



## Effect of ionizing radiation on the color of botanical collections – exsiccata

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### Abstract

Conservation and preservation methods are essential to maintain the wholeness of botanical collections specially for dried herbarium specimens also known as exsiccates, usually referring to a set of identified specimens belonging to taxa and distributed among all herbaria around the world. These vegetal materials are subjected to fungal attack and insect pests threatening their entirety. In recent years, disinfection by ionizing radiation has become an effective strategy to preserve cultural heritage objects and archived materials with excellent results. In this work, the effects on color properties of exsiccates samples irradiated with gamma radiation from Co-60 with different absorbed doses were studied. The botanical pressed and dehydrated samples – exsiccates – were selected from the Dom Bento José Pickel Herbarium (SPSF), located at São Paulo (Brazil). Two exsiccate samples were selected: SPSF-4021 and SPSF-08821. These samples come from Asteraceae and Solanaceae family and were collected in 1946 and 1984, respectively. Families of selected botanical collections are very susceptible to biodegradation. The irradiation was performed at the Multipurpose Gamma Irradiation Facility at IPEN applying absorbed doses of 1 kGy, 6 kGy and 10 kGy. The selected ranged dose promotes insect disinfestation and fungal disinfection. Results were analyzed using colorimetry with CIELAB color space scale. Scanning electron microscopy were performed to analyze surface topography and elemental structure modifications by ionizing radiation and characterize the non-irradiated (0 kGy) and the effective disinfected (10 kGy) exsiccata samples. The results revealed no significant changes on colorimetric morphological properties of then irradiated samples. The color changes between the non-irradiated samples and the irradiated sample at the high absorbed dose are perceptible, but acceptable considering the adopted scale. The microscopy images of the non-irradiated and 10 kGy irradiated samples did not show significant differences in the topographic morphology of the exsiccata samples. The results obtained corroborate the studies of the application of gamma radiation to preserve materials of cellulosic origin. Subsequently and for continuity of this research, other samples will be analyzed.