

Open Bio - WP3 Bio-based content and sustainability impacts

J.W. Hooijmans

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Open Bio

WP 3

Bio-based content and sustainability impacts

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WP 3 – Bio-based content and sustainability impacts

Open Bio - WP3

- Bio-based content

Finalizing the standards (RR) on:

- Bio-based carbon content
- Bio-based content
- Mass Balance ??

- Sustainability impacts

Bio-based content and sustainability impacts

Activities Bio-based content

- TC 411 - WI 00411001-
*FprCEN/TS 16640: Bio-based products —
Determination of the bio based carbon
content of products using the
radiocarbon method*

*Summer 2014 starts Round Robin for
finalizing the standard
- 6 samples to be used with 9 labs*

Activities Bio-based content

- TC 411 – WI 00411008

Bio-based products - Determination of the bio-based content - Method based on the ^{14}C content and elemental analysis

Summer 2014 starts Round Robin for finalizing the standard

Activities Bio-based content

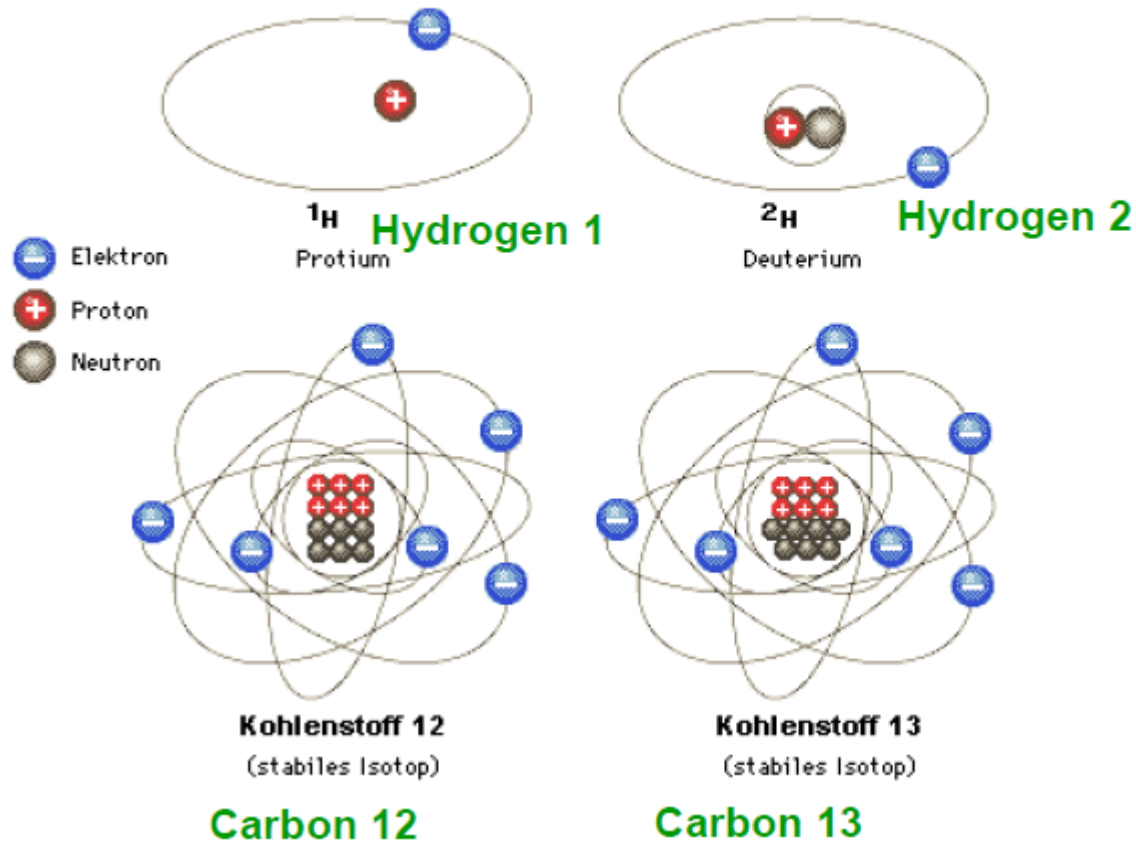
- *Mass balance method*
Still under development in TC 411 / WG 3

Not for products, but for processes
Varying raw materials

Sustainability

- *Not only bio-based content is important but also what and from where plays a part*
- *Stable Isotopes*

