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## Production of Textile Ink using Waste Cotton

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### Abstract

The use of eco-friendly ink for textiles is one of the alternatives to reduce the accumulation of toxic chemicals in biosphere. It is a creative answer for the waste management of textiles and other industries and a green concept as well. The usage of findings explained in the paper is far beyond the conventional uses of green chemistry with the advancement of science and technology. The production of ink using waste cotton contributes to the preservation of our environment from various hazardous chemicals with the use of water-based ink system which is environmentally friendly and safe for humans and all other living organisms. In this research project waste cotton fibers (cellulose fibers) are converted into the ink base for textile. Cotton fibers (cellulose fibers) were dissolved in N,N-dimethylacetamide/lithium chloride (DMAc/LiCl) solvent system and converted into a clear cellulose solution and then step by step added thickener (Polylactic acid and glycerin system) and finally natural pigments make it a whole new natural textile ink. Here, basically Anthocyanins were used as the pigment/colorant. Using Anthocyanin is advantageous in many ways such as the vast availability, easy obtainability of the preferred colors and cost-effectiveness. Cellulose polymer and pigments particles have hydroxyl groups that can create hydrogen bonds with water as well as the natural fabrics (especially cotton). So, due to this reason ink is developed as a water base ink which is more viable task when comparing with other ink production processes. The produced water base ink has a good adhesion with fabric which can be seen in trials followed with manual screen printing. It serves as a great alternative to plastisol and other solvent based inks in many circumstances. One of the most prominent features of this newly formed ink is that the base does not include plastic or any hazardous man-made chemical. These kind of water-based inks seeps in to the garment rather than sitting top of the fabric. This creates a more consistent feel and a very good hand feel along with a better revived look after a few washes. Trials from the manufactured ink are carried out to test color fastness, color migration, wash durability, perspiration and dry/wet crocking of prints. Durability and crocking test results are already available. Durability test resulted 4.0 according to the AATCC135 washing method at 30° C, within five wash cycles. Crocking test was done in both dry and wet conditions according to AATCC008/AACC116 method which gave results 4.5 and 4.0 respectively. Results already finalized are passed the international standards and looking forward for the balance test results.

**Keywords:** Waste management, Eco-friendly, Chemistry, Polymer, Textiles