

Antibacterial and Antioxidant Capacity of Fabric Treated with Purple-Fleshed Sweet Potato Extract

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Abstract : Wool and cotton fabrics are pretreated by a tannic acid aqueous solution to increase their dyeability and then dyed by Purple-Fleshed Sweet Potato (PSP) extract. The dyed fabrics are then investigated by various analysis techniques. The results revealed that wool and cotton fabrics can be dyed bluish red through the pretreatment and dyeing process. Both wool and cotton fabrics only pretreated with tannic acid display decreased L* value but no significant changes in a* and b* values as the concentration of tannic acid increases. And, as expected, the pretreated fabrics are even darker and show a richer purple color after the dyeing process with the PSP extract. With regard to the colorfastness of wool and cotton fabrics dyed by PSP extract in cleaning circumstances, such as dry-cleaning (for wool) and washing (for cotton), the wool and cotton fabrics had a 4.0 and 4.0 grade of colorfastness to dry-cleaning and washing, respectively. However, they both exhibited significantly inferior colorfastness to light (grade of 1.5). Thus, it was found that there is still a need for improvement with regard to color fastness, particularly against light. On the other hand, the wool and cotton fabrics also showed antibacterial and antioxidant characteristics. In addition, both the wool and cotton fabrics showed potential antibacterial ability (>99%) against *Staphylococcus aureus*; however, they showed somewhat insufficient antibacterial ability (60.8% for wool and 94.8% for cotton) against *Klebsiella pneumoniae*. Also, their antioxidant abilities increased up to ca. 90% with an increase in the tannic acid concentration (up to 0.5%). However, after the dyeing process, the antibacterial and antioxidant ability tended to decrease. This is assumed to have occurred because functional moieties such as phenolic acids were detached from the pretreated fabrics into the hot water (the dyeing solution) during the dyeing process. Therefore, further study would be necessary to derive the optimum treatment and dyeing conditions so as to maximize the coloring effect and functionalities of the fabrics.

Keywords : antibacterial activity, antioxidant activity, purple-fleshed sweet potato, fabrics

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