

THE APPLICATION OF BORON AND CARBON STABLE ISOTOPE ABUNDANCE DATA FOR QUALITY ASSURANCE AND UNDERSTANDING THE BIOGEOCHEMISTRY OF COFFEE

1Wieser, M. E., 1Iyer, S. S. and 2Serra, F. 1Stable Isotope Group, The University of Calgary, Calgary, Alberta, Canada; 2Centre for Isotope Geochemistry, Geokarst Engineering, AREA Science Park of Trieste, Padriciano, Trieste, Ita

Coffee is one of the world's most popular beverages and consumers of this product are keenly aware of the relation between the quality of the coffee beans and the enjoyment of the drink. Hence, quality assurance is a major consideration for both importers and exporters of coffee beans. The quality of the coffee depends to a large extent on the geographical and genetic origins of the plant. However, assessing the quality of the product has been largely a qualitative exercise without the benefit of scientifically proven methods. Recent studies by us have shown significant boron isotope abundance variations for a variety of *Coffea arabica* beans representing a number of coffee growing regions around the world. This was likely due to the influence of local sources of boron (including soil, water and fertilizer), each having a characteristic boron isotope abundance ratio. In addition to the quality assurance of commercial coffee, the isotopic data can be used to study the biogeochemical role of boron in coffee plants. The carbon isotope analysis of the chemical fractions of coffee is also a potentially useful method to assess coffee quality as the different compounds (lipidic, proteic, etc.) develop at different rates depending on the availability of nutrients and climatic conditions. The combination of both boron and compound-specific carbon isotope analyses can distinguish differences among varieties of coff