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Light Stable Isotope Analyses of Experimentally Buried and Medieval Archaeological Textiles

Determining carbon, nitrogen, sulphur, oxygen and hydrogen stable isotope ratios in tissues such as bone collagen, tooth enamel and hair keratin is a well established tool for investigating diet and migration in the past (e.g. Wilson et al. 2007b; Barrett et al. 2008; Balasse et al. 2006). It has also been applied to modern sheep tissue, showing systematic variation between different locations, in sheep wool from across Turkey (Hedges et al. 2005) and in lamb muscle tissue from different regions of Europe (Camin et al. 2007).

Stable isotope analysis thus offers a way of examining the geographic origin of an archaeological wool find, providing there is sufficient isotopic difference between find site and production site. This method is intended to complement established morphological methods to confirm local/extra-local identification of textiles, and to explore the origin of finds where morphological analysis cannot identify the origin (e.g. caulking).

Work in modern sheep tissue has shown that these isotopes' values depend on a combination of factors that include climate (e.g. average temperature and rainfall), environment (type and quality of pasture) and husbandry (nature of feeds and stocking level). Stable isotope analysis of wool finds therefore also has the potential to illuminate sheep husbandry practices in the past.

However, isotopic analysis of hair keratin may be compromised by degradation. The many protein types which make up the hair fibre (Lee et al. 2006) decay at different rates (Wilson et al. 2007a). Isotopic changes may illuminate the nature and rate of this degradation.

This presentation will discuss data obtained from isotopic analysis of medieval textiles from sites around the North Sea, including Reykholt, Iceland, and from experimentally buried material. It will examine the limitations to resolution obtainable with this technique, discuss the effects of diagenesis and explore future applications.

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