Design and Development of Rice husk enabled Filter as Point of use Water Purifier

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**Abstract**

Ceramic candles are a popular method of water filtration, and they can be made using a combination of materials, including rice husk, wood dust, sand, and black clay. These materials are readily available, cost-effective, and environmentally friendly. To make a ceramic candle using these materials, initially to prepare the clay. Black clay is the most suitable type of clay for this purpose, and it can be sourced from local markets or clay deposits. Once the clay is obtained, it needs to be thoroughly cleaned and processed to remove impurities later on the other materials need to be prepared. Rice husk, wood dust, and sand should be washed and cleaned to remove any dirt or impurities. To the increase of ceramic candle efficiency of water treatment, AgNO3 nanoparticles are add, to remove the smaller organic compounds and pathogens from the waste water. Raw materials are used in this work, it will be fillers to create a porous ceramic structure. After the materials were prepared, they can be mixed together to make the ceramic candle. The exact proportion of each material will depend on the desired properties of the final product, such as porosity and strength. Generally, a mixture of clay, rice husk,wood dust, and sand in a ratio of 2:2:;1:1 is recommended. Once the materials are mixed, they need to be molded into the shape of the candle. The candle can be made using a candle mold or hand-formed into the desired shape. The mixture should be packed tightly to ensure that there are no gaps or air pockets. The molded candle needs to be dried and fired to create a hard, porous ceramic structure. The drying process involves air-drying the candle for three days to remove most of the moisture content. After the candle is dry, it was fired in a furnace at a temperature of around 900-1000°C for several hours to harden the ceramic structure. After the firing process, the ceramic candle is ready to be used as a water filter. To ensure that the filter requires safe for use for drinking level, it must undergo rigorous testing and characteristics. This typically involves evaluating the filter's performance under an analysis of FTIR, UV-Vis, FESEM, and EDX study, including the determination of the different water parameter analyses. The pore size of the candle made by using this study was proved by FESEM analysis. So, most of the unwanted particles and impurities are not permitted on these pores except by drinking water standards. It works by allowing water to pass through the porous ceramic structure while trapping impurities such as bacteria and pathogen. The filtered water can be collected in a separate container. In this study, ceramic candles made from a combination of rice husk, wood dust, sand, and black clay are a cost-effective and environmentally friendly solution for water filtration. These materials are readily available and can be easily processed to create a porous ceramic structure. By following the steps mentioned above, in this study a high-quality ceramic candle that provides safe, filtered water for drinking and other uses.

**Keywords:**Rice husk, Nano ceramic, Silver nitrate, Organism pollutants, Cartridge filter.