

## Development of Bio Degradable Packaging Materials from Banana Peels

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### **Abstract**

This study focused on the development of eco-friendly biodegradable packaging materials using banana peels, examining both fiber-based and flexible types. The fiber sheet was prepared with HCl, NaOH, Banana peel fiber, Glycerol, Rice husk, Paper pulp, Straw powder, and Gelatin. The mixture was poured into molds, and dried at  $130 \pm 2^\circ\text{C}$  for 30 minutes. The flexible sheet was prepared with banana peel pulp, Ash plantation flour, Glycerol, Vinegar and Water. Mixture was boiled for 30 minutes, and thickened slurry spread on oil paper as thin layer followed by sun-drying for 2-3 days. Water absorption, moisture content, thickness, grammage and biodegradability of the synthesized fiber sheet and flexible sheets were determined. The mean grammage, thickness, moisture content, water absorption of fiber sheet was recorded as  $14.12 \pm 1.40\text{g/m}^2$ ,  $0.49 \pm 0.08\text{mm}$ ,  $1.70 \pm 1.93\%$  Whereas  $1.39 \pm 0.31\text{g/m}^2$ , and  $0.12 \pm 0.02\text{mm}$ ,  $0.54 \pm 0.20\%$  in flexible sheet. The results showed the both type of materials was insoluble in room temperature for 24 hours after being dipped in water, methanol, citric acid, acetic acid, ammonia, acetone, chloroform, and sulfuric acid. Total degradability was observed with both types of packing materials after 30 days of being buried in soil. Ongoing advancements in material properties and production processes position banana peel-based packaging as a viable and eco-friendly option for a sustainable future.

**Keywords:** *Banana peel, Biodegradable, Flexible packaging materials Packaging material*