

Development of sugarcane trash-based guava covering

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Guava (*Psidium guajava*) is a nutritionally rich tropical fruit widely cultivated in Sri Lanka. However, its marketability is often limited by pest infestations, diseases, and abiotic stress such as sunburn. Fruit bagging is an effective eco-friendly technique for minimizing such damage, but the high cost and non-biodegradable nature of conventional coverings, such as plastic and wax-coated paper, necessitate the development of sustainable alternatives. This study investigated the feasibility of producing biodegradable guava coverings from sugarcane trash, an abundant agricultural residue, enhanced with natural additives. Sugarcane trash was pulped using the soda process with NaOH, and carboxymethyl cellulose was incorporated to improve sheet strength. Extracts of *Azadirachta indica* (Neem), *Aegle marmelos* (Bael), and *Limonia acidissima* (Lawalu) were tested for their water resistance and binding properties. Five paper formulations were produced and assessed for thickness, water absorption, and light transmission. Results indicated that treatment T2 (sugarcane trash with uncooked neem) achieved the lowest water absorption, while T2 and T3 (with cooked neem) provided moderate light transmission, beneficial for fruit development. Preliminary field application on guava fruits showed good wrapping performance and durability under outdoor conditions. Using 50 g of sugarcane trash, eight sheets of paper were produced with modest energy and water inputs, highlighting scalability for small-scale production. This study demonstrates the potential of sugarcane trash-based coverings as a cost-effective and eco-friendly alternative to synthetic fruit wrapping, contributing to waste valorization and promoting circular agriculture in Sri Lanka.

Keywords: *Fruit bagging, Guava covering, Natural additives, Sugarcane trash, Sustainable agriculture*