G35 Factors Affecting the Formation of Adipocere in Soils

Shari L. Forbes, BSc, PhD, Centre for Forensic Science, University of Western Australia, M420, 35 Stirling Highway, Crawley, WA 6009, Australia; Barbara Stuart, PhD, Department of Chemistry, Materials and Forensic Science, University of Technology, Sydney, PO Box 123, Broadway, Australia, 2007; Boyd Dent, PhD, Department of Environmental Sciences, University of Technology, Sydney, PO Box 123, Broadway, Australia, 2007; and Ian R. Dadour, BSc, PhD, Centre for Forensic Science, University of Western Australia, M420, 35 Stirling Highway, Crawley, WA 6009, Australia*

The goal of this presentation is to demonstrate to the forensic community the effect of particular burial factors on the formation of adipocere in a soil environment.

The presentation will impact the forensic community by promoting the significance of adipocere formation in burial environments and encouraging further studies in the field of forensic taphonomy.

This presentation will discuss particular factors that are regularly identified in a burial environment and their effect on the formation of adipocere. The research represents a major component of a three year study investigating adipocere formation in grave soils.

Adipocere refers to a soap-like substance that can form during the decomposition process. It is well known as a later postmortem change, particularly in burial environments. Adipocere formation occurs by the alteration of the soft, fatty tissue of a cadaver into a greyish-white substance which comprises mainly saturated fatty acids. The occurrence of adipocere in a burial environment leads to the inhibition of postmortem changes which subsequently preserves the human remains. The degree of decomposition and differential preservation observed depends on the surrounding environment.

Various conditions associated with the burial environment are believed to contribute to the formation of adipocere in soils. Conditions include temperature, moisture, soil type, soil pH, anaerobic environment and the presence of factors such as clothing, coffin, and lime. In the past there have been numerous observational studies commenting on these particular physical factors and methods of burial. However, the literature demonstrates a distinct lack of chemical studies confirming these observations. As a result, a threeyear study was conducted to chemically investigate the effect of individual burial factors on adipocere formation in a soil environment.

In order to determine the effect of particular burial conditions on adipocere formation, experiments were conducted in a laboratory environment so that the individual variables could be adequately controlled. The experiments utilized porcine adipose tissue collected from the abdominal region of pigs (*Sus domesticus*) reared on identical diets for commercial use. The fatty tissue samples were buried in soil environments and allowed to decompose for a period of 12 months under individual burial factors. At the completion of this period the samples were analyzed to confirm the formation of adipocere and compared with control samples to determine the effect of the burial factors on its formation.

This presentation will discuss the results of the chemical study and identify those factors which accelerate and retard adipocere formation. Adipocere samples collected from grave exhumations and forensic cases were also analysed and the results will be compared with the controlled laboratory experiment. The research findings will highlight the effects of adipocere formation, particularly with regard to overcrowding in cemeteries due to its regular occurrence in grave sites, and its forensic implications when present in shallow burials or mass graves.

Adipocere, Burial Factors, Grave Soils

 ** Presenting Author*