Extraction of Nanocellulose from Bagasse

*Procedure undertaken thus far in the pursuit of extraction of CNC from bagasse:*

The following steps briefly describe the steps undertaken in the extraction of cellulose from bagasse:

* The Bagasse feed from after extraction of juices was selectively dried using a hot air oven at 105oC for 4 hours. This produced dried bagasse.
* The dried bagasse was then finely ground using a kitchen mixer until a fine fluffy flour of pulverised bagasse was obtained. This was then sieved using a BSS 60 mesh and hence the particle size of >250 microns was selected for the procedure.
* 99.5g of bagasse powder was then boiled with water for 2.5 hours in deionized water to remove components that might interfere with the extraction of cellulose such as waxes, sugars and dirt. Upon boiling, the suspension was allowed to sit for 12 hours.
* The waster was then separated using a combination of filtration and decantation.
* The obtained bagasse was then dried using a microwave oven. The basic procedure that was repeated in drying composed of 2 steps i.e. (i). Heating for 1 minute and (ii). Agitation of the bagasse lumps using a glass rod.
* The result was super fine bagasse powder which was then further pulverised, but the attempt was futile since the powder could not be further reduced in particle size by using a grinder.
* To this powder, 16% NaOH was added in a ratio of 10:1 (vol:wt) and the reaction mixture was then left for constant stirring on a heating mantle at 65oC for 4 hours.
* The mixture then contained extracted lignin, remaining sugars and suspended cellulose.
* The cellulose was then filtered out of the reaction mixture and was washed several times with deionised water.
* To finally oxidise any remaining impurities, the mixture was treated with H2O2. 400ml of 30% H2O2 was diluted in 400ml of deionised water. Then extracted cellulose was transferred to a 1L flask (along with the minute amount of moisture) and the reaction was allowed to proceed at room temperature with constant agitation for 1hour.
* The result was a white suspension. Finally, cellulose was extracted out of this reaction mixture and then was several times with deionised water.
* *The extracted cellulose was then dried again using a microwave oven with the same protocol for drying as above.*
* *The obtained cellulose was then pulverised again in order to remove lumps of cellulose and finally a fine powder was obtained.*