

A Comparative Study on Water Vapour Permeability of Surface Treated Paperboards with Keratin and Gammalu (*Pterocarpus marsupium*) Latex

H. M. I. A. Uduwerella*¹, M. K. Ranasinghe¹, A. R. P. C. C. J. Amarasinghe²

¹*Department of Animal Science, Faculty of Animal Science and Export Agriculture, Uva Wellassa University Badulla 90000, Sri Lanka.*

²*Department of Science and Technology, Faculty of Science and Technology, Uva Wellassa University, Badulla 90000, Sri Lanka.*

Chicken processing industries produce a high amount of feathers as a wastage, which cause disposal problems. Chicken feathers contain a high percentage of keratin; a protein, which shows good resistance towards water. Gammalu latex is a naturally available resource in Sri Lanka, which has high barrier properties. Extracted keratin and Gammalu latex can be applied as a coating on the surface of paperboards for biodegradable packages in order to improve the barrier properties against water vapour permeability, while preventing the environment pollution caused by thermoplastic polymers. Thus, the present studies mainly focused on the extraction of keratin from chicken feathers and develop a coating to paperboards, and compare the properties of that with a coating made of Gammalu latex. Pre-treated chicken feathers were subjected to a feather dissolving, protein precipitation, protein purification and film preparation process. Paperboard (0.25 g cm⁻²) coated with 2% (v/v) Glycerine with Keratin and 2% (v/v) Glycerine with Gammalu latex were used as treated samples. Non-coated paperboards used as the control sample. All samples were stored in a climatic chamber at controlled environment. Water vapour permeability was evaluated under constant temperature (35 C) and relative humidity (65%) for three weeks. Data were analyzed using two-way ANOVA technique in Minitab 17. Results showed significant deference ($P < 0.05$) amongst the treated samples while keratin showed least water vapour permeability followed by Gammalu latex coated paperboards. This study revealed that keratin coated paperboards could be used as an effective packaging material with low water vapour permeability.

Keywords: Chicken feathers, Keratin, Gammalu latex, Water vapour permeability, Paperboards