Reusing of Coconut Fiber and Used Vegetable Oil and the Application of TiO2 Nanotubes in Air Filter

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The project arose from the assumption that the reuse of waste cooking oil is insufficient; oils have low solubility in aqueous medium, causing pollution and suffocation of aquatic life. I also verified that in my country (Brazil) are produced about of three million tones of coconut residue per year, so I began a project to process the sustainable disposal. The project, from a qualitative perspective, reaches three strands: environmental, economic and social. The methodology starts in residences, where the oil is collected. Green coconut barks of the Cocos nucífera L. species were also collected, which have the mesocarp triturated to obtain the powder. This powder receives the waste vegetable oil and the product is exposed to the sun to reduce moisture. The biomass obtained has a high calorific value and can be used as fuel for boilers or cylindrical format compressed. As a final step, I developed a prototype air filter with conventional filtration steps resulting from burning gas, adding a top internal coating with titanium dioxide nanotubes, which performs a chemical reaction turning gaseous pollutants to non-harmful. Analysis shows that the biomass obtained has three times more calorific value, when compared to wood extracted from the native forest. The TiO2 is able to degrade molecules like CO2, CO, SO2, NO, NH3 and H2S. Process costs are reduced due to the high availability of inputs (waste vegatable oil and coconut fiber) and the efficiency of TiO2 nanotubes that even after ten cycles of chemical reactions continue with approximately 90% of its photocatalytic capacity.

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