Tracing the geographical origin of beefs based on carbon and oxygen isotopes

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To distinguish the country of origin of beefs that are currently sold in Korean market, a comparative analysis was conducted to examine carbon and oxygen isotopic compositions of beefs imported (from the USA, Mexico, Australia and New Zealand) and domestically produced beef. The result of the carbon isotope analysis showed good distinction between Korean beef and beef imported from the USA, Mexico and New Zealand. Based on carbon isotope values, it was difficult to distinguish between beef produced in Korea and beef imported from Australia, but these origins were easily distinguishable from oxygen isotope values. The oxygen isotope values reflect differences in consumed waters of the animal [1,2], according to the latitude of the country in which the beef was produced [3]. Such a result can be utilized to identify the origin of beef samples.

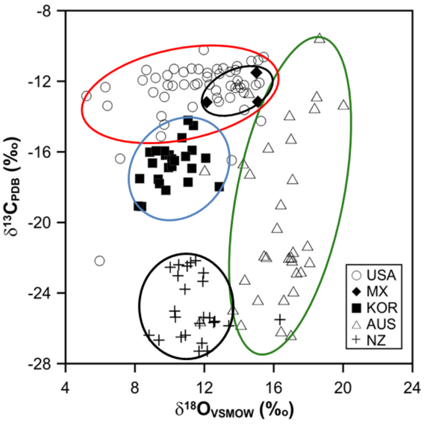

Figure 1: Cross plot of $\delta^{13}C$ and $\delta^{18}O$ values obtained from dry material from beefs produced in several countries.

[1] Franke *et al.* (2005) *Eur. Food Res. Technol.* **221**, 493-503.
[2] Kelly *et al.* (2005) *Trends food Sci. Technol.* **16**, 555-567.
[3] Nakashita *et al.* (2008) *Anal. Chim. Acta* **617**, 148- 152.

Rare earth elements fractionation as proxies of unconformity uranium deposit mineralized fluids

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To better understand the formation of uranium deposits, rare earth elements (REE) and particularly REE compositon of oxides is a powerful tool. Indeed, REE fractionation occurs in uranium oxide [1] by substitution with U and REEs are poorly affected by post-crystallization events [2]. In such a case, REE should provide information on the temperature and redox conditions during deposition, pH and complexing ion concentrations of mineralizing fluids.

We herein document the case of the Athabasca Basin unconformity type, for which REE patterns show a MREE enrichment during incorporation as free species in U oxide for a pH between 3 and 5 [3]. In order to understand the speciation of the mineralized fluid, REE speciation in three multi-ligand solutions (reduced seawater, groundwater and F-rich groundwater) was calculated using PHREEQ-C and Nagra/PSI data base [4], which was modified to include well-accepted infinite-dilution (from 25 to 200°C) of inorganic species. Results from 25 to 200 °C show that at 3<pH<5 (i) in the reduced seawater lanthanides exists; (ii) in the groundwater, lanthanides occur as sulfate and fluoride complexes and free ionic species displaying a MREE enrichment; (iii) in the F-enriched groundwater, lanthanides occurs as free ionic species (HREE enriched) and complexed with fluoride (LREE enriched). Eventually, U oxides patterns are comparable with results of REE speciation in groundwater and LREE ratio indicates a deposition temperature between 125 and 150°C.

[1] Janeczek & Ewing, (1991) *J Nucl Mat* **185,** 66-77 [2] Fryer & Taylor, (1987) *Chem Geol* **63,** 101-108 [3] Kister *et al.* (2005) *Eur J Mineral* **17**, 325-342 [4] Hummel *et al.* (2002) Nagra/PSI Chemical Thermodynamic Data Base 01/01. Universal Publishers, Parkland.