Vorab-Abstrakt von Cornelius Palmbach

Disinfection of mould-contaminated archival and cultural objects by means of X-ray irradiation – New research results on the effect on moulds and cellulose

This research project examines the effects of X-rays on cellulose and some moulds frequently found on paper. The aim was to identify applications for X-ray irradiation that can be used as a disinfection method for archival material.

The question was if X-rays are suitable as an alternative to gamma radiation and if they are less harmful. For this purpose, the minimum X-ray dose required to reduce the microbial count to a harmless level was determined. The material-altering effect was examined on samples treated with X-rays and gamma radiation.

Spectrophotometric measurements showed that there is no noticeable colour change with either type of radiation. The determination of the molecular weight distribution, in turn, showed that the molar mass of the cellulose is considerably reduced with both treatment methods. Using mechanical tests, however, it could be demonstrated that this has no significant influence on the tensile strength. The examination of the oxidation behaviour also showed no significant difference between the differently treated samples.

The studies thus show that both methods have an almost identical effect on cellulose. Thus, X-ray treatment is primarily a supplement to the known disinfection methods and is particularly suitable for objects that would not withstand treatment with alcohol.