**Validation and accreditation of automatic method in NIR Near Infrared Spectroscopy on butter matrix**

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Under Regulation EU No. 1169/2011 on the provision of food information to consumers, the mandatory nutrition declaration gives the energy value and the amount of fats, saturated fatty acids, carbohydrates, sugars, proteins, and salt in prepackaged food (Article 30).

Here we describe the validation process of near infrared reflectance (NIR) spectroscopy for determining nutritional parameters in a butter matrix. All 145 samples were analyzed in duplicate using the NIR method on an NIRFlex 500 spectrometer and accredited instrumental analytical techniques. Samples were measured in a Petri dish, in which the entire surface was covered. A quantitative-predictive model was created by comparing the results of the reference analytical method with those obtained with NIR spectroscopy. The carbohydrate and energy values were calculated.

Calibration was performed using 85 samples on average. The R2 (regression coefficient) ranged between 0.72 (protein) and 0.92 (moisture) and error (SEC) between 0.030 (salt) and 1.22 (saturated fatty acids). 25 samples were used on average for method validation. The R2 ranged between 0.59 (salt) and 0.91 (fat) and error (SEP) between 0.037 (salt) and 1.29 (saturated fatty acids).

This effective and quick method has been positively validated and our laboratory has obtained accreditation from Accredia. Prepackaged food product labels carrying a correct nutritional declaration ensures that consumers can make informed choices about their food purchases.

**Keywords:** NIR Spectroscopy, butter, nutritional parameters, validation

REFERENCES

BUCHI NIR-FLEX 500 User Manual

EU Reg. No. 1169/2011 and subsequent amendments

Guideline of the Ministry of Health on analytical tolerances applicable in the official control phase, June 16, 2016.

ISO 21543:2020 Milk and milk products — Guidelines for the application of near infrared spectrometry