Sensor Fint 2021 - Smart Spectral Sensors for Agri-Food Quality and Process Control

Theme: **No specific theme**

Título: An inline optic sensor technology to determine milk pH in yogurt manufacturing

Abstract:
Accurate determination of yogurt fermentation end-point (i.e., the end of the fermentation process at pH = 4.6) is essential for yogurt manufacturing. As a result of the high complexity of milk fermentation induced by lactic acid bacteria, an inadequate fermentation end-point selection could significantly compromise manufacturing cost and the final yogurt quality. Currently, acid coagulation to produce yogurt in the industry is monitored from discontinuous pH measurements that are measured manually every 10-15 minutes, a laborious and inaccurate technique. This work evaluates an in-line optical method that allows continuous determinations to predict the pH progress during yogurt fermentation in order to eliminating the need to take periodic samples. The method uses a NIR light backscatter probe that works at 880 nm. A pilot-scale experiment was designed with five replicates to study the effects of three different levels of milk fat (0.2 g / 100 mL, 1.6 g / 100 mL, and 3.6 g / 100 mL) with a concentration of 3.7 g / 100 mL protein in yogurt fermentation at 43 °C. The results showed that the optical sensor technology was suitable for inline monitoring of yogurt acidification. The inline optical pH prediction models were successfully validated with standard error of prediction values of 0.004, 0.001 and 0.006 pH units and coefficients of variation of 0.086, 0.021 and 0.123% for skimmed, semi-skimmed and whole milk, respectively. Continuous, pilot plant validation of the prediction model improved the results of previous lab-scale work. It can therefore be said that the method seems to have a promising future at the industrial level by facilitating the monitoring of the yoghurt fermentation process.

Bibliography::
The abstract does not contain any literature reference. I have included a short BIO.
Dr. Castillo joined the Universitat Autònoma de Barcelona (UAB) as Associate Professor of Food Processing in 2009, where he has been recently promoted to Full Professor. He came from the University of Kentucky (UK) where he was Assistant Research Professor (Biosystems & Agricultural Engineering, BAE). Professor Castillo's research program focuses on the development of optical sensor technologies for food process control. Summarized scientific production track-record is as follows: Funded projects–37 (21 as PI); Competitive research funds received–2.5 million €; US Patents–2; EU patents – 1; EU patents under review–1; patent pre-evaluations -6; publications -321 (Refereed articles–73; Book chapters–5; Non-refereed articles–17; Conference papers–60; Presentations at conferences –oral & posters–166); Students advised–44 (6 postdoc, 10 PhD., 19 MS, and 9 TFG); International visiting scholars–22; Interns/part time employees–51; Presentations/invited conferences–35; International professors invited–18. His outstanding scientific contribution in the chemical and engineering sector of dairy products processing has been recognized with two prestigious international awards in the US (IDFA Research Award in Dairy Food Processing -ADSA, 2008- and Samuel Cate Prescott Award for Research –IFT, 2009-).

Envío de resumen
Referencia del resumen: SF2021-38064

Palabras clave:

pH, inline, monitoring, optic sensor

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Notas: