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Peruvian cultural heritage material characterization, achievements during the last twenty years

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Peru is a country worldwide recognized for its rich cultural tradition and heritage, spanning from monumental architecture as ancient as several thousand years to historical building, objects and documents corresponding to the colony and republican periods (XV to XIX centuries).

In this context archeologists, historians and conservators face a hard work dealing with a large variety of materials, manufacturing techniques and degradation agents that must be identified and characterized to rescue and adequately conserve this invaluable cultural heritage, which includes materials as raw earth, straw, textiles, human and animal mummies, pottery, metals and jewelry, wood, paintings and documents.

Approximately twenty years ago, with the help of IAEA, we started an ambitious plan to develop nuclear analytical techniques to give support to other characterization techniques generally used in the field and in the conservation workspace, giving emphasis to capacity building in students and professionals working in this marvelous field.

In this presentation we summarize the work, achievements and difficulties faced in the last two decades, relevant to the themes proposed to the workshop, and the most outstanding necessities to manage with the huge work to properly characterize and identify materials and techniques used by ancient crafters as well as to conserve our cultural heritage.

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Moving toward a sustainable conservation – Experience of the Museum of Archeology and Ethnology (MAE-USP)

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Most of the ethnographic collections present in traditional museums in Brazil were formed by collectors, purchases, donations and exchanges by large encyclopedic, naturalist museums, typical of the 19th century. It is in this context, the Museum of Archeology and Ethnology (MAE-USP) collection were constituted.

The MAE has been made a big effort to guarantee their conservation. Preservation of tangible objects as well thousands of organic objects, composed of plant fibers, wood, skins, feathers, seeds and various materials, has always been challenging as they are prone to deterioration by biological agents such as insects, mold, bacteria and rodents.

Chemical treatments are traditionally examples of actions to preserve many museum collections around the world. Since the 19th century, collectors and museum professionals have applied a variety of toxic substances through fumigations and direct applications trying to enhance the conservation.

Although a well-intentioned practice, the application of pesticides to protect ethnographic objects could not predict the negative impact on the safety of those who would handle these objects in the future and by restricting the possibilities of using these collections by the descendants of their creators. Today, these contaminated objects cannot be touched without gloves or experienced by for example, indigenous groups.

The current insertion of native communities in curatorial actions at museums has made it possible to renew the way in which these institutions work. At this moment, it is no longer plausible that a museum institution continues to carry out toxic treatments on funerary, sacred objects, human remains, among others. The possession and use of these objects transcend the museum's borders

and the possibilities of use must be considered in the perspective of the future.

Due to the renewal of the theoretical parameters of the conservation discipline, the Integrated Pest Management policy is more suitable for museological institutions. Efforts to prevent damage have been more effective than just thinking about curative conservation. In addition, the need to develop a more sustainable present and future has led institutions to develop greener prevention policies, without the use of toxic products, respecting the environment and the user.

In this scenario, since 2010, MAE-USP has abolished the use of pesticides to treat the collection. Since then, the institution has been dedicated to building a protocol to reduce risks related to infestations. This protocol encompasses, among other actions, the treatment of objects affected by biological agents and the preventive treatment of new objects through ionizing radiation.

The use of ionizing radiation for the disinfestation of museum objects is a very safe process and has proved to be a great alternative to traditional methods of disinfestation that involve pesticides of high persistence and toxicity. For this reason, we have also worked to disseminate the technique among conservators.

This work intends to share the actions carried out by MAE-USP in partnership with the Nuclear and Energy Research Institute (IPEN) to facilitate the treatment of ethnographic objects, as well as an important collaborator to make the conservation process at MAE more sustainable.

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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.