cannabis is smoked, the heat converts the *non-active* THC-A and CBD-A to *active* THC and CBD. The active forms are smaller molecules and easier to extract so it is advisable to convert the raw material to the active form before the extraction. This is called "decarboxylation" or simply "decarbing". Decarbing involves heating the raw material for a certain period of time - here is a graph:



Generally speaking, 35-40 minutes at 230-240F will cause a high degree of conversion. A proven decarb procedure is to first enclose a 3/4"-1" thick layer of raw material between two layers of tinfoil - roll the edges of the tinfoil over each other to create a semi-seal, then put it into an oven pre-heated to 230-240F (see the following pics). After 15-20 minutes turn the tinfoil container over and leave it for another 15-20 minutes. Take it out and let it cool. At this point the raw material will be mostly decarbed and dry.

If you are concerned about terpenes loss you may want to decarb in a closed container to prevent the terpenes from escaping. You can put the raw material into a mason jar, twist the top tight, then put the mason jar into an oven at 230-240F for 40 minutes. When removed from the oven and cooled, terpenes will be stuck to the walls of the jar - shake the raw material in the jar to scrub the terpenes back into the raw material. Using this method the terpenes cannot escape and there is little or no smell in the room. When the jar cools, a vacuum can form in the jar making it hard to get the cap off - run some hot water over the jar and use a spoon to pry the lid off. You could also release some CO2 into the jar to displace the oxygen to prevent oxidation of the raw material. CO2 is heavier than oxygen so just open the supply line very slightly to allow CO2 to "flow" into the jar, thereby forcing the oxygen out.

RATIO: Due to the oily nature of cannabis, attempting to extract using only bud as raw material can cause the formation of a hard "cake" in the base of the extractor and this can negatively affect extraction efficiency. Note that the quality of the extract of the trim and the bud from the same plant are genetically-determined and are the same - only the *quantity* varies. It is recommended that extractions use a 50-50 mixture of bud and trim with a bias toward a higher amount of trim at the Extractor base.

GRIND: There are two methods to try. **The first is sieve grinding.** If you can't get 15-16oz into the Extractor the "grind" is too coarse and if 15-16oz only fills the Extractor 3/4 full, the grind is too fine. Hand-grinding the dried, decarbed raw material through a standard stainless steel kitchen sieve provides a good consistency.

The second is hand-grinding. Just grab a handful of decarbed material and roll it back and forth between your hands to break up the material. This will not be as fine a grind as sieve grinding and you will not get as much into the extractor but the results may be preferable for certain types of feedstock. Due to the large variation in feedstock, you have to experiment to see what works best for you.

COLUMN LOADING: When loading the raw material into the Extractor, load approx. 2 ounces of the material, then tamp it light-medium with a long thin tube or rod (a length of 1/4" steel rod will do), trying to keep the tube fill even - don't use a "packer" (such as a broom handle) as this can leave voids. Load 2 more oz, tamp it, etc.. When tamping, the point is to minimize any "voids" (open spaces) in the column as voids can allow CO2 to pass through without full contact with the to-be-extracted compounds.

CO2 DENSITY: Essentially, this refers to the number of CO2 molecules in the extraction chamber during an extraction. Because CO2 is a small molecule it takes many CO2 molecules to surround/dissolve the extract molecules. Very generally speaking, the higher the density, the more effective the extraction. Therefore it is important to achieve a high level of liquid CO2 during the initial CO2 load.

SYSTEM CLEANING: Oily extract can coat/plug the lines and valves causing the system to malfunction. Keep the system clean.

CO2 usage - expect to use 4 to 6 20lb. Supply tanks to extract a 16oz. raw material load. Because there is less oil to extract as the process continues, expect the yield-per-tank to decrease with each tank used. Remember to transfer the remaining CO2 to the cold Recapture Tank before swapping. It is possible to continue to get extract with lower density and/or additional Supply tanks but at some point it's not worth the time to continue and the raw material should be changed. Experimentation is key.

Clarifying - There will always be a small amount of organic material in the extract and a small centrifuge is very useful for "spinning out" raw extracts. First mix the extract with a small amount of alcohol to thin it out. Then centrifuge - 5 minutes at 8000rpm seems effective - then pour the mixture onto an evaporation plate to allow the alcohol to evaporate.

What to do with the depleted material - depleted raw material will still contain cannabinoids. Soaking it in fractionated coconut oil will yield an edible oil - you can experiment with ratios of "raw material to grams of coconut oil" to achieve the desired potency. The resultant oil can be used for edibles.

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