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Title: Novel Comparative Efficiency of Ozone and Gamma Sterilization on Fungal Deterioration of Archeological Painted Coffin, Saqqara Excavation, Egypt
Author(s): Geweely, NS (Geweely, Neveen S.); Afifi, HAM (Afifi, Hala A. M.); Abdelrahim, SA (Abdelrahim, Shehata A.); Alakilli, SYM (Alakilli, Saleha Y. M.)
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Abstract: An archeological wooden painted coffin was excavated in Tety tomb from Saqqara excavation. It belonged to the Ministry of Antiquities. This coffin was discovered in a bad state of conservation with many destroyed big and small pieces in Saqqara stores. Analyses and investigation study were performed on the ground layer of the coffin by X-ray diffraction (XRD), Energy dispersive X ray analysis (EDX) equipped with environmental scanning electron microscopy (ESEM) and Fourier transform infrared spectroscopy (FTIR). Results confirmed that the degradation factors affecting the wooden painted coffin are essentially attributed to direct effects of microbial phenomena, which have lead to many deterioration forms as: macro-and microcracks, hydrated salts, flaking, coloration, scaling and defoliation microbiological spots. Nine deteriorating fungal species were isolated from the painted and ground layers of the tested coffin. Fusarium moniliforme followed by Aspergillus flavus able to significantly solublize calcium salts as major components of the ground layer of archeological wooden coffin. Effect of ozone and Gamma sterilization on growth; lipid, tryptophan oxidation and protein, nucleic acid leakage in the most dominant toxigenic deteriorated fungal species were detected. No mycelial growth was observed at 4 ppm of ozone at all exposure times. As Gamma radiation dose increased over 250 Gy, the growth parameter gradually decreased to reach the lethal dose at 2000 Gy. The production of mycotoxins by the tested toxigenic fungi was completely disappeared under the exposure to 3 ppm and 90 min to ozone.

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Addresses: [Geweely, Neveen S.; Alakilli, Saleha Y. M.] King Abdulaziz Univ, Fac Sci, Dept Biol Sci, Jeddah, Saudi Arabia.
 [Geweely, Neveen S.] Cairo Univ, Fac Sci, Dept Bot, Giza, Egypt.
 [Afifi, Hala A. M.] Cairo Univ, Dept Conservat & Restorat, Fac Archaeol, Giza, Egypt.
 [Abdelrahim, Shehata A.] Fayoum Univ, Fac Archaeol, Dept Conservat & Restorat, Faiyum, Egypt.
Reprint Address: Geweely, NS (reprint author), King Abdulaziz Univ, Fac Sci, Dept Biol Sci, Jeddah, Saudi Arabia.
E-mail Addresses: ngeweely@yahoo.com

Author Identifiers:

Author	ResearcherID Number	ORCID Number
Fac Sci, KAU, Biol Sci Dept	L-4228-2013	
Faculty of, Sciences, KAU	E-7305-2017	
affi, hala		0000-0002-7219-2991
geweely, neveen		0000-0002-9170-1114

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