Abstract:

Severe decay and degradable structure shows the urgent need to structural study and conservation treatment of historical leathers. Structural investigation for technological and pathological study has a great importance prior to interventive conservation. Softening is a main intervention in the conservation of historic leathers. Polyethylene glycol (PEG) and Silicon oil are many used compounds in this procedure (for wet or dry leathers). In this research, Structural condition (from technological and pathological aspects) and softening methods (by PEG and Silicon oil) has been investigated for the conservation of historic leathers. Moreover, effect of Ascorbic acid (as an antioxidant) on PEG properties was evaluated due to probable oxidation of PEG. A leather bottle attributed to Seljuk period was studied as an important object regarding to its date and technique. The leather bottle was composed of several pieces of leather and had been discovered in *Ghalee Kuh_i Ghaen* historical site. After field assessments and literature review, classical wet chemical method and instrumental analysis were applied to structural evaluation of the relic. In addition, softening methods were assessed on the leather. The historic specimens and new leather samples were used for treatment and accelerated aging processes. Manufacture procedure of new samples was the same as technical information of the historic leather. According to results, historic leather pieces had been produced from goat skin by sweating and lime unhairing, and vegetable tanning methods. The specimens had been probably dyed by iron and vegetable compounds and lubricated by animal fats (obtained from cow or sheep). Leaching of free fats, decrease of moisture and effect of soil composition have been resulted to failure in the flexibility of leathers. Additionally, oxidation and chemical transformation of free fats were accelerated the drying process. White organic salts on the leather indicated to leaching of structural free fats. Biologic activity and specially macroorganisms were accounted as one of main decay factors. Moreover, limited activities of microorganisms were detected on the surface which could be result to severe degradation in the future. The results of these damage factors are severe structural degradation of leather, and a reducing in its denaturation, melting and thermal oxidation temperatures. Thermo oxidation stability of softening compounds and structural properties of samples were assessed by Colorimetry, study of shrinkage temperature, pH measurement, tensile strength, DSC and ATR-FTIR techniques. Results during treatments and accelerated aging showed that Silicon oil has better effects with comparison to PEG (with or without Ascorbic Acid). Moreover, application of Silicon oil for treatment of historic samples indicated to better improvement of structural properties of leather.
Keywords: Leather, Leather Bottle, Seljuk period, Conservation and Restoration of leather, Structural study of leather relics, Leather dressing