

Development of a biodegradable, clear flexible packaging film using *Alstonia macrophylla* leaves

Increasing amounts of packaging waste are discarded in to municipal waste streams in most of the developing countries as well as Sri Lanka. A considerable amount of research has been devoted to the production of biodegradable polymer films derived form natural sources such as protein, polysaccharides and lipid materials to reduce synthetic polymer waste. Therefore this study was also carried out to produce a bio-film using *Alstonia macrophylla* (Hawari Nuga) tree leaves. Leaves were fermented in an inoculated water tank for few days to loosen the cut in film. Films were separated manually to remove the attached debris. Film were cleaned or bleached with three different techniques. These films were pasted together by gelatin with different number of layers (2,3,4) to evaluate their mechanical properties. The effect of leaf maturity was also tested for the ease of film separation and strength. The microorganisms responsible for the digestion of leaf material were also investigated. Physical properties of the films were evaluated using ASTM D-882-91 standard test method.

Bio films produced were flexible, transparent and slightly yellow in colour. Fully matured leaf at the falling stage gave the best quality film. The microorganisms mainly responsible were decomposing fungi; classes Phycomycetes and Deuteromycetes, and Actinomycetes. With the increase of the number of layers in the film, the ultimate tensile strength increased while the transparency of the film decreased. Tensile strength and percentage elongation values of leaf cutin films revealed that they are compatible with other bio-polymer films like corn zein protein and modified soya protein isolate films developed by other scientists. However, the leaf cutin film developed had a lower value of percentage elongation at break than those of

synthetic polymer films like high-density polyethylene (HDPE) and low-density polyethylene (LDPE) etc. Therefore, these films can be used in such applications where elongation is not very important.