



# MAX ION

The cyb/CTM 'Maximum Yield' ATB Salt tek

<https://www.dmt-nexus.me>



# INTRODUCTION

Code Name: '**MAX ION'**

This is a Hybrid ATB (*Acid To Base*) tek developed by cyb and ChemisTryptaMan.

This technique is presented assuming that you already have a working knowledge of extracting, safety etc. and have the necessary equipment.

The tek should be used in conjunction with a pH meter if possible.

It is primarily for use with Mimosa Hostilis Root Bark {MHRB} (*preferably Brazilian*) but should work equally well with Acacia Confusa Root/Trunk Bark {ACRB/ACTrB} and other genus.

Ingredients included are designed to create maximum ionic strength in the solution and so aid greater yield by forcing the entire product out of the plant material.

The ingredients shown are for a starting amount of 50-100g of bark but this tek can be used for any size of initial plant material. {note: Do not just double the ratios per ratio of bark}

A final aqueous layer of 1 -1 .5 litres is desirable so a 1-2 litre glass vessel is advised.

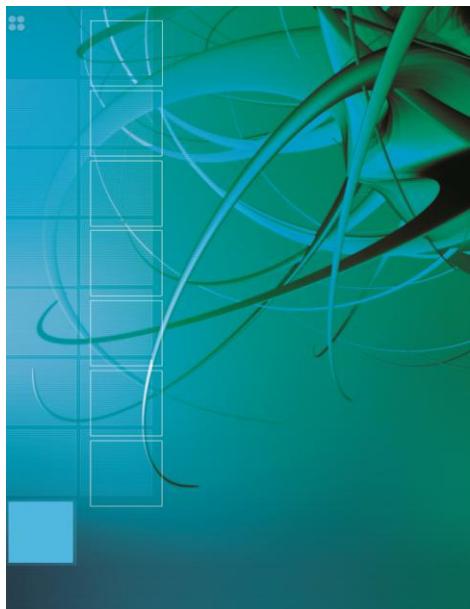
A yield of 3% is theoretically achievable.

*Note:*

There are many variables in bark % (*harvest time/area, heat/drought etc.*) Therefore this yield % is a rough guide.

**Safety measures must be taken at all times.**





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## Prepare - Freeze/Thaw

Place your plant material in a glass container (jar) and cover with filtered water.{appx 300-400ml} {Preferably powdered or shredded bark but with as much surface area as possible}.

Heat this mixture lightly in a water bath for about an hour.

Return to room temperature and then freeze.

As soon as it is frozen, take out, thaw and refreeze (x3)

## Acidify

1. Transfer material to your glass extraction vessel and add a small amount of distilled vinegar OR ascorbic acid (vit C) OR citric acid to a minimal amount filtered water (approx 50ml) and the pour into the vessel.

A target pH of 2-4 is desirable.

Place the vessel in warm (*not hot*) heat bath for minimum of 8 hours.

{*low heat, the glass vessel should be able to be handled without burning*}

## Defat

*This stage not necessary when using MHRB but is advisable if using ACRB or ACTrB.*

2. Cool to room temperature and Defat (add) with a small amount (50ml) of warm, light Naphtha. Shake up a few times, then remove Naphtha and dispose of it.

## Salinate (adding salt)

3. Add apprx1 litre of Salt solution (*using HOT filtered water*) to the acid soak. {*more if the initial bark material is greater than 100g*}

Using appx.70-80g of NaCl (Salt), first dissolved in minimal hot filtered water (approx 200ml) and topped up to make final amount.

## Base

4. Dissolve apprx 40g of NaOH (Lye) in a minimal amount of COOL filtered water (approx 100ml) and add to the acidic/saline mix.

*A pH of 12+ is desired, so add more if necessary.*

5. Warm the mix in the heat bath for 2 hours  
(stir occasionally)

{*Low heat, the glass vessel should be able to be handled without burning*}

6. After 2 hours, cool to room temperature.

## Pull

7. Add minimal amount of 'warm/hot' NPS (*Non Polar Solvent*) (*Light Naphtha or Heptane/Hexane*) Immediate mix/shake before temperature equilibrium occurs.

8. Settle to allow for separation and repeat mix/shake x 3 (*transfer should be fairly rapid*).

9. Pull Solvent from the mix and store in jar.

Allow the solvent to cool to room temp then store in fridge to aid in crystal forming.

