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Evaluation of Different Flexible Laminates for Preventing the Post Processing Losses of Hygroscopic Foods

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Flexible packing is steadily gaining importance in the packing industry with improved barrier properties and lower cost compared to rigid packing. The objective of this research was to evaluate different flexible laminates for water vapour transmission rate and identify the best suitable material for hygroscopic foods with different flexible laminates, using critical moisture contents of foods.

Seven types of flexible materials namely LDPE, OPP/CPP, OPP/LLDPE, PET/LLDPE, PET/MPET/LLDPE (SL), PET/ALUFOIL/LLDPE, and PET/MPET/LLDPE (SB) were used. Cereal (Rice flour), Condiment (Chilly powder), Beverage (Coffee powder) and Confectionary (Biscuit) were used as hygroscopic foods.

The hygroscopic foods were packed using above flexible laminates and kept under normal environmental conditions. Water vapour transmission rate (WVTR) of different dried foods were measured at absorption phase and desorption phase with different laminates. Initial moisture content (MC) of foods, total weight of packed sample and the area of water vapour transmission was measured.

The value of the WVTR of the flexible laminates LDPE (1.1132g/m^2 /day) and PET/LLDPE (1.2082g/m^2/ day) had higher than others at absorption phase. The lowest value of WVTR was observed in PET/ALUFOIL/LLDPE (0.0041g/m^2/ day) than other triple laminates type such as PET/MPET/LLDPE (SB) and PET/MPET/LLDPE (SL). It could be observed that triple laminate has lower WVTR than single films or double laminates.

Triple laminates had taken longer time period to reach critical MC of hygroscopic foods. Single films or double laminates can be used for rice flour, chilly powder and coffee powder if longer shelf life is not required as it is cost effective.

More suitable laminate type for packing rice flour and chilly powder were identified as any kind of triple laminates and PET/ALUFOIL/LLDPE respectively. Coffee powder can be packed safely in PET/ALUFOIL/LLDPE and PET/MPET/LLDPE (SL). Single laminates and double laminates cannot be used for biscuit which has lowest critical moisture content value.