

Introduction

Edibles can be a wonderful method for cannabis patients to ingest their medicine without the harmful side effects of smoking. However, since the material will not be heated by the patient prior to ingestion, it is important that edible makers ensure that their products have been fully decarboxylated for maximum therapeutic activity.

What is decarboxylation?

In living cannabis plants, the cannabinoids are synthesized in an acidic form. This form has little effect on humans and must be heated to lose a carbon dioxide molecule to become active.

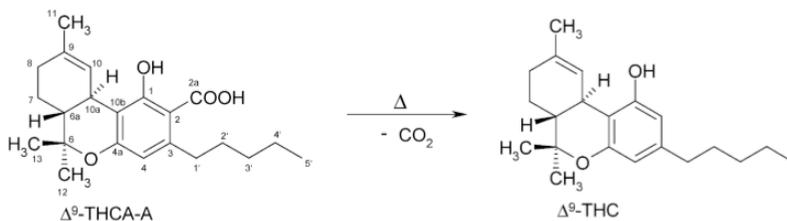


Fig. 1. Chemical structures for the decarboxylation reaction of Δ⁹-THCA-A.

What are the optimal conditions for decarboxylation?

Maximum conversion of THCA into THC has been reported to occur by heating for 15 minutes, at 300 degrees Fahrenheit, which results in a 70% conversion rate. Insufficient heating will result in the majority of the cannabinoids to remain in their acidic form, while excessive heating will result in degradation of THC to CBN or vaporization of the compounds. Cannalytics recommends heating plant material in the oven prior to mixing it with any other ingredients.

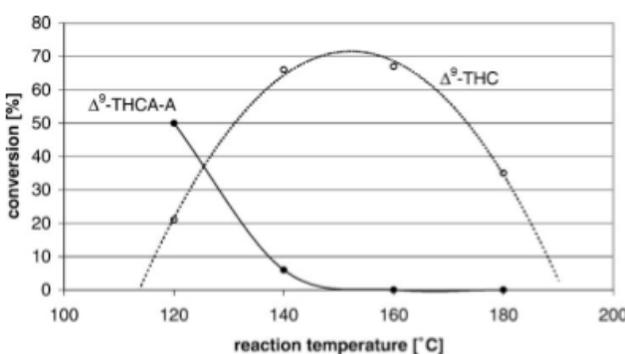
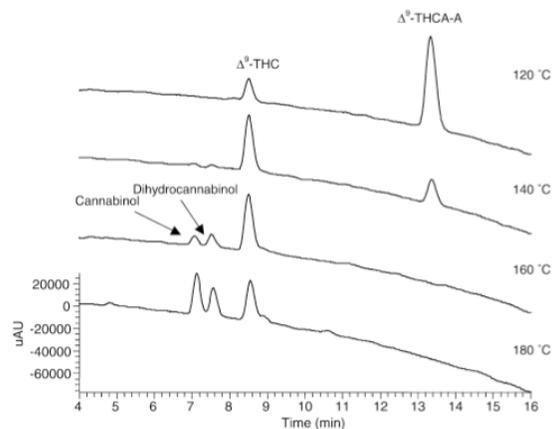


Fig. 8. Conversion of Δ⁹-THCA-A into Δ⁹-THC prior to HPLC analysis.



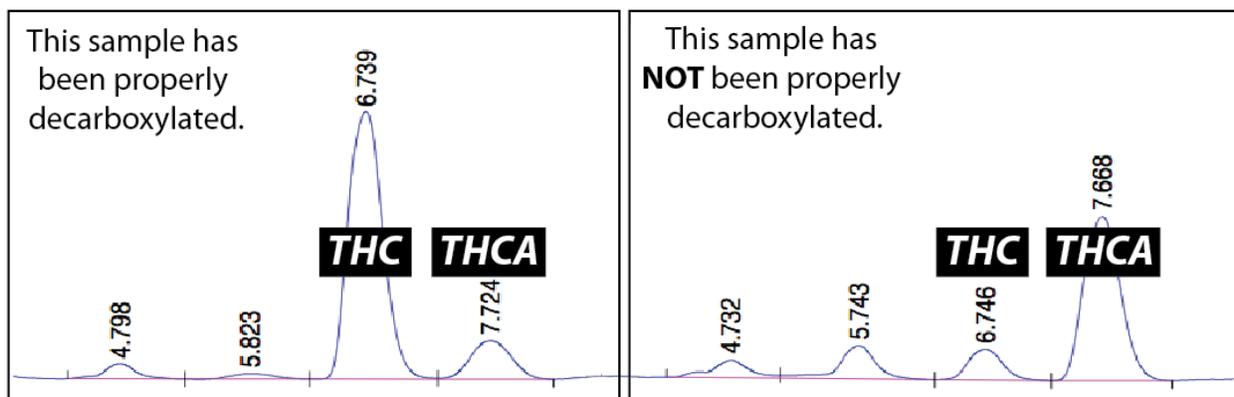
Batching and Dosages

In order for your test results to have maximum relevance, Cannalytics recommends that edibles be made in as large of batches as possible and that each dosage be of the same weight. This will reduce variability in the potency reported for each product allowing patients to better predict how a product will make them feel.

The preferred method for reporting the cannabinoid concentration of edibles is by total milligrams of each cannabinoid present. This is obtained by multiplying the mass of each edible by its concentration (% w/w). Patients may be surprised to see that the average cannabinoid content of edibles is between 30-90 mg, thinking that this is too little an amount to have an effect. Here's an example to demonstrate that this is an appropriate amount. Let's assume that an average joint has a mass of 1000 mg (1g) with a THC concentration of 15%, meaning there are 150 mg of THC in this joint. Now consider the fact that 70% of THC is destroyed by combustion, meaning that only 45 mg of THC would remain to reach the patient's lungs. From this example it is easy to see that edibles within the 30-90 mg range would indeed be at a therapeutic concentration.

The Advantage of HPLC

Because our high-pressure liquid chromatography method does not involve heating the samples for quantification, we are uniquely positioned to distinguish between products that have been properly decarboxylated prior to analysis from those that have not. The chromatograms below are examples of edibles that we have received to date. You can see the extent of decarboxylation by comparing the relative areas of the THC and THCA peaks.



References

Dussy et. al. (2005). Isolation of d9-THCA-A from hemp and analytical aspects concerning the determination of d9-THC in cannabis products. Forensic Science International; 149: 3-10.

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