

Sunsanee Vanprasert 2009: Optimum Condition for Dyeing Silk with Natural Indigo.

Master of Home Economics, Major Field: Home Economics, Department of Home Economics.

Thesis Advisor: Assistant Professor Kajijarus Piromthamsiri, Ph.D. 112 pages.

The objectives of this research were to study 1) the effects of dyeing condition upon the color, colorfastness to washing and tenacity of silk fabric dyed with natural indigo, and 2) the optimum condition for dyeing silk with natural indigo. Experiments were conducted by using temperature at 30 °C and 45 °C, duration of dyeing for 15 and 30 minutes, and reducing agent and alkali at sufficient and 20 percent over sufficient amounts.

The results of the study concerning the effects of dyeing conditions upon the colors of silk fabric dyed with natural indigo showed that the colors of dyed fabrics were light blue. Various dyeing conditions yielded very close color values. The dyed fabrics had high L\* values, low a\* (greenness) values, low b\* (blueness) values, low C\* (brightness) values, h\* values in the range of blue and low K/S (lightness of color) values. Temperature, duration of dyeing, and amount of reducing agent and alkali had no effect on the colors of the dyed fabrics.

The results of the study concerning the effects of dyeing conditions upon the colorfastness to washing showed that after washing  $\Delta E$  values were between 1.1394–8.8635 indicating the colorfastness of the dyed fabrics was at a very good to fair level. The dyeing temperature significantly affected the color change value ( $\Delta E^*$ ) at the .05 level. The fabric dyed at 30 °C had higher color fastness (lower  $\Delta E^*$  value) than the fabric dyed at 45 °C.

The results of the study concerning the effects of dyeing conditions upon the tenacity of the fabric indicated that after dyeing, breaking loads of the fabric decreased by 31.11 percent. The dyeing duration significantly affected the tenacity at the .05 level. The fabrics dyed for 30 minutes lost more tenacity than the fabrics dyed for 15 minutes.

The most optimum dyeing condition for dyeing silk fabric with natural indigo was dyeing at 30 °C for 15 minutes, and using reducing agent and alkali at sufficient amount (sodium hydrosulfite 1.75 grams and sodium hydroxide 1.75 grams per 1 gram of indigo). By using this condition, the dyed fabrics had the best quality of colorfastness to washing and tenacity.

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