

Recently, bio composite materials are being synthesized using natural cellulose fibres as reinforcements together with matrix, which have attracted the attention of researchers, due to their low density with high specific mechanical strengths, their availability, renewability, and their being degradable and environment-friendly. The present work attempts to make an improvement in the existing helmet manufacturing methodology and materials used, in order to have better mechanical properties and also enhance the compatibility between fibres and the matrix.

The helmet is prepared using pineapple leaf fibre reinforced into epoxy resin matrix using hand lay technique. First, the pineapple woven fabric is cut to the required dimension and weighed. The interior thermocol of an old helmet is used as the mould for the preparation of our helmet. Based on the dimensions of the fabric, the mass of epoxy needed is calculated, and the woven fabric is wetted in the matrix medium. The wetted fabrics is laid on the mould, prior to this, the silicon releasing agent is applied on the mould for easy removal of the casted samples. The moulds are cured at room temperature for 24 hours and then removed. Post removal, the extra projections are trimmed using a hex blade. The helmets made thus are stiffer than the commercially available helmets. Fabric delamination is observed, and minor wrinkling effects are seen that can be removed during process optimization.

Features:

- This helmet is made from pineapple natural fibre.
- These helmets are stiffer than the commercially available helmets in the market.
- We can save up to 50% plastic usage through these helmets.



# 24 PROJECT

## DESIGN AND FABRICATION OF BIO-COMPOSITE HELMET

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