

Using magnetic resonance to evaluate food quality

July 27 2017

The applications and benefits of nuclear magnetic resonance (NMR) in medicine are well known, but the technology is also used in other areas such as agribusiness, where its applications include quality analysis of seeds and other products of animal and plant origin. NMR has recently reached the retail commerce sector, where it expedites the assessment of meat and fruit quality in supermarkets.

Fine Instrument Technology (FIT), a Brazilian company based in São Carlos (São Paulo State, Brazil), has developed a low-field NMR device that takes a few seconds to perform chemical and physical analyses of fruit, grains, olive oil, milk and meat, among other products. "[The technology](#) is different from that used in NMR devices for medical applications," says Daniel Consalter, Ph.D. in physics and one of FIT's managing partners.

The device, called SpecFIT, uses low-field NMR and does not produce images. It measures the sugar content of fruit via the fade duration of an incident radio frequency pulse, which is then compared digitally with information in a database that translates the measurement into the chemical composition of the product. The same technology can be used to analyze beef in terms of fat content, moisture, tenderness, flavor and succulence.

The SpecFIT food system is scheduled for launch at the end of 2017. It will consist of a low-field NMR device with an antenna or probe, a radio transceiver, and a computer. The device sends a radio signal to the

sample, which can be a food product, for example. The signal is captured by an antenna inserted into the sample. The antenna then emits a [radio signal](#), which is digitized, analyzed and converted into product quality information. "The faster the signal from a piece of fruit disappears, the sweeter it must be, since signal fade is proportional to the viscosity of the water in the [fruit](#), which in turn depends on the amount of sugar," Colnago explains.

FIT used the same technology in developing a [device](#) that analyzes the oil content of dende palm and seeds without having to dehydrate them first. "In the conventional approach, the measurement of [oil content](#) in samples requires an extraction method that can take up to 48 hours and entails the use of solvents and heat. With the new technology the entire procedure takes no more than three minutes, including sampling, weighing and measuring," Consalter says.

Provided by FAPESP

Citation: Using magnetic resonance to evaluate food quality (2017, July 27) retrieved 27 April 2024 from <https://phys.org/news/2017-07-magnetic-resonance-food-quality.html>

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