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Building global models for fat and total protein content in raw milk based on historical spectroscopic data in the visible and short-wave near infrared range

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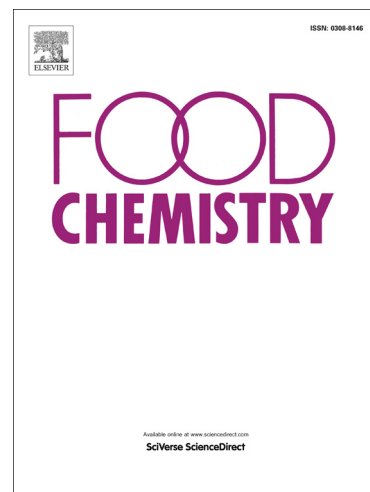
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1 **Building global models for fat and total protein content in raw milk based on**
2 **historical spectroscopic data in the visible and short-wave near infrared range**

3

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8

9 **Abstract**

10 A large set of fresh cow milk samples collected from many suppliers over a large
11 geographical area in Russia during a year has been analyzed by optical spectroscopy in the range
12 400–1100 nm in accordance with previously developed scatter-based technique. The global (i.e.
13 resistant to seasonal, genetic, regional and other variations of the milk composition) models for
14 fat and total protein content, which were built using Partial Least-Squares (PLS) regression,
15 exhibit satisfactory prediction performances enabling their practical application in the dairy. The
16 root mean-square prediction errors (RMSEP) were 0.09 and 0.10 for fat and total protein content,
17 respectively.

18 The issues of raw milk analysis and multivariate modelling based on the historical
19 spectroscopic data have been considered and approaches to the creation of global models and
20 their transfer between the instruments have been proposed. Availability of global models should
21 significantly facilitate the dissemination of optical spectroscopic methods for the laboratory and
22 in-line quantitative milk analysis.

23

24 **Keywords:** milk analysis, global modelling, light scatter, visible spectroscopy, short-wave near
25 infrared spectroscopy, model transfer, variable selection

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