

Opening session / 2**Ionizing Radiation for Preservation: Uses of Electron-Beam Technology for Conservation of Photographic and Cinematographic Films****Author:** Pablo Antonio Vasquez¹**Co-author:** Maria Luiza Nagai¹ *Nuclear and Energy Research Institute – IPEN/CNEN/SP, Brazil*

The Nuclear and Energy Research Institute – IPEN through the Multipurpose Gamma Irradiation Facility and the Electron Beam Irradiation Facilities has disinfected several tangible cultural collections from the University of São Paulo – USP. Brazilian weather conditions added to the actions of insects and fungi promote biodegradation especially in cellulose based materials. In this sense, ionizing radiation is an excellent alternative to the traditional preservation process mainly because of the biocidal action. Electron beam irradiation also presents new possibilities for processing materials with greater speed, despite having limited penetration. Adequate storage of photographic and cinematographic materials is a challenge for experts from preservation institutions. Contamination by fungi is one of the leading causes of problems in this kind of collections. In addition, another common physicochemical degradation affecting cellulose triacetate films causing deacetylation of polymer chain is called “vinegar syndrome”. In this work are presented results of the effect of the electron beam irradiation on photographic and cinematographic films using an electron beam accelerator with energy of 1.5 MeV and beam power of 37.5 kW. Selected film samples were characterized by FTIR-ATR spectroscopy and FEGSEM-EDS microscopy. Samples were irradiated with absorbed dose between 2 kGy and 200 kGy. Irradiated samples were analyzed by UV-Vis spectrophotometry, FEGSEM, thermogravimetric analysis (TG) and differential scanning calorimetry (DSC). Results showed that disinfection by electron beam radiation can be achieved safely applying radiation absorbed doses between 6 kGy to 10 kGy with no significant change or modification of main properties of the constitutive polymeric materials. Electron beam irradiation, due to the effect of crosslinking is presented as an alternative to treat films affected by “vinegar syndrome” applying absorbed dose of 80 kGy in order to increase shelf life of cultural heritage materials.

Interpretation, presentation and dissemination of the scientific results. Case studies and success stories / 94**Success stories on the characterization of Cultural Heritage in Latin America: dating of the Mayan Codex of Mexico and determination of arsenic in Chilean mummies****Author:** Cecilia Fuertes¹¹ *CONICET-INN, Argentina*

Two success stories on the characterization of cultural heritage in Mexico and Chile using accelerator-based techniques will be presented and discussed.

The first case is the determination of the authenticity of the Mayan Codex of Mexico (MCM). The Mesoamerican codices are documents describing pre-Hispanic history and cosmogony. The MCM was unveiled in 1971 during an exhibition at the Grolier Club of New York. This codex is a folding-screen book, with 11 pages painted on bark paper covered with a fine layer of stucco. It illustrates astronomical events related to Venus cycles. Since the discovery of the Mayan Codex, its authenticity has been subject of controversy and discussion due its scarce iconographic content and its unknown origin. Some studies have been conducted to verify if the materials in the MCM match with those found for other pre-Hispanic documents. Among them, the group led by Dr. Ruvalcaba presented a comprehensive study of the whole document using a set of non-destructive techniques (1). They concluded that no modern inorganic materials are present in the codex. Besides, it was also