ISGC 2022

N°1083 / OC
TOPIC(s) : Life cycle assessment, biodegradability, eco-toxicity

Stable and unstable isotopes fingerprints for biobased qualification, classification and certification

AUTHORS
Olivier BOBIN / CIRAM, 9 ALLÉE JACQUES LATRILLE, MARTILLAC

PURPOSE OF THE ABSTRACT

Many products are manufactured by combining plant-based materials with petrochemicals materials. This "green chemistry" is becoming essential for many industrial fields as it is the future of bioeconomy.

For biobased products, quantification tools and physical measurement technics are essential. Among the different methods available, stable isotopes of carbon, oxygen, nitrogen, hydrogen and the unstable isotope of carbon (carbon-14 or C14) are very efficient tools in the characterization of biobased materials. They are reliable, suitable to all carbon containing materials and easily reproducible.

More specifically radiocarbon is the perfect tool in order to quantify precisely the biobased content, i.e. the concentration of the carbon content within the product derived from biomass and from petrochemicals.
All the materials containing carbon, without any distinction can be tested, for any fields of the industry.
Applications include :
- test the biobased conformity of a raw material & check your supply chain,
- analyse the biobased concentration in a painting or an ink,
- check the percentage of natural and synthetic fibres in a textile,
- certify a construction material for a "biobased product" label,
- analyse a bio cosmetic,
- obtain the OK biobased® label for your bioplastic,
- etc?

The isotope fingerprint linked to all natural products can inform about:
- the geographical origin,
- the botanical processes,
- the fertilization processes,
- the adulteration.

These processes can be traced by stable isotopes quantities of carbon (?13C), oxygen (?18O) nitrogen (?15N) and hydrogen (?2H).

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS
biobased | radiocarbon | quantification | carbon 14

BIBLIOGRAPHY