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Title: Surface evaluation of the effect of X-rays irradiation on parchment artefacts through AFM and SEM

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Abstract: Bio-deterioration poses a serious risk in the preservation of ancient parchment. The deteriorating effects of microorganism can affect the surface layers of a membrane sheet causing the total loss of the written text and/or the decorative apparatus of which it is the vehicle. In this work the use of the X-ray radiation performed by an experimental setup, designed at ENEA (Frascati), is proposed to inhibit the microbial growth. In order to find the most suitable dose for this purpose and to evaluate the deteriorating effect produced by the irradiation, a series of modern parchment samples has been treated and analysed by means of two microscopic techniques, namely Atomic Force Microscopy and Scanning Electron Microscopy. The combined use of these techniques allows the characterization of the alteration in the surface morphology and in the fibrillary networking of the collagen molecule within parchment, in order to evaluate the applicability and suitability of the disinfection method proposed.

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