Production and Evaluation of Cassava Starch, Lime waste and *Aloe vera* Based Edible Film as Food Packaging Material

V. Sivasamalai*, and S. Vasantharuba
Department of Agricultural Chemistry, Faculty of Agriculture, University of Jaffna, Sri Lanka
*sivasamalai15@gmail.com

Production of non-biodegradable plastic packaging is raising global concerns about environmental pollution. The main purpose of this study is to develop and evaluate an agricultural by-product-based renewable packaging material that can replace plastic packaging. The study investigated how different types of lime waste and *Aloe vera* gel influenced the properties of cassava starch-based edible films. Raw materials used in this study included cassava starch (extracted from fresh cassava tubers), dried lime waste flour (obtained from the valorisation of kitchen waste), *Aloe vera* gel (extracted from fresh leaves) and food-grade glycerol. Six different edible films were developed using three types of 1% (w/v) lime waste flour (dried lime peel (P1), dried lime pulp (P2) and a mixture of dried peel and pulp (P3)), with 10% (v/v) *Aloe vera* gel (A1) and without *Aloe vera* gel (A0). Cassava starch (3% w/v) and glycerol (1% w/v) were kept constant across all six treatments. Distilled water was then incorporated, and the mixture was homogenised at 90°C for 30 minutes. Thereafter, the solution was left to cool, and films were produced via the casting method. The resulting packaging materials were analyzed to investigate their properties. P1A0 (lime peel-based film without *Aloe vera*) showed the highest significant polyphenol migration of 94.88 mg GAE/kg of food simulant ($p<0.0001$), exhibited the lowest water solubility ($p=0.035$), and displayed a smooth, pale-yellow microscopic image. Similar, non-significant results were observed for thickness and moisture content ($p>0.05$) across all films and XRD results showed a specific peak at 29.5°, and FTIR showed the presence of hydrogen, C-H, C=N and C=C bonds. In conclusion, the P1A0 edible film delivers promising results for producing an edible film that can function as a food packaging material, while replacing synthetic plastic packaging and promoting a sustainable, eco-friendly solution.

Keywords: *Aloe vera*, Cassava starch, Edible film, Food packaging, Lime waste