

# EFFECT OF GLYCERINE TREATMENT ON THE MECHANICAL STRENGTH OF BANANA LEAVES TO BE USED IN FOOD PACKAGING

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**Abstract:** The pollution is a major drawback in the conservation of natural ecosystems, especially the aquatic habitats. One of the main causes behind this is the plastic items that are used as single-used food packing. The utilization of banana leaves as food wrapping and serving material is an age-old practice that evidences that there are possibilities to develop sustainable packaging materials from banana leaves, which will help in the present context for tackling plastic pollution. The current study aims to analyze the effect of a chemical named Glycerine on the mechanical strength of banana leaves in the path of developing a bio-degradable food packaging material. For this purpose, the fresh banana leaves harvested from Jaffna peninsula were collected, reduced in size, and subjected to treatment with glycerine solutions at two concentrations (25% and 33.3%) for seven days. Each day, the samples of banana leaves were retrieved from the dip, dried for 24 hours at room temperature, and then assessed for mechanical properties such as Load-bearing capacity, Tear resistance, and Hardness. The results revealed that the banana leaves reached optimal mechanical strength through the treatment with 33.3% glycerine for one day, where there was a significant increase ( $P < 0.05$ ) in the load-bearing capacity ( $1.88 \pm 0.08\text{N}$ ,  $2.18 \pm 0.08\text{N}$ ), tear resistance ( $1.90 \pm 0.09\text{N}$ ,  $3.33 \pm 0.26\text{N}$ ), and hardness ( $16 \pm 2\text{N}$ ,  $22 \pm 2\text{N}$ ) of the banana leaves before and after the optimum treatment. The results suggest that Glycerine solution (33%) can enhance the banana leaves' mechanical strength, which may be used as a source for developing bio-degradable packaging materials. Furthermore, these biodegradable packaging materials will support in the conservation of aquatic ecosystems including the cascade system, by mitigating pollution and in the restoration of water quality.

**Keywords:** Bio-degradable; Food-wrapping; Load-bearing; Packaging material; Tear resistance.