Comparison between chemometric analysis and machine learning for the prediction of macronutrients in fresh cheeses from the Netherlands

Cristina Malegori et al, employed near-infrared hyperspectral imaging (NIR-HSI) to discern and predict dehydration, proteolysis, and lipolysis during the maturation period, with a specific focus on a particular cheese type: Formaggetta, a semi-hard cheese typical of a region in Italy. (1)

Furthermore, Calvini et al, used HSI to quantify the rind percentage in grated Parmigiano Reggiano cheese samples. These authors converted Each hyperspectral image into a one-dimensional signal referred to as a hyperspectrogram, which includes the information present in the image.(2)

While most calibrations of NIR or HSI models conducted on cheese samples were specific to a single cheese type, da Costa Filho et al chose a more generalized approach, using five types of cheese in the same calibration.(3) This approach, where more than one type of sample is incorporated into the model, can be referred to as a 'broad-based approach.'

In 2019, Stocco et al. collected a total of 1,050 diverse cheeses, categorizing them into 37 groups. They calibrated eight models using NIR data obtained from three different instruments to assess and compare their performances.(4)

In the present study, XXXX different types of samples of cheeses from The Netherlands were utilized to calibrate and validate NIR models for predicting macronutrient content. To the best of our knowledge, such an extensive range of diverse cheese varieties has never been employed in a single model, representing an 'extremely broad-based approach.'

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2. Calvini RM, Sara & Pizzamiglio, Valentina & Foca, Giorgia & Ulrici, Alessandro. Exploring the potential of NIR hyperspectral imaging for automated quantification of rind amount in

grated Parmigiano Reggiano cheese. Food Control 2020;112(107111).

3. Paulo Augusto da Costa Filho PV. Broad-based versus specific NIRS calibration: Determination of total solids in fresh cheese. Analytica Chimica Acta. 2005;544(1-2):82-8.

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