

Natthapicha Supprathanporn 2010: The Development of Water Resistance Corrugated Board Pallet. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging and Materials Technology. Thesis Advisor: Assistant Professor Tunyarut Jinkarn, Ph.D. 138 pages.

The main objective of this research was to develop water resistance corrugated board pallet by investigating on corrugated board material that was a main structure of a corrugated board pallet. This research focused on physical property, water resistance property and mechanical property of biopolymer coating corrugated board. There were 3 groups of biopolymer coatings observed in this research. The first group was single substance coating that was composed of hydrophobic starch coating, zein coating, stearic acid coating and beeswax coating. The concentration of all biopolymers was set at 1, 2, and 3 percent respectively. The second group was mixed biopolymer coating or emulsion coating that was composed of hydrophobic starch (3%, w/w) - stearic acid (1%, 2%, and 3%) (w/w) and hydrophobic starch (3%, w/w) – beeswax (1%, 2%, and 3%) (w/w). The third group was bi-layer coating that was composed of hydrophobic starch/zein, hydrophobic starch/ stearic acid and hydrophobic starch/beeswax. The results showed that water contact angle of corrugated boards coating with hydrophobic starch, stearic acid and beeswax were increased significantly ($p \leq 0.05$). The contact angles were increased in the range between 3 to 9 percent and this was differed from zein coating that the water contact angle was decreased. For emulsion coating group, corrugated board coating with hydrophobic starch (3%, w/w) and stearic acid coating (3%, w/w) was the only treatment that water contact angle increased significantly ($p \leq 0.05$) with the increment of water contact angle about 8%. For bi-layer coating, water contact angle of corrugated boards coated with hydrophobic starch/beeswax also increased significantly ($p \leq 0.05$) in the range of 2-4 percent. Further studies about mechanical properties of coated corrugated boards were found that, for most treatments, edge-wise resistance was decreased significantly, however, flat crush resistance remain unchanged. Water resistance results of corrugated boards coating with 2% (w/w) hydrophobic starch; emulsion of hydrophobic starch (3%, w/w) and stearic (3%, w/w); as well as bi-layer coating of hydrophobic starch (3%, w/w) and beeswax (1%, w/w) that were kept in warehouse condition of tropical region showed that all coated corrugated board still had good water resistance property throughout four weeks of storage time. Moreover, for these three types of coating, result on mechanical property of coated corrugated board pallet parts via a compression test was acceptable without any significant differences from uncoated corrugated pallet parts.

Student's signature

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