10. Repeat Pulls x6 (with warm/hot NPS)

Combine the pulls with the NPS in the fridge .

11. When all done evaporate down the combined NPS using a cool fan by around 40%, or until Milky. {showing full saturation}

## Freeze Precipitate

12. Freeze total NPS in small Pyrex flat bottomed dish with a lid or cover.

@ > -6deg for 12-18 hrs.

13. Decant NPS and Store in a jar for the next extraction.

{*NPS can be washed with water to remove yellowing*}

14. Immediately dry crystals with 'Cold Fan' for at least 20-30 minutes.

15. Scrape.

## Re-Crystallization

16. If necessary, Re-x using hot Naphtha or Heptane/Hexane.

17. Immediate fan dry after the freeze (20-30 mins), Scrape and collect.

# Why?

## Freeze Thaw

- i. Cover your plant material with filtered water.  
{Preferably powdered but with as much surface area as possible}  
The ionic strength is then certain to be higher inside the cells and they will absorb a lot more of the water by diffusion. Filtered water has a higher ionic strength than other types.
- ii. Heat this mixture lightly for about an hour  
This is to soften the cell walls and allow for maximum water build up inside the cell walls.
- iii. This is then to be frozen and thawed several times.(x3)  
This will cause the already swollen cells to burst and free the alkaloids from within them.

## Acid Soak

The solution should be maximally concentrated with bark and acid for the long acid cook therefore just covering the material with acidic water.  
Optimally the solution would still flow easily so around 300-400ml Filtered Water should be used  
This should assist the lysing of the cells  
Also this will convert the molecule in solution to salt form.  
The proteins in the plant will break apart in either acid or base as long as it is being heated. The reaction mechanism is actually the same either way; it just changes the order in which the electrons move around.

## Defat

This is done to remove any undesirable fats and other plant material leaving the molecule in solution before the basing stage (*the molecule won't be taken up by the NPS as it is still in salt form.*)  
Ideally you do the defat and the pull with the same solvent.  
A defat is not exactly about getting rid of ALL the fats, it is about getting rid of whatever fats (*again, NOT ALL*) can dissolve while your alkaloid is in salt form, meaning that when you freebase, only the freebase will be available to be picked up by the solvent (as the same solvent will have removed the rest during the defat)

Defat is not really necessary for MHRB as there is very little fat present but is a good idea for ACRB/ACTrB.

## Salt

Adding a highly saturated salt solution to the mix to gives a high ionic strength to the solution and is more likely to form 'clumps' of molecules and help to push the product out in the first 2-3 pulls.

## Base

The addition of Lye (*NaOH - Sodium Hydroxide*) adds to the ionic strength of the mix. It changes the order in which the electrons move around and raises the pH to the desired value of around 12.  
This turns the molecule from salt form to freebase form which can be retrieved using Non Polar Solvent.

## Non Polar Solvent

This is your means of extracting the molecule from the aqueous layer and 'pulling' it away to be precipitated into crystal (or Goo) form later.

Generally more product can be held in warm or hot solvent and cannot be held in cool or cold solvent.  
This is why freeze precipitation works...the colder the solvent the more the product will want to crystallize and 'crash out' of solution.  
This is also why the product will want to re-dissolve back into solution as the solvent warms up towards room temperature and beyond.  
A cool fan drying of the product will aid in evaporating the solvent before higher temperatures can be reached.

## Re Crystallizing

Re-X is performed to further rid the product of plant fats and undesirable alkaloids.  
This will clean the product and hopefully result in nice white crystals.

### **note:**

## Disposal of used ingredients

Lye and plant material can be flushed away as lye is primarily used as a drain cleaner.  
Solvents can be evaporated to collect whatever traces may be left behind  
OR  
{Preferable} Re-used for the next extraction.  
A wash with water can be performed to clean up the solvent further.  
Solvent can be reused *ad infinitum*.  
Store in a jar with a lid...but be aware that temperature changes can cause the solvent vapour to expand in the jar...so regular release is advisable.

