

The global legacy of historic biocide use in heritage collections: Contemporary exposure implications for staff and researchers in the 21st century

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Over the past few centuries, it has been common practice for collectors, particularly those with interests in natural history, to preserve their artefacts through the application of a wide range of biocidal compounds. Many, if not all, of these compounds have been banned from use in modern day on health and safety grounds. Significant residues of these pesticides and herbicides still remain within natural history collections across the world – a problem that is exacerbated by poor and incomplete records.

Museums, which often house vast natural history collections, are today faced with the need to enforce implementation of safe, standard procedures to protect personnel and visitors when handling the collections, but are often without the means, or the knowledge, to do so. Where historic records are missing, it is impossible to identify which artefacts are contaminated, and with what. For most museums, chemical analysis of collections (which may consist of several hundreds of thousands of specimens) is economically non-viable, and ethically problematic, where sampling is required.

Current research at Lincoln is looking at the interaction between the aging natural history artefact and the biocide residues still present, in order to develop rapid and cheap screening methods for biocide identification. Research with the National Museum of Wales has shown that, over time, the aging processes of the cellulosic backing sheets within herbaria collections have reduced the Hg(II) biocide residues present. The resultant Hg(I) products are fluorescent, and readily identified using a hand-held UV lamp. This is a very simple and cheap technique that is accessible to even the smallest museums across the world. It will allow the identification of contaminated specimen sheets in large collections and allow prioritization of samples for immediate remounting. In this way, significant levels of hazardous chemicals can be removed from the herbarium environment.

Biography

Belinda J. Colston is an analytical chemist with more than 25 years research experience in academia. She gained her Ph.D. from the University of Manchester in 1989, and took up her first lectureship in 1993 in the Department of Chemistry at De Montfort University, Leicester. In 2003, Professor Colston moved to the University of Lincoln, where she was awarded the Chair in Analytical Chemistry in 2010. As Director of the Historic and Ancient Materials Research Group, her research is focused on the degradation mechanisms of historic materials and their interaction with local environments, including the effects of chemical residues from historic conservation treatments.

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