ABSTRACT

Natural cellulosic fibers are obtained from plant source. They may be from the plants which are specially grown for it like flax, jute etc. And the other source is the waste generated after the harvest of the fruit like pineapple, banana etc. Banana fibers are obtained from the banana pseudostem which is discarded after the harvest of banana fruit. These lignocellulosic fibers are lustrous and stronger than cotton. The inherent drawback of banana fibers is the stiffness due to high lignin content. Hence they need to be softened to be used in textiles. The present study aims to soften banana fibers and spin yarns from it. The spun yarns were used to construct banana blends.

Two softening treatment were standardised using enzymes and chemicals. The chemical treatment has been applied for patent. Both the treatments were applied on banana fibers and their effect was studied with the help of material characterization and physical properties. The untreated and treated yarns were used to spin two varieties of yarn: hand spun and ring spun. Another set of yarn was procured from Navsari Agricultural University, and cotton banana fabrics were woven. The fabric was divided into three parts, one was kept as untreated and the other two were treated with enzyme and chemical treatment.

Untreated and treated banana fibers were used to spin 100% banana yarn on phoenix charkha and three respective cotton banana fabrics were constructed. For the second variety enzyme and chemical treated fibers were cut into staple length and banana blend yarns were spun on ring spinning system at TRADC Kosamba, as a part of collaborative research project. Four spun yarns were produced and they were used to weave blend fabrics.

It was observed that chemical treatment was more effective than enzyme treatment. Enzyme treated fibers had a soft hand but lacked spinnability. Treating at fiber stage gave better results than treatment at fabric stage. Fabrics made by using yarns from Navsari resulted in thick fabrics, which after treatment can be used for home furnishings.

Ten fabrics were constructed under three categories. Category I comprised of treating the fiber first and hand spun and woven on handloom which included untreated cotton banana fabric, enzyme treated cotton banana fabric, chemical treated cotton banana fabric (Banana Khadi). Category II: using Navsari yarn for fabric construction and treating the fabrics which included untreated cotton banana fabric,

enzyme treated cotton banana fabric, chemical treated cotton banana fabric. Set III: regenerated fiber and banana fiber blend (75/25) for weft and regenerated warp yarn including viscose banana, modal banana and excel banana where banana fibers were chemical treated and viscose banana enzyme treated.

Kawabata analysis was done for four fabrics- Banana Khadi, enzyme treated cotton banana (fiber treated), modal banana chemical treated and viscose banana enzyme treated. The resultant was that all these four fabrics can be used for men's suiting material and similar such applications.