Cocaine extraction from Coca Leaves

Reagents Needed:

Kerosene
Solid Na_2CO_3
Distilled H_2O
H_2SO_4 5%
Solid $KMnO_4$ (6% Solution is used)
NH_4OH 10%
HCl 37%
Acetone
Diethyl Ether

Note: The pictures were taken from 2 extractions performed with ~2Kg and ~5Kg of leaves, but all the procedure outlined refers to the latter.

Procedure:

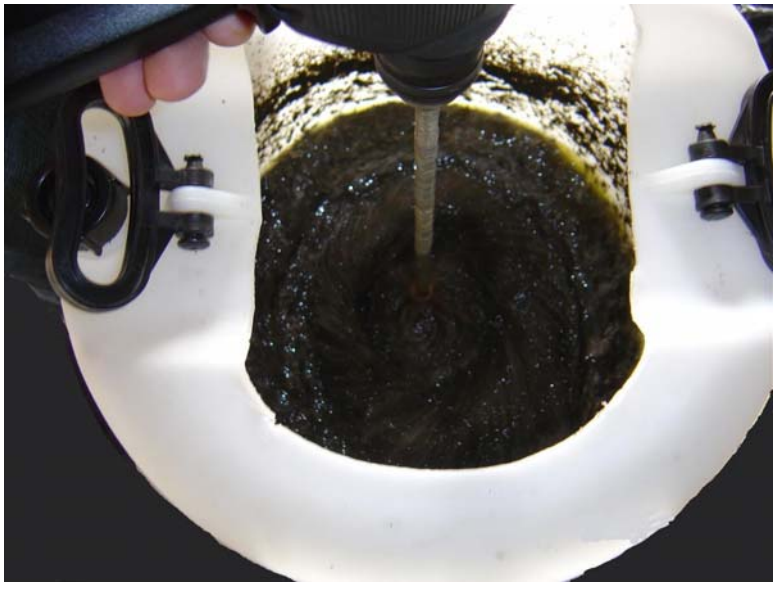
5 kilo bags of coca tea were opened bag by bag and the content was put in a bucket.

A solution of containing 900gr of Na_2CO_3 dissolved in 9,5L was prepared.

4,750 grams of dried crushed coca leaves were mixed with this solution, using 1900ml of solution for each kilo of leaves. The mixing procedure was carried out in small batches of 500gr to distribute the water evenly. The leaves don't get too wet: water hardly comes out if you squeeze a handful.

All the moistened leaves were put in an open top 50L container. 30 more minutes were waited and then 25L of kerosene were added to the container.

The mixture was left for 3 full nights (totalling ~60hours) and during the course of the 3 days it was stirred at least 4 times in sessions of about 10-15mins using a drill mounted with that tool used by plasterers/decorators to mix buckets of paint with water.



After 3 nights the kerosene was separated from the leaves (no water layer forms). The procedure was carried out this way: all the kerosene on top was poured out in another 50L container filtering it with some nylon stockings to prevent leaves from getting into the receiving container. The remaining leaves were put, little by little, in a bucket with holes on the bottom while squeezing the

kerosene out into a receiving bucket under the one with holes (a nylon stocking was used again between the 2 buckets). All the kerosene was the poured in the other 50L container.

A 5% w/w solution of H_2SO_4 was prepared (this passage was done earlier).

2 extractions with 5% H_2SO_4 were performed. The first one with 300ml the second with 100ml. Each time the container was shaken very hard (some emulsions form but almost nothing) for 30 minutes and allowed to separate. The acidic water layer on the bottom was recovered each time using the old suck into the tube trick: the container was put 1 meter above ground, tilted 45% then a Polypropylene tube attached to a rod was driven inside the container to point at the lowest possible spot inside the container and some sucking was performed on the other end of the tube. The H_2SO_4 started to come into a receiving container along with some kerosene as well towards the end. The 400ml of H_2SO_4, that we should call ‘agua rica’, and some kerosene were put in a 1L sep funnel and let sit for ~30 minutes then separated. The emulsion was filtered and some more agua rica was recovered.

A solution of 6% KMnO4 was prepared and chilled in the fridge (this passage was done earlier).

An ice bath was prepared and the beaker containing the agua rica was put there to chill until the temperature reached 4-5° C. The colour of the liquid is reddish brown like red beer.

