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Study on the Effect of Collagen Color Fixing Agent on Leather Dyeing Performance

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Abstract A color fixing agent of collagen (PCDMC) was prepared by free radical polymerization water solution polymerization of methacryloyloxy ethyl trimethyl ammonium chloride (DMC) with collagen hydrolysate at the protection of nitrogen and using t-butylhydroperoxide (t-BHP) and sodium metabisulfite (SMBS) as redox initiator pair. The solid content and viscosity of color fixing agent was 37% and 300-600mPa•s, respectively. Then it was used in leather color fixing process and compared with commercial products DT-A622 and formic acid. The leather handle, dye uptake rate, K/S value and resistance to dry and wet fastness were as index to evaluate their color fixing effect. The results showed that PCDMC took on excellent softness and color, dye uptake rate was 97%, K/S value was 23, dry rub fastness and wet rub fastness were improved 0.5-1 grades.

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Study on the effect of collagen color fixing agent on leather dyeing performance

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Keywords: collagen; graft copolymerization; color fixing agent; application

Abstract. A color fixing agent of collagen (PCDMC) was prepared by free radical polymerization water solution polymerization of methacryloyloxy ethyl trimethyl ammonium chloride (DMC) with collagen hydrolysate at the protection of nitrogen and using t-butylhydroperoxide (t-BHP) and sodium metabisulfite (SMBS) as redox initiator pair. The solid content and viscosity of color fixing agent was 37% and 300-600mPa·s, respectively. Then it was used in leather color fixing process and compared with commercial products DT-A622 and formic acid. The leather handle, dye uptake rate, K/S value and resistance to dry and wet fastness were as index to evaluate their color fixing effect. The results showed that PCDMC took on excellent softness and color, dye uptake rate was 97%, K/S value was 23, dry rub fastness and wet rub fastness were improved 0.5-1 grades.

Introduction

Dyeing process can improve leather appearance, so as to meet market demand and popular styles, as well as increase leather products' additional value. The anionic dyes (acid dyes and direct dyes) are often used in dyeing process. Compared with dispersive dyes, vat dyes, and insoluble azo dyes, because there are hydrophilic hydroxyl, sulfo, carboxyl and amino in direct dyes and acid dyes, they has lower wet rub fastness. To reactive dyes, although the dyes and fibers can form covalent bonds, but non-bonded dyes also can reduce wet rub fastness when soaping inadequacy [1]. Meanwhile, acid and alkali can make covalent bond decompose; as a result, the fastness reduced. For acid dye, direct dye, reactive dye and other anionic water-soluble dye, in order to improve the wet rub fastness, the dye must be changed into insoluble salt and deposited on fibers by Coulomb attraction and Van Der Waals attraction. Otherwise, macromolecular fixing agent can form transparent film on fiber surface, so as to enhance the wash fastness of dye to prevent decoloration, bleaching, and transport phenomena occurring when washing [2]. Through fixing process crust can not only receive good impression to meet fashion needs, but also reduce water pollution caused by dye [3]. In traditional fixing process with acid, pigment acid is formed so that the dye is insoluble in water and precipitate. This method requires completely absorption, otherwise the fibers deposit on the surface. For acid and direct dyes, the formaldehyde condensation polymer fixing agent can significantly improve wet rub fastness and make leather resistant to wash and soap. The anionic fixing agent whose main component is tannic acid can improve the wet rub fastness, but there is dark shade, poor handle, especially a small amount of tannin can adsorb iron and cause discoloration of finished product [4, 5].

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