

ECOPROPYLENE: UTILIZATION OF DISPOSABLE MASKS INTO COMMERCIAL PLASTIC

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ABSTRACT

The researchers conducted a study to determine if disposable face masks can be utilized as commercial plastic. The study was designed to primarily: (1) determine the time obtained for the 3-ply disposable masks to reach their melting point using the (a) open-heat stove method and (b) closed-oven method; (2) determine the numerical data accumulated from the individual durability trials of the EcoPropylene in terms of (a) tensile test; (b) three-point bending test; and (c) free-fall drop impact test; and lastly (3) determine the recommendations/ suggestions of recycling experts and organizations pertinent to the improvement of ECOpropylene. Information and research data gathered were primarily through experimentation, observation, and interview. The researchers used a mixed method approach. The study was conducted in Calamba, Laguna; the experimentation was held in one of the researchers' residences in Calamba. Two techniques in melting masks that were performed were the open-heat stove and closed-oven method to determine which technique is best in melting the disposable masks the fastest. Also, the experiment was arranged in three different tests: tensile test- to determine the flexibility and resistance of the material; three-point bending test- to determine how much weight the material can withstand; and free-fall drop impact test- to determine how much external impact force the material can take. Results showed that the open-heat stove method is the fastest in melting the masks as it gathered an overall average mean of 13.79 minutes after the three trials. As to the study, results showed from the tensile strength test revealed that the plastic made from masks can resist a great amount of stress from being stretched or pulled as it obtained an average mean of $30,832.82 \leq P$ or around $3,144.07 \leq \text{kg/m}^2$. The three-point bending test revealed that the plastic had great potential in supporting heavy loads even without foreign support, with an overall average mean of $23,163.78 \leq P$ or approximately equal to $2,362.05 \leq \text{kg/m}^2$. Lastly, the free-fall drops impact test revealed that the plastic can only be dropped at an average height, which is normal for all types of plastics, as it gathered an overall average mean of <3.67 feet or <3 feet and 8 inches. It is noted that the produced plastic has the capability to resist stress and support heavy loads, but would need further studies as to how to improve external impact force. The said plastic can help decrease plastic pollution but needs further study to determine its safety and sustainability.

Keywords: disposable masks; recycling, tensile strength, flexural strength, mechanical test, tensile test, three-point test, free-fall drop impact test; Calamba City Laguna, Philippines