

# New path studied to create dry probiotic apple cubes

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Researchers of the Universitat Politècnica de València and the Universidade Federal do Ceará (Brazil) have completed a study that lays the foundation to produce packaged apple cubes enriched with *Lactobacillus casei* probiotics. The work has been published in the most recent edition of the *Journal of Functional Foods*.

According to the researchers, the enrichment of foods with probiotic strains can provide important health benefits. "They contribute to reducing the risk of cardiovascular diseases and type 2 diabetes, they have anti-inflammatory potential and protect against colitis, among other benefits," says Juan Andrés Cárcel, researcher of the Analysis and Simulation of Agri-food Processes Group at the Universitat Politècnica de València.

In order to produce these new products, the Spanish and Brazilian researchers dried the fruit at three temperatures during their study – 60 degrees being the highest, followed by 40 and lastly 10 degrees, combined, or not, with ultrasounds.

"The process is relatively simple. The fruit is impregnated in a dilution of probiotics and the product is then subjected to the drying techniques. Initial results show they could be a viable, low-cost alternative to produce new foodstuffs, snacks, etc, enriched with probiotics," says Cárcel.

## Mathematic model

In the study, researchers of the Universitat Politècnica de València and the Universidade Federal do Ceará developed a mathematic model which made it possible to predict the drying kinetics and the inactivation of *Lactobacillus casei* in the analysed samples.

The researchers found that the application of ultrasound, for the drying at both 60 and 10 degrees, resulted in a final product containing a high enough concentration of *Lactobacillus* to surpass the established threshold to be considered probiotic food.

"The drying speeds rose as the temperature of the process increased and with the application of ultrasounds. In regards to the concentration of probiotics in the apple cubes, in some of the tested conditions, it was similar to the concentration of microorganisms present in commercial probiotic dairy products. The results produced after drying at 10 and 60 degrees with ultrasounds were specifically interesting. This opened up the possibility of producing dry [probiotic](#) apple snacks," says Antonio Mulet, also a researcher for the Analysis and Agro-food Processes Simulation Group at the Universitat de València.

Until now, probiotics were found mainly in dairy or liquid products. As the researchers highlight, this study offers positive preliminary results and constitutes a first step in order to produce fruits enriched with these strains.

**More information:** Sueli Rodrigues et al. Development of dried probiotic apple cubes incorporated with *Lactobacillus casei* NRRL B-442, *Journal of Functional Foods* (2017). [DOI: 10.1016/j.jff.2017.12.042](#)

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