

## **Dyeing properties of *Askin* fabric with indigo**

**Su-Ho Kim<sup>1</sup>, Young-Sung Kim<sup>1</sup>, Jin-Pyo Hong<sup>2</sup>, Seok-Han Yoon<sup>2</sup>, Young-A Son<sup>1\*</sup>**

<sup>1</sup>BK21 FTIT, Department of Organic Materials and Textile System Engineering, Chungnam National University,  
Daejeon, S. Korea

<sup>2</sup>Korea Dyeing Research Center, Daegu, S. Korea

E-mail: [yason@cnu.ac.kr](mailto:yason@cnu.ac.kr)

### **1. Introduction**

Recently, the trend in textiles is to provide high-function and high-technology end-uses. Polyester is widely used in textile fabrics because of its applicable advantages in various textile industry. It is well known that *askin* fabric is a modified fiber material using typical polyester fibers. This *Askin* fiber material is used in marine clothing, underwears, shirts, swimming suits and so on. For this purpose, high levels of color fastness should be guaranteed. This aspect is of great importance during its manufacturing. In this context, vat dyes have been attracted due to the advantages of superior fastness. Thus, we have used indigo dye for dyeing the *askin* fibers and have investigated related dyeing properties in terms of dyeing temperature, dye concentration, reducing agent amount and alkali amount. Then, we have determined the proper amounts and the optimized conditions for deep shade dyeing results.

### **2. Experimental**

*Askin* fabric was used to find the optimized dyeing conditions. The indigo vat dye and reducing agent were purchased from Aldrich. All other chemicals used in this study were of laboratory grade reagents.

Fiber substrates were dyed in a sealed, stainless steel dye pots of 120cm<sup>3</sup> capacity in a laboratory-scale dyeing machine. Samples were placed in a 30°C dye bath of 1:40 liquor ratio. After 30 min at 70°C, the temperature was raised until it reached 90°C to 120°C with 2°C/min and was then continued for 60 min. After dyeing treatment, the fabric was washed with the proper amount of surfactant, alkali and reducing agent. We have investigated concentration, alkali amount, reduction agent amount using different factors.

Colorimetric data of the dyed fiber substrates were measured on a Datascolor SF 600 plus spectrophotometer. The relative color strengths (K/S) were determined using the Kubelka-Munk equation:

$$K/S = \frac{(1-R)^2}{2R}$$

where,

K: coefficient of absorption of the dye at  $\lambda_{\max}$

S: coefficient of scattering at  $\lambda_{\max}$

R: reflected light at wavelength  $\lambda_{\max}$

### **3. Results and discussions**

In order to examine the effects of dye concentrations and dyeing temperatures on the color strength, fiber substrates were dyed with indigo dye at dyeing

temperatures (90 °C to 120 °C). Fig 1 and Fig 2 showed the effect of dyeing temperatures and dye concentration on color strength of indigo dyeing. The results showed that high color depth was obtained from the condition such as 110 °C and 8% owf. Also, high color depth was achieved by 3g/l of alkali and 5g/l of reducing agent. The results of wash fastness also showed high level of washing durability.

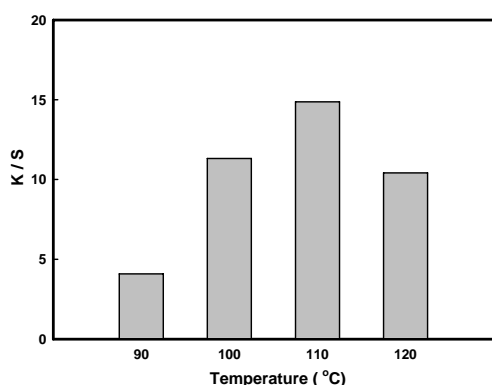


Fig.1. Effect of dyeing temperatures on color strength of indigo vat dyeings

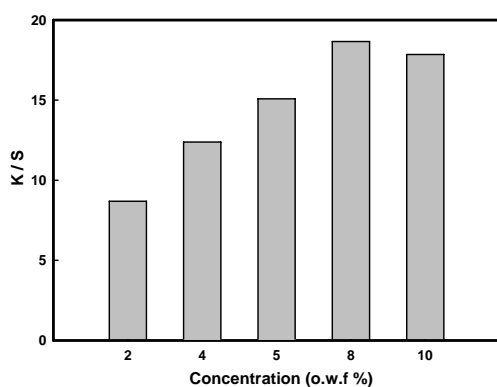


Fig.2. Effect of dyeing concentration on color strength of indigo vat dyeings

#### 4. Conclusions

In this work, the dyeing properties using indigo vat dye were examined. The effect of dyeing temperatures showed that color strength of the dyeings was dependent on condition of the dyeing temperatures. Also, It has been found that suitable amounts of reduce agent and alkali were determined from the experiments. In addition, the efforts to reduce the use amount of chemicals were considered in terms of environmental pollution and cost reduction

#### 5. Reference

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