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UTILIZATION OF CHEMICAL-PHYSICAL TECHNIQUES TO STUDY THE AGING IN LINEN FIBERS

Abstract

After more than 10 years of researches covering the existence of possible causes which can modify the ^{14}C content in an organic fabric, a persuasion takes shape that the material not always has a behavior like a closed system and that a radiocarbon rejuvenation is certainly possible.

This research, which utilized for its analyses the X-ray diffraction (XRD), the differential calorimetry (DSC) and the infrared microscopy with Fourier transformed (FTIR), confirms, in a semi-quantitative way, that the reactivity of ancient and new fabrics to physical and chemical agents is not a constant but it can increase due to a plurality of factors. In particular, thermal treatments can modify the macromolecular structure of the cellulose. In some cases further confirmations have been obtained by comparing our results with the data coming from analyses carried out with AMS facilities.

Furthermore, we noticed that the conventional cleaning treatments, especially the acid one, modify the molecular structure.

And finally, we had the possibility to ascertain that at least one of the encrusting substances which grow together with the linen fibrils, the pectin, is affected by the thermal treatments given to the cloth to which it adheres. This substance, not easily removable with normal cleaning treatments, produces, as a result of the heating, a considerable increase of the carbonyl and carboxyl groups.