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Serbian Young Chemists' Club

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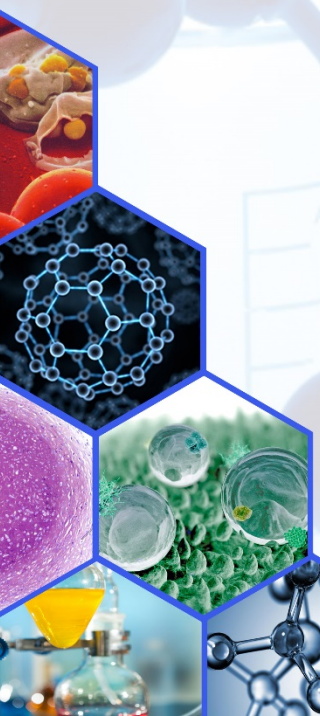

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Influence of the alkali treatment conditions on the chemical composition and capillarity of the jute woven fabrics

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Jute fibers have been subjected to various types of chemical modifications to improve their suitability as textile materials. Among them, the alkali treatments have been widely used as the most direct and ecological chemical treatments to remove the hemicelluloses from the jute fibers. The content of hemicelluloses has impact on the various sorption properties, such as capillarity, moisture sorption, water retention power, etc. Capillarity, defined as macroscopic motion of the fluid system under the influence of its own surface and interfacial forces, is a desirable quality in textile materials, because it allows the fiber to absorb moisture, liquids, oils etc. [1].

In this investigation, the influence of the alkali treatment conditions on the chemical composition (content of hemicelluloses) and capillarity of the jute woven fabrics was studied. In order to partially remove hemicelluloses, the jute fabric was alkali treated with NaOH solution of different concentrations (5%, 10% and 17.5%) during 5 min at room temperature, while the capillarity rise method was applied to evaluate the capillarity of the jute fabrics with different content of hemicelluloses. The capillarity rise height of untreated jute woven fabric is 1.0, 4.0, 10.0, 16.0, 36.0 and 55.0 mm after 1 min, 5 min, 15 min, 30 min, 45 min and 1 h respectively. With increasing the NaOH concentration, the content of hemicelluloses decreased. The untreated jute woven fabric has 21.76% hemicelluloses, while after the alkali treatments, the content of hemicelluloses decreased down to 13.79%. When the hemicelluloses were reduced progressively, the capillarity of the jute woven fabrics was improved, i.e. the capillarity rise height increased up to 11.0, 43.5, 68.5, 77.0, 97.0, and 124.5 mm after 1 min, 5 min, 15 min, 30 min, 45 min, and 1 h, respectively.

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