

WATER PURIFICATION USING NATURAL PLANT FIBERS

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Summary

Our project utilized readily available local materials- coconut (*Cocos nucifera*) husk and costus plant (*Costus afer*), to purify water for domestic purposes. The fibers of coconut and *Costus afer* plants were used to purify dirty/impure water obtained from shallow wells from Etim Ekpo Local Government Area of Akwa Ibom State, Nigeria. The purification process was more efficient when the fibres from the coconut plant were placed between the leaf fibres and the stem fibres of the *Costus afer*. This was because the coconut fibers removed the chlorophyll from *Costus afer* leaves. The filtrate has a characteristic colourless nature due to the fibers ability to absorb metals with the hydroxyl group (OH) present in them. This project could be scaled-up for use in community water treatment.

INTRODUCTION

Though Nigeria is blessed with abundant water resources, potable water is a scarce commodity in most rural areas of the country. This is largely because the cost of installing modern water treatment facilities is not affordable by rural dwellers. This accounts for the record of high prevalence of water related diseases among the rural poor. Coconut (*Cocos nucifera*) and *Costus afer* both have natural water purification capabilities. Coconut absorbs soil water, purifies and mixes it with internally synthesized glucose to produce the coconut juice stored in the fruits. On the other hand *Costus afer* absorbs soil water purifies it and stores it in its stem. Both plants have enormous cellulosic fibres. Some plants have been employed to remove metals from water. This process is known as phytoremediation.

The aim of this project is to employ readily available and affordable local materials (natural fibres) to purify water.



Plate 1 : Coconut tree with fruits

Plate 2 *Costus afer* plant

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METHODOLOGY

Fibres from the husk of coconut (*Cocos nucifera*) and *Costus afer* were extracted and pounded into fine particles. The various fine particles were arranged in layers in a filtration funnel such that the *Costus afer* fibre is at the top, while the *Cocos nucifera* fibre below.

Water contaminated with particles and various metals was poured into the filtration funnel and the filtrate is collected in a conical flask.

Chemistry of the purification process.

Fibers are cellulosic substances. Cellulose is a large polymeric carbohydrate with many hydroxyl (-OH) groups which is capable of binding metals.

RESULT

The final filtrate obtained was a crystal clear water which is colourless, odourless and tasteless. Metal analysis on the filtrate using Atomic Absorption Spectrophotometer showed that the fibres removed a reasonable amount of metals from the contaminated water.

CONCLUSION

A blend of a ground mixture of coconut fibres and *Costus afer* fibres is a good filtration material for impure water. This method is environmental friendly, cheap and sustainable. If this project is scaled up, it is capable of solving the potable water challenges of rural dwellers.