# The Chemistry of Extraction

By ChemisTryptaMan

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## 1) Solubility

## 2) Partition Coefficients

## 3) Ionic Strength

## 4) Acid/Base Chemistry

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### Solubility

Solubility is the extent to which a solute (*anything being dissolved*) can dissolve in a particular volume of solvent (*the liquid holding the solutes*)

In a chemistry classroom what they will tell you is that 'likes dissolve likes'.

This refers to the polarities of the molecules that one is attempting to dissolve. In general, non-polar molecules will dissolve in non-polar solvents (*oils*) and polar molecules will dissolve in polar solvents (*water*).

This is why oil and water don't mix. The molecules of each are not soluble in each other, so they won't mix.

The term miscibility is usually used for liquid-liquid situations, like ethanol being completely miscible with water means that they can be mixed in any proportion and it will form a homogeneous mixture. The truth of the matter is that oil and water do mix, just in such small amounts that we can't see it.

As far as extraction goes, this means that there is some amount of naphtha in the water, and some amount of water in the naphtha. This is because at low ionic strengths (*more on this later*) most of the water molecules are neutral and do not repel the non-polar molecules as strongly as strongly as a fully charged ion in solution. Spice can exist in different forms that have different solubility in both water and naphtha. Solubility in both will increase at higher temperatures, as this is the case with most solutes and solvents.

Higher temperatures mean higher solubility.

### Partition Coefficients

Partition Coefficients are a measure of how a solute will behave in a biphasic (2 layered) liquid system. These have values that are given in terms of the concentration in the non polar layer divided by the concentration in the aqueous layer.

The standard solvent system, which most literature values are given, is for an octanol/water system. The goal when performing these extractions is to get the highest Partition Coefficient for the DMT so that most of it will end up in the non-polar layer (*naphtha*).

This process of finding the optimum PC is different for every solute in every solvent system.

We are mostly working with freebase DMT in a naphtha/water system. We do this by attempting to decrease the solubility in the water layer while increasing the solubility in the naphtha layer.

How can we do this? Well heating the entire solution will increase the solubility in both layers, to different extents, but the bottom line here is that you want the bottom layer to be cool when your pulling the spice from it, so if you're going to use temperature your best option is to heat the naphtha before adding it to the cool (*room temp*) water and mixing as much as possible before the temperature equilibrate (*which happens within seconds*).

There is another way to achieve our goal though, and that is by increasing the ionic strength of our aqueous layer in order to decrease the solubility of the spice in the aqueous layer. This also has the added benefit of decreasing the solubility of the water within the naphtha and the naphtha in the water, which is why adding salt results in less emulsions forming at higher ionic strengths, a more complete separation of the two layers is achieved.

### Ionic Strength

Ionic strength is essentially a measure of how much charge is present in a solution. It has a value that is calculated by taking the concentration of every solute in solution, raising that concentration to its charge, and then adding these all together. This means that molecules with more than one unit of charge have a much greater effect on the ionic strength.

Calcium and Magnesium both have a charge of +2, while sulphate and phosphate ions have varying charges based on the pH of the solution, but at the high pH's that we run the extractions at they carry a charge of -2 and -3 respectively.

pH plays an important role in ionic strength for reasons we will get into momentarily.

I don't like to encourage the use of distilled water, I prefer filtered water and for this reason alone, distilled water has had its ionic strength lowered to the lowest possible level intentionally, what you are buying is de-ionized water. With filtered or spring water you have removed anything that might be harmful to the process and are left with a plethora of ions such as sodium, potassium, chloride, magnesium, calcium, and many, many more. I understand the desire to start with distilled water but from a chemists perspective it is not really necessary and may actually decrease your yield if a high enough ionic strength has not been reached.

### Acid/Base Chemistry

Alright, so this is where I want to begin with the two different forms of DMT.

These are the Salt and the Freebase forms.

The only difference between the two is that in the salt an extra hydrogen nucleus (*proton*) has been attached to the molecule at the amine (*where the nitrogen is located*). This makes this form have a charge of +1 at the Nitrogen.

The charge is actually spread out over the atoms surrounding the nitrogen, but most of the charge is located right on the added proton. The rest of the molecule is still very non-polar and hence still quite soluble in the naphtha, but the charge has a powerful effect on the solubility in water because water can easily dissolve charged molecules, even when they have a large non-polar region. Every molecule that can either receive or give up a proton will exist in the two different forms with different pH's determining what state that molecule is in.