Stable Isotopes: examples



1 : 2

Mass

12 : 13

„Bioelements“ and Stable Isotopes

Main elements: COHNS

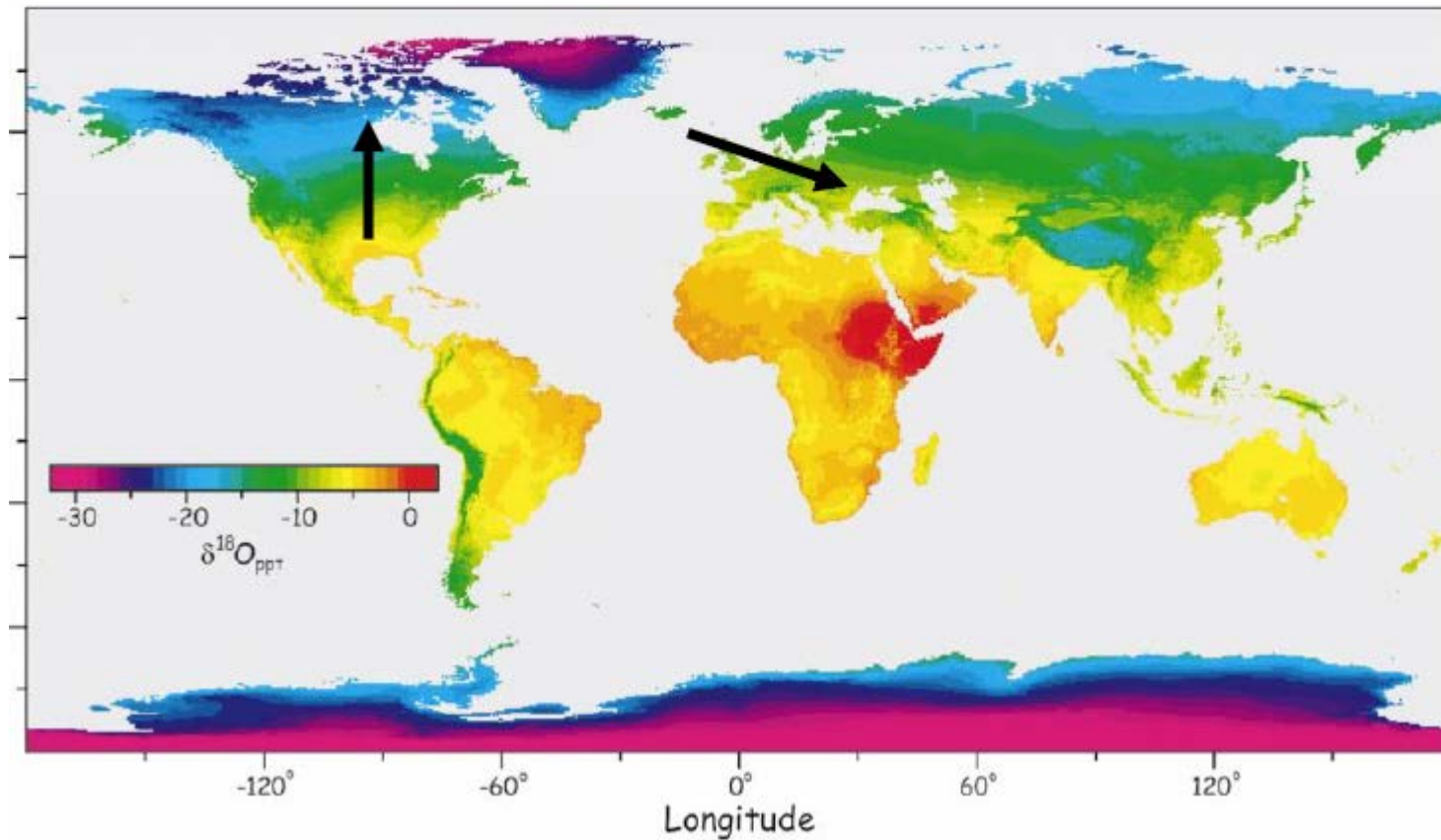
		%
H	1 2 (3)*	99.9 0.01 1
C	12 13	99 1
N	14 15	99.6 0.4
O	16 17** 18	99.76 0.04 0.2
S	32 33** 34	95 0.7 4,2

*radioactiv

** usually not measured

Global isotopic Pattern (of ^{18}O e.g.)