Every 5-10 minutes 16ml of the KMnO4 solution were added with vigorous stirring. 8 additions were made, totalling 128ml. After the last addition 30 minutes were waited and then the solution was filtered.

MnO2 stayed on the filter and the resulting liquid (oxidized agua rica) is now fairly colourless.

A 10% w/w solution of NH4OH was prepared (this passage was done earlier).

An excess of this solution was slowly added until ph ~10. This passage was done very carefully making sure ph do not rise above 10 since it would damage the alkaloid.

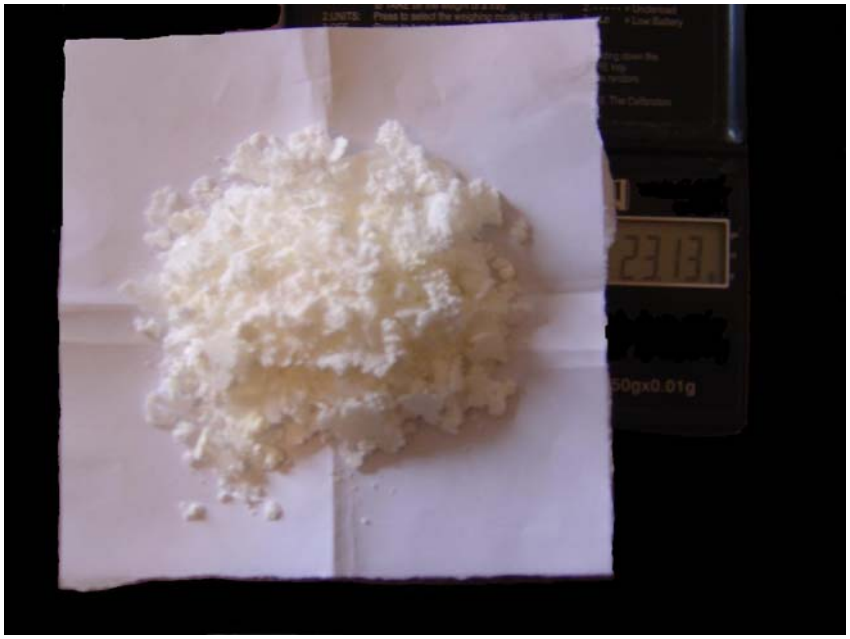
The Cocaine freebase starts precipitating and after about 20-30 minutes the solution was filtered. A lot of material was also stuck on the stirring rod and on the beaker.

Everything was let dry overnight and some more drying was performed the morning after in the oven.

The resulting material was dissolved in ~100-150ml of ether in the same container used the day before (the one with a lot stuck on the sides) and most of it dissolved but some dark brown goo that stayed on the bottom (probably still a little bit of water and some inorganic salt); so little anyway that it was not difficult to pour all the ether on a Pyrex baking dish to evaporate without pouring the goo, that basically stayed glued to the bottom wall of the beaker.

Once evaporated a very nice crystal formation was noted and the white freebase was recovered with the aid of a razorblade and weighted 23,13g.

Yield (Cocaine Base): 23.13g Cocaine Base / 4750g leaves = 0.48%



240ml of acetone were dried with anhydrous potassium carbonate and an equimolar quantity of HCl (6.58ml) was calculated and added to it. The calculation was done considering that only 230ml were going to be used.

The freebase was dissolved in 240ml of ether and the acetone/HCl solution was added with stirring the beaker was capped with cling film to prevent solvents from evaporation. After ~30 minutes some more stirring was performed and the some more acetone/HCl was added drop wise until there was no more visible reaction (this can only be done when the solution is let sit for a little bit and is clear and not milky, as you would not notice it).

3 hours were waited and the solution was filtered. The filtrate was dried and weighted 24,14g.

Yield (Cocaine HCl): 24,14g Cocaine HCl / 4750g leaves = 0.5%

The process can be easily scaled down with the only precaution of using more H2SO4 than the proportional equivalent since it would be very impractical to use less than 50 ml in a 2 phase extraction. Just bear in mind that the more H2SO4 you use the more Cocaine base you lose when you precipitate it with ammonia (0,17g every 100ml) even though the loss is reasonable to consider 2 extractions of 70ml and 50ml for 500-1000gr of leaves.