

## *Use of hydrocolloids to develop a tactile food freshness indicator*

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### *Abstract*

Currently, the static “Best Before” and “Use By” dates are the standard in the food industry, but they are often overcautious, and this leads to an increase in unnecessary food waste. FAO (2019) estimated that approximately 30% of food produced for human consumption around the world is either lost or wasted each year. This is equivalent to 1.3 billion tonnes of food. Consequently, the interest in the developments of smart packaging to reduce food waste increased lately.

The objective of this project is to develop a tactile food freshness indicator based on a plant-based gel and placed on a bumpy surface (Mimica Touch). The Indicator is intuitive to use: freshness is associated with a smooth surface of the gel layer and upon break down the bumps can be felt. This makes the indicator inclusive for people with visual and cognitive impairments too.

Characterisation of hydrogels from different sources was carried out (i.e. gel strength and firmness, melting temperature, viscosity and microbial content) to select the optimal material.

In order to control the gel liquefaction, two different paths were examined: enzymatic digestion and the use of chaotropic agents (e.g. alkaline solutions) to disrupt the hydrogen bonding of the gel network. The rate of the reaction is proportional to the ambient temperature experienced by the product and was matched with its spoilage rate.

The results obtained show excellent correlation to predict the freshness of different food products (milk  $\rho_{xy}=1$ , and orange juice  $\rho_{xy}=1$ ). This technology could potentially help to decrease food waste.

She is the R&D Team Leader at Mimica Lab Ltd, working on the development of a temperature-sensitive indicator for food freshness.

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### *Speaker Biography:*

Giorgia Raci is a second year PhD student at Chester University, after completing a Master Degree in Food Science and Human Nutrition at Università degli Studi di Torino (Italy).