



RECONSTRUCTING HUMAN DIETS AT A FINE SCALE: SEQUENTIAL MEASUREMENT OF AMINO ACID $\delta^{13}\text{C}$ VALUES ALONG SINGLE HAIRS OF PRE-COLUMBIAN INDIVIDUALS

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PhD Thesis Abstract

This thesis investigates the application of liquid chromatography-isotope ratio mass spectrometry (LC-IRMS) to archaeological hair keratin as a means to improve human palaeodietary reconstructions. Human mummified tissues were retrieved from various pre-Columbian cemeteries located on the coasts, and coastal and intermediate valleys of northern Chile (Atacama Desert), with the individuals under investigation covering a wide range of cultures and chronological periods. Fine-grained dietary characterisations were undertaken by analysing $\delta^{13}\text{C}$ amino acid values from keratin acid hydrolysates made from scalp hair segments (0.5 or 1 cm in length), cut sequentially along a single hair fibre. Interpretations were complemented by bulk carbon, nitrogen, and sulphur stable isotope analysis of hair bundles, and additional non-skeletal tissue (tendon), when available.

Although the improved chromatographic method is capable of measuring samples as small as 0.5 cm from a single hair, repeatability was improved by analysing 1 cm segments, allowing the identification of dietary changes at a virtual monthly scale. The compound-specific approach succeeded in refining the individuals' palaeodietary reconstruction by increasing temporal resolution, and by allowing the identification of the diverse sources of food in the mixed dietary intakes.

Inter- and intra-individual variations in dietary intake were identified and the implications discussed. In brief, Archaic Chinchorros (Maderas Enco, Morro 1 and 1-6) relied predominantly and consistently on marine resources, which continued to be the preferred source of subsistence for the coastal Early Formative individuals (Quiani 7, Camarones 15A). Late Formative individuals (Azapa 14 and 115), a few kilometres inland, displayed terrestrial-based diets typical of agriculturalists and agro-pastoralists. Inka individuals at the coastal site of Camarones 9 relied mainly on marine resources and maize fertilised with seabird guano. At the inland oasis of Pica 8, Late Intermediate Period individuals consumed foods of various provenance as they were likely involved in interregional exchange of goods.

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Reference

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