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Dyeing Property of Subtropical Plant Fibers Treated with Sodium Hydroxide or Liquid Ammonia

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Abstract: Six kinds of subtropical plant fibers, Hibiscus, Pineapple, Okra, Plantain, Banana and Agave were treated with liquid ammonia (NH_3) and 11% sodium hydroxide (NaOH) solution. The water absorption and dyeing property were measured. Generally water absorption decreased by the liquid ammonia and sodium hydroxide treatments. From the microscopic observation of the fiber dyed with a C.I. Direct Blue 1, it is obvious that the dye penetrates extremely by the NaOH treatment for every fiber. Also it is clear that dye penetration brings about not only from the surface of the multicell fiber but also through the crack in the fiber. Dyeing rate and equilibrium dye uptake increased considerably by the NaOH treatment for all fibers. On the other hand, NH_3 treatment caused a decrease of the dyeing rate for Plantain and Banana, and other fibers increased the rate compared with the untreated ones. The effect of the NH_3 treatment for dyeing behavior is smaller than that of the NaOH treatment.

Key Words: Subtropical plant fibers, Sodium hydroxide, Liquid ammonia, Dyes, Water absorption

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