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Development of a biodegradable packaging with antimicrobial properties from cassava starch

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Plastic is the most popular packaging material in the world, but it causes serious environmental issues such changes to the carbon dioxide cycle, problems in composting, and increased toxic emissions. Packaging films which are made from Cassava starch with “Heen Maduruthala” extract can be a substitute for this plastic problem as a sustainable solution. This newly developed packaging would be degraded naturally and quickly without causing any harm to the environment. Also this would be an effective barrier for the harmful microorganisms. This study used “MU51” Cassava variety because it is the mostly grown local cassava in Sri Lanka. Packaging films were prepared by a special technique called “casting technique” by using different concentrations of Cassava starch, Glycerol and “Heen Maduruthala” extracts. Some physical and chemical properties of prepared films like moisture, colour and thickness were evaluated compared to a control sample during this research. The addition of “Heen Maduruthala” extract improved the antimicrobial effect of cassava starch films and remarkably inhibited the microbial growth in food samples. According to an analysis, the main responsible chemical compounds for the antimicrobial effect were determined as Eucalyptol and Caryophyllene. There were no compounds that transferred to the food sample from the packaging film which confirmed that there would be no leakages in the packaging film. The developed films showed proper thickness, good extractability, high biodegradability and negligible cyanide content. According to this study we can say that the ordinary packaging systems like cling films can be replaced by this cassava starch based antimicrobial films to reduce the environmental problems and extend the shelf-life of food products.

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