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GAMMA PRE-IRRADIATION EFFECTS ON NATURAL DYEING PERFORMANCES OF PROTEINIC BLENDED YARNS

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Abstract

The objective of this study was to develop a naturally dyeing process of 70% wool /30% Angora mohair blended yarns by using bio-mordants as an environmentally friendly alternative for the conventional metallic salts. Bio-mordanting operation was achieved by using of condensed tannin extract from quebracho bark trees. Conventional mordanting has been performed using the conventional mordants like copper sulphate and tin chloride. Another specific objective of this study was to investigate the possibility of application of pre-irradiation treatment in natural dyeing in order to improve the tinctorial affinity of blended yarns. Prior to natural dyeing the blended yarns were subjected to irradiation treatments using an industrial gamma irradiator of type SVST Co-60/B, the minimum irradiation doses accumulated by the blended yarns were about 18 kGy and 28 kGy. To show the influence of gamma pre-irradiation on natural dyeing behavior of blended yarns the spectrophotometric measurements were performed by evaluating the color difference attributes and color strength. Color fastness to washing, light, acid and alkaline perspiration were evaluated in order to establish the effectiveness of gamma treatments and mordanting operation (conventional mordanting or bio-mordanting) on natural dyeing. The blended yarns were also analyzed in terms of their main physical-mechanical and physical-chemical characteristics. Scanning electron microscopy and Infrared spectroscopy were used to monitor surface modifications, chemical and conformational changes in proteinic fibers induced by the applied treatments.

Key words: bio-mordanting, eco-textiles, gamma irradiation, natural dyeing, proteinic fibers

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