Stable Isotopes Support Functional Ingredients Research

How can we prove that our ingredients are the ones that are beneficial for human health? 'Quite simple', according to IsoLife - as long as they originate from plants.

IsoLife BV, a spin-off from Wageningen-UR, is located in the center of Food Valley. They are specialized in labelling plants with ^{13}C, a safe, non-radioactive stable isotope. The degree of labelling is up to 98%, in which case almost every single ^{12}C-atom in the plants' molecules has been replaced by a ^{13}C-atom. In a short interview, **Dr. Ton Gorissen** and **Dr. Ries de Visser**, founders of IsoLife, give their view on how stable isotopes can be used to support health claims for functional ingredients.

Why should we use ^{13}C-labelled plants or plant components like ^{13}C-fibers or ^{13}C-starch? - "To be able to measure the bioavailability of ***your*** ingredients or to demonstrate that certain metabolites in the intestines, blood or excreta are derived from them." Gorissen gives an example: "Fibers like resistant starches are fermented in the gut system yielding short chain fatty acids such as butyrate. Butyrate is thought to have important protective effects on the development of colon cancer. The only way to prove that the measured butyrate in the gut system or in the blood stream originates from ***your*** fibers, is by isotopic labelling of these fibers, preferably with ^{13}C. This enables you to distinguish them from butyrate originating from ***any*** other source present in your diet or metabolism, ^{13}C is a perfect tracer for this purpose."

What are main advantages of using ^{13}C-labelled components? – "Several," according to de Visser, "but the most important ones are that the underlying working mechanisms are revealed and the variation in your results is drastically reduced, since every volunteer is her/his own control. This will at least decimate the number of volunteers needed for a human trial - thus substantially reducing the costs - and it will make your evidence more sound and acceptable by EFSA (European Food Safety Authority)."

"In addition to their use as tracers," Gorissen adds, "several of our products are also employed in laboratories as internal standards. Adding a tiny amount of our ^{13}C-labelled plant components to your samples, gives you the ability to eradicate variation due to different machines, different technicians, different laboratories and independent of processing times and procedures. The internal standard acts as a perfect yardstick."

Can all ingredients/plants be labelled with ^{13}C? – As long as they fit in the special labelling phytotrons: yes.

In the past, IsoLife has labelled many different food crops such as wheat, maize, potato, broccoli and tomato, but also herbs like basil and sage, and even small trees. "However, slow growing *Cactaceae* will be difficult," jokes De Visser. "Thus, most plant-derived ingredients can be used as ^{13}C-tracer or standard, including for instance carbohydrates, fatty acids, and polyphenols."

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