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UTILIZING COIR (COCOS NUCIFERA) FIBERS AS EFFICIENT HEPA FILTER FOR A SUSTAINABLE MICRO-POLLUTANT AIR PURIFIER

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ABSTRACT

Air quality has been a major concern in the Philippines, harming the respiratory health of all Filipino citizens. Air purifiers are currently being utilized to mitigate this problem, however the HEPA filters used are impractical. With this, the researcher conducted an assessment of an air purifier that utilizes Coir (Cocos nucifera) fibers as a sustainable and efficient micro-pollutant air purifier. This study revolves around minimizing the presence of TVOC (Total Volatile Organic Compounds), CO2 (Carbon Dioxide), and the total amount of Formaldehyde in the air. The experiment was conducted in a controlled 2.71 m × 3.05 m room where the set parameters were measured for 15 minutes every 30 seconds acquiring 31 data sets per group. The results showed a significant decrease in all three pollutants: CO_2 levels dropped from an average of 445.87 ppm to 422.65 ppm with a p-value of less than 0.05, the amount of formaldehyde decreased from 0.0021 mg/m³ to 0.0010 mg/m³ with a p-value less than 0.001, and TVOCs decreased from 0.0096 mg/m³ to 0.0015 mg/m³, with a p-value less than 0.001, further demonstrating the purifier's capacity to improve air quality. The study proves the claim of decreasing levels of formaldehyde, TVOC, and CO_2, the micro-pollutant air purifier

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significantly enhancing indoor air quality. According to the results, coir-based air purifiers are an environmentally friendly way to enhance household air quality, especially in areas with low air quality.

Keywords: *Coir (Cocos nucifera), Air Purifier, Total Volatile Compound, Carbon Dioxide, Formaldehyde, Air Filter*