LETTERS TO THE EDITOR

Alginate for the Production of Softer Type of Leathers

Alginic acid or algin is an organic acid which occurs in large quantities in many sea weeds. It is a linear polymer of D mannuronic acid and L-guluronic acid residues linked together by 1, 4 linkages, probably β and ∝ respectively.[1] Its sodium salt gives viscous solution with good film-forming properties and is used as a sizing material as an adjunct to starch because it fills the cloth better and is tougher and more elastic.[2]

It has been suggested that sodium alginate can be used (a) in paste drying in conjunction with starch or casein, (b) in the application of leather finishes and (c) as dye levelling agent. It was reported that the -dialdehyde, obtained by periodate oxidation of alginic acid, gave fuller leathers when retanned with chrome.[3] However, the preparation of dialdehyde alginic acid for use in tanning was expensive and less convenient from practical stand point. Since alginic acid possesses one carboxyl group on every monomer unit and is known to form insoluble complexes with aluminium and chromium, it was thought that its introduction in leather by conjugation with chrome may impart fullness and roundness to the leather. An attempt was therefore made to sandwich alginic acid in leather by a two-step chrome tanning procedure.

Experimental

Pickled goat skin chrome-tanned with basic chromium sulphate (1.5% Cr_2O_3) was treated with alginate solution 1-4% on fleshed weight; the viscosity of the alginate solution was decreased by the use of a thinner developed by us. This leather was shaved and retanned with basic chromium sulphate, 1-2% Cr_2O_3 on fleshed weight. The leather after ageing overnight was neutralised to pH 5 with sodium bicarbonate dyed with 2% Naphtalene leather Brown ADS (Sandoz India) and fatliquored with 4% of Lypoderm H: the dye and fatliquor were fixed with acetic acid. Next day, the leather was set, dried, sammed, staked, toggle-dried and buffed on the flesh side. The feel of the dyed crust thus produced was compared to the similarly dyed fatliquored crusts of goat skins tanned with (a) chrome (2.5% Cr_2O_3) in a single step in the conventional manner and (b) chrome in two steps i. e. tanning first with 1.5% Cr_2O_3 equivalent of chrome and again with 1 to 1.5% Cr_2O_3 equivalent of chrome on the next day.

Results and Discussion

Chrome leather having sandwiched alginate is round, full and supple but the grain tends to become "bold"; the dye penetration is much better than in leathers containing no alginate; the alginate treatment also resulted in level dyed effect. This type of treatment may be suitable for softy and other mellower types of leathers like nappa, uppers, anilines and clothing leathers.

The alginic acid being a polyfunctional carboxylic acid having widely separated carboxylic sites, treatment of chrome leather with its salt may mostly result in unipointal attachment of the acid to chrome

but not in chelation. If alginate-treated chrome leather is retanned with chrome it is more likely that the polyfunctional alginate ligand will get firmly bound in between two chromium and this would be the reason for the aforesaid improved properties.

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