



## Physical Anthropology Section – 2010

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### H75 Predicting the Postmortem Submersion Interval From the Adipocere Formation on Rabbits

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After attending this presentation, attendees will gain a new understanding of the early stages of adipocere formation in relation to accumulated degree days (ADD) in submersed remains.

This presentation will impact the forensic community by assessing the link between adipocere formation and ADD, thus providing information that can assist in a more accurate estimation of postmortem interval (PMI).

Adipocere is often present on decomposing bodies found in damp environments. The formation of adipocere is influenced by a number of factors such as the requirement of a moist and anaerobic environment. In some circumstances the presence of adipocere may retard decomposition. This has the potential to make PMI estimation in such cases difficult. Limited research has been conducted to assess the applicability of adipocere formation to the estimation of postmortem interval, or the impact of adipocere formation on decomposition in relation to ADD. This paper explores the correlation between ADD and the early stage formation of adipocere.

This study, using 60 wild rabbit (*Oryctolagus cuniculus*) carcasses, was carried out in northwest England. A control group (N=30) was deposited on the surface in direct contact with the ground. Chicken-wire cages were used to prevent scavenging. The rabbits of the experimental group (N=30) were submersed in water in individual buckets. Chicken-wire fencing on top of the buckets was used to prevent carcass floatation and to ensure complete submersion throughout the duration of the experiment. Thermocouples and dataloggers were used to measure the water temperatures, individual inner body temperatures and ambient temperature at the site. Data collection protocol for both groups was carried out every 100 ADD. This included assigning a Total Body Score (TBS), taking soil and water samples for pH measurement and for the submersed group, examining the subcutaneous adipose tissue and the internal organs.

The preliminary results of this experiment indicate that adipocere is more likely to form after 630 ADD on submersed remains. No adipocere was formed on any of the control group rabbits. The late occurrence of adipocere establishes the fact that its formation is a feature related to the advanced stages of decomposition. The adipocere found was in its early stage of formation, despite the advanced decomposition of the rabbit carcasses. Previously published case studies indicate that adipocere can also be found on submerged bodies in less advanced stages of decomposition (O'Brien & Kuehner 2007; Nishimura *et al*, 2009). This implies that there are multiple factors influencing its formation.

An important factor in the formation of adipocere is the exposure of the adipose and other internal tissues to water. Intact skin prohibits this contact and therefore may inhibit adipocere formation. Skin slippage is a recognised feature in decomposition which can be used to establish PMI (Heaton, *et al.*, *in press*). In cases where PMI estimation may have been complicated by adipocere formation, knowing that skin sloughing had to have taken place before the adipocere could have been formed could assist in establishing a more accurate PMI.

More extensive research is needed to fully establish the linkages between adipocere formation and ADD.

#### **Adipocere, Postmortem Interval, Accumulated Degree Days**