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Identification of pesticides in a collection of Yidaki at the South Australian Museum

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ABSTRACT

The exhibition Yidaki; Didjeridu and the sound of Australia, features sound recordings made of selected Yidaki instruments from the collection of the South Australian Museum, which were played by master performer DjaluGurruwiwi and members of his family in 2016. Prior to their playing, the instruments were screened for hazardous chemicals that may have been previously applied to prevent or treat pest infestations. This involved collaboration between South Australian Museum staff, Flinders University scientists, and conservators from Artlab Australia.

Many hazardous chemicals have been used in the past on Museum collections. These chemicals include organochlorides, organophosphates, aromatic hydrocarbons, heavy metals and various biocidal commercial chemicals [1]. Museum staff and visitors alike could be exposed to hazardous chemicals by skin contact as well as by inhalation of dust or volatile compounds [2]. The playing of collection instruments poses an obvious higher risk of exposure.

Elemental analysis was undertaken using portable X-ray fluorescence (PXRF) to analyse for heavy metals. Small (milligram) samples of selected instruments were taken, extracted using organic solvents and then analysed using gas chromatography-mass spectrometry (GC-MS).

Results indicated that bromine, mercury, and arsenic were present on less than half of the 40 instruments analysed. Preliminary results suggest that some pesticides such as 2,4-dichlorophenoxyacetic acid(2,4-D), 2-methyl-4-chlorophenoxyacetic acid (MCPA) and chlorpyrifos (CPF) are not present. However, initial results suggest the presence of naphthalene. Additional analysis will be undertaken to further confirm this.

1. Rushworth, I.D., et al., *Heritage Science*, 2014. **2**(1): p. 3.
2. Marcotte, S., et al., *Journal of Cultural Heritage*, 2014. **15**(1): p. 68-72.

BIOGRAPHIES

Renita Ryan is the Principal Conservator of Objects at Artlab Australia, where she has worked for the past 17 years. She is also a professional member of the AICCM.

Alice Beale is the Senior Collection Manager of Anthropology at the South Australian Museum, where she has worked for the past 4 years. Prior to the South Australian Museum Alice worked as an Assistant Curator at the Western Australian Museum.

Maximilian Mann is a third-year analytical chemistry student at Flinders University. His independent research project involved the method development, analysis and identification of organic pesticides on objects from the South Australian Museum.

Associate Professor Rachel Popelka-Filcoff uses advanced analytical methods to analyse cultural heritage materials at Flinders University. Her work is the first comprehensive characterisation of Australian Aboriginal natural mineral pigments. She is the President of the Society for Archaeological Sciences, and on the editorial board of Journal of Archaeological Science.