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Abstract

Title:

Tea: An alternative adsorbent for the preservation of cellulose triacetate film

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Abstract:

Cellulose triacetate based film, the main cinematic film produced between the 1940s and the 1990s, is an inherently unstable material, affected by autocatalytic deterioration through hydrolysis. The release of, and subsequent exposure to acetic acid, known as 'vinegar syndrome' accelerates the deterioration process, placing all cellulose acetate based materials at risk, or already in the process of deterioration. Currently, preservation strategies rely on costly low temperature macro-environment storage to slow deterioration, or microenvironments with the addition of adsorbent materials to trap moisture and off-gassed acetic acid.

Specifically designed adsorbent materials, such as molecular sieves, are expensive, require specialist knowledge, and can be difficult to obtain, limiting accessibility for remote, underfunded or community run collections. In addition, a large amount of material is required for effective film preservation, which has negative environmental impacts.

This research investigated the potential for tea and tea waste to act as an alternative, low cost, accessible and sustainable adsorbent material for the preservation of cellulose triacetate film. Adsorption capabilities of a range of tea varieties and treatments were compared with those of the commercially available adsorbent materials activated charcoal, silica gel and molecular sieves. Adsorption testing of a range of relevant solvents established tea as an effective adsorbent of water and acetic acid vapour, with an aversion to adsorption of the common plasticiser dibutyl-phthalate. In addition, accelerated corrosion testing indicated used tea, or tea waste exhibited no detrimental effect on silver, the image forming material in cinematic film. The potential use of tea waste as an adsorbent material involves added cost, sustainability and accessibility benefits.

These findings support tea as a viable alternative adsorbent for the preservation of cellulose triacetate based film materials, requiring further research into optimum application systems.

Brief Biography of the Author(s):

Julianne Bell has a background in archaeology, history, languages and graphic design, and recently graduated from the Master of Cultural Material Conservation at the University of Melbourne specialising in objects conservation. Along with a penchant for ceramic materials and audio-visual preservation, Julianne is currently freelancing as a sculpture and monument conservator.

Petronella Nel has a BSc (Honours), PhD (Chemistry) and MA (Cultural Materials Conservation). She is about to commence leading an ARC-LP titled 'A national framework for managing malignant plastics in museum collections'.

Mick Newnham is currently Manager of Conservation & Research at the National Film & Sound Archive of Australia. He is the current President of the South East Asia Pacific Audio Visual Archive Association (SEAPAVAA) and has contributed to the work of the International Federation of Film Archives (FIAF) Technical Commission, the Association of Moving Image Archivists (AMIA) Preservation Committee and the International Organization for Standardization's TC 46 WG 2-the working group responsible for ISO standards and recommended practices pertaining to the care of audio visual materials.