

New Insights on Disinfection of Archival and Library Materials Using Gamma Radiation

ABSTRACT

One of the threats for our cellulose-based cultural heritage is destruction by mold. Besides the destruction of the materials, there is also a risk for occupational health. Mold may cause infection (mycoses) and allergic reactions and can be toxic due to the formation of mycotoxins. Some groups are even carcinogenic as they form aflatoxins (*Aspergillus flavus*). Often-used disinfection systems are ethylene oxide (EtO) and gamma radiation. EtO is toxic for humans and materials processed with EtO can emit this component for many years after treatment. Materials treated with gamma radiation appear to be nontoxic after treatment as no components are added to the materials. Unfortunately the literature shows contrary results. At high doses (60–200 kGy), material deterioration has been reported. However mold present in archival records, for example, can be killed at a dose of less than 10 kGy. Our research project, begun in 2005 and continuing to May 2007, aims to find the most suitable conditions for gamma disinfection. Results are being compared with manual cleaning treatments and both aspects are included: material stability and health. The most optimal treatment conditions are being sought from different points of view: from how to present the materials to the vendor (density of the materials) to the effects of a low dose on the survival of the mold and spores in direct relation to the stability of the materials. The latest results of our project showed that lowering the dose of the disinfection treatment is feasible with a good effect of killing mold and spores while deterioration of the materials is reduced to a minimum. The minor deterioration found was accepted by the participating conservation workshops as it is significantly less severe than the deterioration caused by active mold.

Presented at the Book & Paper Group/ICOM-CC Graphic Documents Joint Session, AIC 35th Annual Meeting, April 16–20, 2007, Richmond, Virginia. Received for publication Fall 2007.

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