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Modification and characterization of leather superfine powder

Zhiwen Ding[1,a] Zhaoguo Ma [1,b] Zhengping Cheng[1] Enhong Li[2]

[1] China leather and footwear industry research institute, Beijing, China;

[2] Shaanxi University of Sicence and technology, Xi'an, China ;

[a] ding-zhiwen@263.net; [b] ma-zhaoguo@163.com;

Keywords: leather superfine powder; maleic anhydride; acrylic acid; surface modification

Abstract: Stable leather superfine powder suspension was got by superfine powder of leather solid wastes, maleic anhydride(MAH) and acrylic acid(AA). The best MAH, AA modifying conditions with grafting ratio as index were discussed by orthogonal test according $L^9(34)$ factor levels, and the results show that modified products Ⅰ is got by the total amount of MAH account for 50% of the amount weight of leather superfine powder at 80°C for 3 hours in the solution of N,N-dimethyl formamide (DMF). The MAH modified products was filtered and washed with water to reserve, and then was further modified by AA and MA being designed orthogonal test according $L^9(34)$factor levels for optimum conditions with grafting ratio as index. The best modification conditions were as follows: ammonium persulfate(APS) as the initiator, the mass of initiator accounted for 2% of total weight of monomers , the volume ratio of AA and MA was 5, and the reaction temperature was 90 °C for 3 hours in 12% aqueous solution. The monomer grafting percentage of the products was 37.8%. The product was characterized by infrared spectroscopy (IR) and Size analyzer.

1Introduction

In leather-tanning process, a large number of leather solid wastes are produced by the process such as shaving, trimming produces. Data [1] shows that 140 tons of leather solid wastes were produced in pig-skin-making process every year in China. Chromium-containing waste mainly can be separated into the chromium salt and protein to extract protein by acid method, enzymatic and oxidation and acid-base combined with enzymatic and so on[2]. These methods are also the main using way for solid wastes in China. There are several aspects of deficiency for extracting collagen protein from solid leather wastes [3]. The powders are modified by maleic anhydride and acrylic in aqueous solution, which allows them to disperse, eventually improves the stability in the water-borne finishing agent in order to improve the health properties and coating leather feeling.

2 Experimental

2.1 Main equipments and materials

Maleic anhydride (AR), Beijing chemical reagent company; Ammonium persulfate (AR), Beijing chemical plant; Acrylic class finishing agent, Industrial products; Size analyzer, LS 13 320, Beckman Co., America; Infrared spectrometer, TENSOR 27, Bruker Co., German;

2. 2Modified superfine leather powder

Put a certain amount of superfine leather powder and moderate DMF into a 250mL and three mouth flask. Mixing them to scatter and slowly warming to the specified temperature, a specified volume of maleic anhydride is added. The reaction bettween maleic anhydride and superfine leather powder can occur for a certain time through heat preservation [4].