



Oxygen isotope ratio measurements on bioapatite samples prepared from mammal tissues: method development at ICER Centre

Gabriella Kiss (1), Marianna Túri (1), István Futó (1), János Kovács (2), Péter Szabó (2), and László Palcsu (1)

(1) Isotope Climatology and Environmental Research Centre, Institute for Nuclear Research, Hungarian Academy of Sciences, Debrecen, Hungary, (2) Institute of Geography and Earth Sciences, University of Pécs, Pécs, Hungary

To get more information about the changes of the palaeoclimatic conditions on Earth, many method can be used, especially, stable isotope measurements on different elements. Beside the stable isotope analysis of hydrogen, carbon and nitrogen, which can provide interesting facts about the environment and diet in case of modern samples, the stable isotope measurements of other elements like oxygen can complete these informations with other data, for example the environmental water temperature, in case of older samples.

During this work we compared some different preparation methods for oxygen isotope analysis of biological apatites. To carry out these measurements, well preserved tissues should be used for the chemical processes, for example scales, teeth or bone pieces/powder. During our experiments the effect of the different precleaning methods (*a.* distilled water; *b.* 1 M calcium acetate—acetic acid buffer solution; *c.* 10 % hydrogen peroxide and 1 M calcium acetate—acetic acid buffer solution) and the duration of the hydrogen-fluoride treatment (6, 12, and 24 hours) were examined. The preparation methods were tested on enamel samples (mainly *Stephanorhinus sp.*), with a well known and previously published $d^{18}O_{\text{phosphate}}$ vs. VSMOW values between +11 ‰ and +20 ‰ (Szabó et al., 2017). The phosphate $d^{18}O$ ratio of the bioapatite was measured in silver phosphate precipitation form. The measurements were carried out on a Thermo Finnigan Delta plus XP isotope ratio mass spectrometer with a TC/EA high temperature elemental analyzer. Through these investigations the relation between the shift in the measured isotope ratios and the precleaning or preparation processes can be brightened. With these comparisons and investigations, our goal is to develop an accurate and precise method for the oxygen isotope analysis of bioapatite at the ICER Centre.

Reference(s):

Szabó et al., Quaternary Science Reviews 157 (2017) 52-65.