

# Studies on Dyeing Properties of Paper Yarn Fabric

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## 1. INTRODUCTION

Environmental-friendly Korean paper yarns were manufactured with machinery Hanji paper, which were originated in a bast fiber from Korean paper mulberry and prepared by the modified method instead of traditional manufacturing method. The machinery Hanji paper was slitted in width ranging 1.3 to 4 mm resulting the yarns with different thickness, and was twisted by using two-for-one spinning machine to explore the effect of the number of turns per meter on the mechanical properties of the paper yarn. The Korean paper yarn showed the excellent far-infrared ray emissivity and emission energy. Antimicrobial activity of paper yarn on *staphylococcus aureus* and *klebsiella pneumoniae* was excellent over 99.9%, after 18 hours. Deodorization removal of paper yarn on ammonia was over 99.5%.

In this work, it was studied on mechanical properties of paper yarn and dyeing properties of paper fabric.

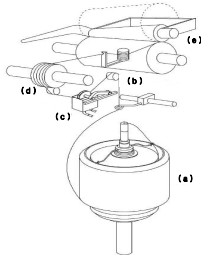


Fig. 1. Scheme of paper yarn manufacturing method[1].

## 2. Experimental

The tenacity(g/d), break strain(%), evenness(U%) and surface morphology of paper yarns were measured using universal testing machine(UTM), evenness tester(Uster) and SEM, respectively. To investigate the dyeing properties and color fastness of the paper yarn fabric, the dye-O-meter and various fastness tester were used.

## 3. RESULT AND DISCUSSION

As a result, it was confirmed that the fineness of the paper yarn was dependant upon unit Hanji

weight and slitting width. It was increased with increasing Hanji weight and slitting width. Moreover, tenacity and evenness of the paper yarn were influenced by the geometrical structure of cellulose fibrils. Higher tenacity was obtained when the cellulose fibrils were arranged along the length axis. The tenacity of the paper yarn reached the value corresponding to 70~80% of cotton yarn. However, the break strain of paper yarn was 5~7% lower than that of cotton yarn.

The dyeing properties and color fastness of paper yarn fabric investigated for the exhaustion behavior and colorfastness to washing, lighting, and rubbing using the reactive dye and the natural dye. It was shown that the paper yarn fabric consisted of holocelluloses had excellent dyeing properties on reactive dye[2]. In the initial step, the exhaustion of reactive dye was rapidly, but after alkali addition, the exhaustion speed of reactive dye was increased gradually. It was appeared that colorfastness of paper yarn fabric dyed with the reactive dye and natural dyes was good below color difference( $\Delta E$ ) value 1 at washing fastness and dry rubbing fastness. However, color fastness to light of paper yarn fabric on reactive and natural dyes was poor.

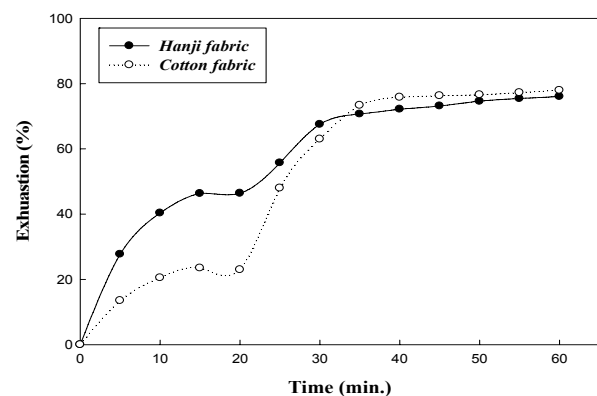


Fig. 2. Exhaustion curves of paper yarn and cotton fabric dyed with C. I. Reactive Red 195.

## 4. REFERENCES

- [1] H. C. Kim, Method for Manufacturing of Paper Yarn, Korea Patent, 0654155, 2006.
- [2] H. G. Baik and K. Choo, *J. Kor. Fiber Soc.*, 23, pp.161-166, 1986.