

## Diagnosis and proposal of treatment by gamma rays for documents with fungi in the National Archive of Chile

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The National Archive of Chile is a public institution that safeguards 40 linear kilometers of documents from all over the country, from the year 1541 to the present. Its documents are made on different types of paper depending on the time of production. From the 16th century to the 19th century, it is mainly cotton fiber paper and from the 19th century onwards, it is characterized by different papers of industrial production. Paper and its high cellulose component is an attractive medium for attack by fungi, which degrade the material to the point of destroying it and thereby losing the information it contains.

Because there is not a systematic procedure to determine the state of conservation of the documents (this corresponds to the evaluation of the physical condition and the characteristics of the supports), was developed a diagnostic methodology, using documentary collection of the Real Audiencia and its 3,272 books produced between the 16th and 19th centuries. The methodology used showed that the most worrying risk detected was that of fungi, whose percentage is 5.1% of the total fund, which, although proportionally scarce, threatens the physical disappearance of the documentation.

The methodology proposed in this article and the results obtained based on it allow to identify the physical conditions of the supports and their deterioration, all information has been stored in a database that currently gives the possibility of having controlled the characteristics of each unit of documents individually, a fact that was not known before the application of this methodology.

The technique that conservation uses for the treatment of fungi, consists of applying an alcohol solution on the documents and cleaning with cotton, this technique is slow and expensive, a conservator only manages to disinfect 10 books per month, therefore, apply this method of disinfection in the 5.1% affected, it would take several years. Another solution is the application of ultraviolet light, but due to its photo-damaging characteristic, it is highly invasive for the paper fibers. A proposed solution that appears to be the most suitable for treating fungi on paper is the application of gamma rays, due to its high effectiveness, because it is non-invasive and because it can be applied en masse to a set of objects, which makes it a highly efficient and effective solution for dealing with documents. Providing general solutions that massively satisfy the need for the archive is a great investment.

The diagnostic experience, as well as the gamma ray treatment proposal, is an experience that can be disseminated and replicated in other archives with similar institutional characteristics and in other countries of the region. All the countries of the former Spanish colonies have this same type of documents with similar deterioration. In addition, this technique would allow saving time and prolonging its useful life, to remain as sources of live information for today and the future.

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