Therefor: **Each location has a constant isotopic composition of water (global network) > tracing back of materials possible.**



Application in
food control

Sustainability issues,
including type of
biomass and origin

Water reflects with the
 $^{18}\text{O}/^{16}\text{O}$ isotopic ratio
the region

Nitrogen and sulphur
mark the location by
their $^{15}\text{N}/^{14}\text{N}$ and $^{34}\text{S}/^{32}\text{S}$

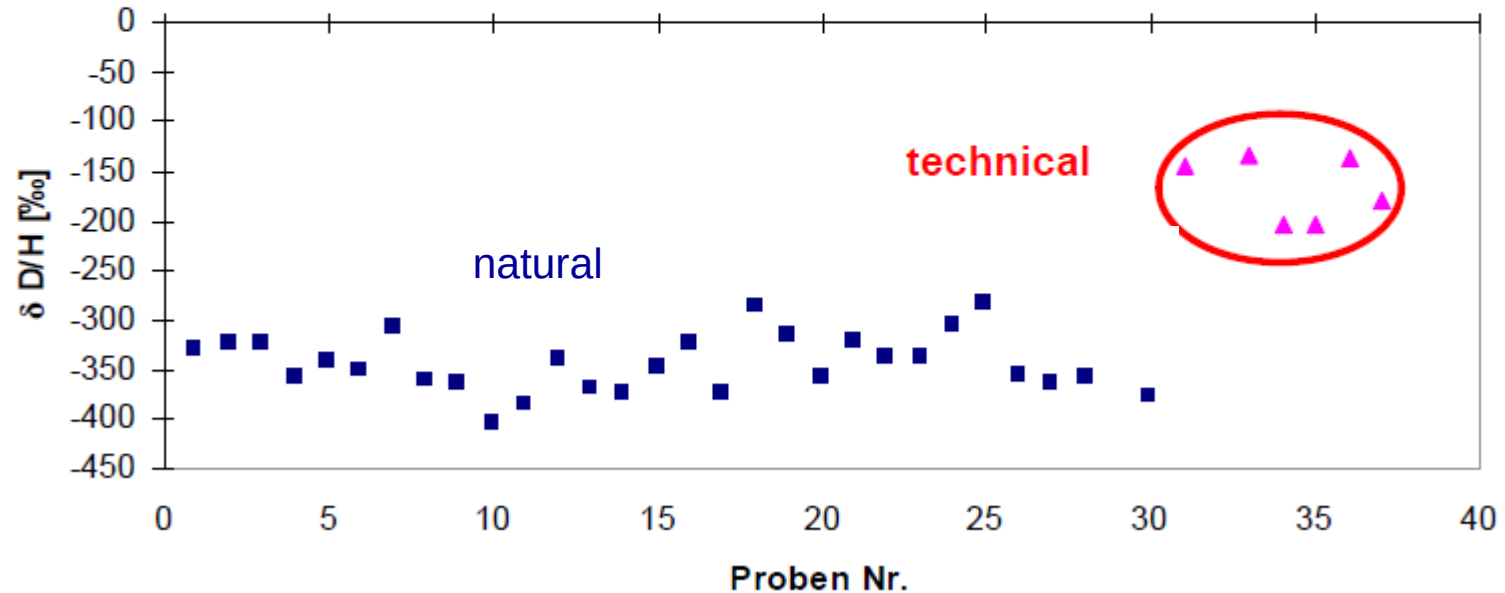
Isotopic ratio of carbon
reflects the plant species
and the climate



Use for confirmation of claims

Example: Acetic acid

Hydrogen is a very sensitive tool to detect synthetic origin of substances (large effect, CH_3 -group only, not $-\text{COOH}$).



Conclusions

Stable isotopes are mainly used to confirm or reject the origin of products (authenticity, tracing back)

They can distinguish between different pathways of synthesis and raw materials (C3 and C4)

Stable isotope compositions are not easy to change (or even not at all of solid materials)

Because of the range of variations within natural materials quantification is only possible if the isotopic composition of the raw materials are known.

ECN

Westerduinweg 3
1755 LE Petten
The Netherlands

P.O. Box 1
1755 LG Petten
The Netherlands

T +31 88 515 4949
F +31 88 515 8338
info@ecn.nl
www.ecn.nl