This switch from one form to another happens around a particular pH for each molecule. For DMT, this pH (*known as its pKa*) is around 8.5.

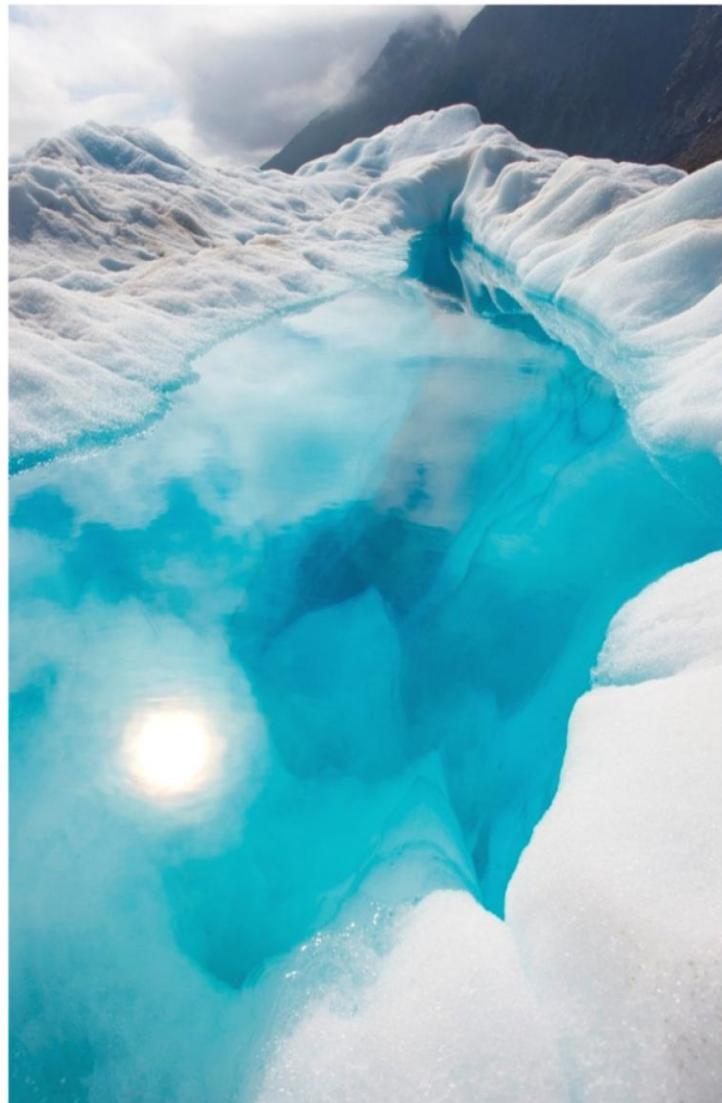
When a molecule is dissolved in a solution where the pH is equal to its pKa, exactly 50% of the molecules exist in each form, so in the case of DMT a pH of 8.5 will cause the DMT molecules to be 50% freebase and 50% salt. Moving one pH unit higher will make the proportion (around 90%) freebase to salt. Two pH units above the pKa (10.5), and 99% of the molecules will be in freebase form. At 11.5, 3 pH units above, 99.9% will be in freebase form and so on. So a pH of twelve is really a desirable level for the extraction.

This topic is also relevant to increasing ionic strength using the protein that is present in the plant material being used. A protein carries a charge of -1 at extraction pH levels, but when a protein is heated for several hours under heat in the presence of either acid or base as a catalyst, it will break apart into its constituent amino acids, which will each have a charge of -1 at the high pH levels being used.

This could potentially have a drastic effect on the final ionic strength of the aqueous layer but I have not yet tried it myself.

The pKa where most amino acids gain a charge of -1 is around 10-12, so even higher pH's will ensure that a full charge is gained by every molecule where a charge can be gained. Some molecules with amine groups like DMT itself will actually lose a charge of +1 and become neutral, but since we are already working at high pH's this effect should be negligible. There are other topics that need to be covered, like crystallization, but really the most important thing here is that by reducing the volume of your pulls you are raising the concentration of spice in the NPS used. When you put your pulls in the freezer you are decreasing the solubility of the spice in the NPS and forcing the crystals to crash out.

END.



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