ICOM-CC
19th Triennial Conference
2021 Beijing

OBJECTS FROM INDIGENOUS AND WORLD CULTURES

Application of gamma irradiation to conservation: Effects of ionizing radiation on the color of featherwork

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Featherwork is one of the most remarkable categories of material culture produced by Brazilian indigenous peoples due to its technical qualities and aesthetic beauty. Weapons, baskets, and musical instruments are frequently decorated with feathers, which are also used in body adornments that, in addition to their aesthetic purpose, are intended to convey information about the wearer, their position within a group, and the cultural values that they wish to transmit. The preservation of this type of artifacts is demanding given the biological cycle of the organic materials that compose them, which are inevitably subject to various stages of deterioration. In addition to the damage resulting from their use and perishable materials, these ethnographic objects are exposed to a new environment when they are incorporated into museum collections, where their existence must be prolonged. Since Brazil's tropical climate often leads to pest proliferation, their degradation can be exacerbated by the action of insects such as moths and microorganisms such as fungi with irreversible consequences, making their conservation a daily challenge. Although the art of featherwork is still practiced by indigenous communities, the scarce supply of raw materials and contact with the tribes involved has reduced the scale of production. The preservation of this material heritage is thus very important, particularly in ethnographic museums. The use of gamma radiation for the disinfestation of cultural heritage artifacts and archived materials has been shown to be a safe process and an excellent alternative to traditional methods, which usually involve toxic chemical pesticides. Ionizing radiation has been used for more than 40 years and, since 2004, the Multipurpose Irradiator at the Institute of Energy and Nuclear Research (IPEN), a pioneering technology developed in Brazil, has made its application to cultural heritage a reality. With more than 20,000 cultural artifacts irradiated, IPEN is currently the national and international reference center for the use of radiation technology applied to the preservation of cultural heritage collections. Several studies have been conducted to determine the optimal dose required to eliminate contamination by biological agents in organic materials such as wood, leather, and feathers. A maximum dose of 10 kGy is recommended for featherwork in order to avoid affecting the physical and chemical properties of this type of material. This poster reports on the results of the effects of ionizing radiation on the color and morphological properties of a featherwork from the Museum of Archaeology and Ethnology at the University of São Paulo (MAE/USP). Samples of feathers were selected and irradiated with gamma rays at the Multipurpose Gamma Irradiation Facility, applying absorbed doses of between 0.5 and 200 kGy. The samples were chosen according to the color of the feathers and then photographed and analyzed using colorimetry based on the CIELAB 1976 color space scale before and 48 hours after irradiation and scanning electron microscopy. There were no significant changes in morphological and color properties within the disinfestation range applied.