

# Place Gelation of UHT milk: An applicative study

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## Abstract

Stability of UHT milk during storage is a crucial aspect for both consumers and manufacturers and gelation represents the main cause of product recall from the market. Factors causing milk gelation are not fully understood yet but a primary responsibility is attributed to bacterial peptidases remaining active in milk after thermal treatment. These peptidases are encoded by *aprX* gene that is mostly harboured by psychrotrophic bacteria. Thus, storage of raw milk at low temperature causes an increase in this population and ultimately in the enzyme density. In gelled UHT milk, these peptidases showed a specific proteolytic activity on  $\kappa$ -casein, with the release of soluble peptides here proposed as early indicators of milk gelation onset. An applicative study was carried out to validate this approach and a Capillary Zone Electrophoretic method was developed to evaluate the presence of these markers in milk. Three bacterial strains (*Pseudomonas poae*, *Pseudomonas fluorescens* and *Chryseobacterium joostei*), isolated from raw bulk milk collected at an industrial plant, were inoculated (10<sup>3</sup>- 10<sup>4</sup> CFU/mL) in microfiltered milk and incubated at 4°C for up to six days. Every day, the cultured milk samples were batch-sterilized (98°C for 8 min) and stored up to 90 days at 25 or 40°C to study the ability of peptidases previously produced by the three strains to release the target peptides and cause milk gelation. Specific proteolysis evaluated in these milk samples led us to formulate a mechanism for milk gelation onset.

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## Biography

Paolo D'Incecco has completed his PhD in Food Systems at the University of Milan implementing his studies on structure of dairy products at the Advanced Microscopy Platform of Bio21 Institute, University of Melbourne, and at Max Rubner Institute (MRI), Kiel, Germany. Currently, he is a Postdoctoral Fellow in the Department of Food,

Environmental and Nutritional Sciences, University of Milan, where he is running research on the evaluation of the effects of selected technological treatments on milk and dairy products by different approaches, including microstructure analysis. He has published 13 papers on these topics in reputed international journal.