

Study on Sizing Properties of Cotton Yarn with Grafted Chitosan Size

Chitosan has many advantages, such as abundant sources, simple preparation and low price. Since the 1950s,

[Cotton yarn Microwave Drying / Sterilizing machine](#)

China has begun to try to use chitosan in the textile field. However, due to the strong regularity and stiffness of the molecular chain of chitosan [1], [Microwave drying machinery and equipment](#)

there are more intramolecular/intermolecular strong hydrogen bonds, resulting in its poor water solubility, which can only be dissolved in dilute acid solution with a concentration of at least 2%.

Modern warp sizing process is completed in water system, which requires that the size can be dissolved in water at a certain temperature, or at least better dispersed in water.

Adding high concentration of acid to dissolve chitosan will inevitably cause great damage to the mechanical properties of some acid-fearing fibers (such as cotton and viscose), which will limit the adaptability of the sizing yarn varieties.

At the same time, the defect of poor molecular toughness of Natural Chitosan leads to the excessive tensile strength of sizing yarn, and poor elongation, which fails to achieve better sizing elongation. Objective. This has also become one of the reasons why the research of chitosan syrup started earlier in our country, but it has not been widely used as the main size up to now.

Previous studies have shown that grafting different vinyl monomers onto the molecular chains of chitosan can significantly improve its various properties, such as tensile properties, swelling resistance and water resistance.

In view of this, the commonly used hydrophilic monomer acrylamide was grafted onto the molecular chain of Natural Chitosan to prepare chitosan-acrylamide graft copolymers with different grafting rates.

Through sizing tests on pure cotton warp yarns, the suitable range of grafting rate of modified chitosan was determined, so that it could be easily soluble in acetic acid aqueous solution with a lower concentration (1%) and kept good. Good sizing performance provides a reference for the wider use of chitosan in warp sizing field.

For coastal provinces such as Zhejiang and Guangdong, developing bio-based textile sizes from fishery by-products with low cost, good environmental protection and good performance can save production costs for enterprises and conform to the trend of low carbon and environmental protection.

