Development of a new equation based on MIR spectra to predict lipolysis in dairy goats

Marine Gele, Sofia Meurisse, Philippe Trossat, Aurore Oudotte, Thierry Fassier, Hugues Caillat, Philippe Lamberton, Alexandra Eymard, Hélène Larroque, Laurence Bernard, et al.

▶ **To cite this version:**

Marine Gele, Sofia Meurisse, Philippe Trossat, Aurore Oudotte, Thierry Fassier, et al.. Development of a new equation based on MIR spectra to predict lipolysis in dairy goats. 2023 ICAR/Interbull Conference, May 2023, Toledo, Spain. 2023. hal-04178538

HAL Id: hal-04178538
https://hal.inrae.fr/hal-04178538v1

Submitted on 8 Aug 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

ICAR 2023	Submission date 29/03/2023 Submission time 10:34 PM

Contact person's details

First Name	Marine
Surname/ Family Name	Gelé
Company / Institution	INSTITUT DE L'ELEVAGE
City or Town	PARIS
Phone number	+33249710631
Email address	marine.gele@idele.fr

Summary

Reference number	35
Title	**Development of a new equation based on MIR spectra to predict lipolysis in dairy goats**
Sessions / Topics	Session 07: Latest tools using MIR-spectra in the ICAR world
Presentation preference	Oral Presentation preference

Authors	Marine Gelé [1], Sofia Meurisse [1], Philippe Trossat [2], Aurore Oudotte [2], Thierry Fassier [3], Hugues Caillat [4], Philippe Lamberton [5], Alexandra Eymard [6], Hélène Larroque [7], Laurence Bernard [8], Catherine Hurtaud [9], Christelle Cebo [10]
Centers	[1]Institut de l'Elevage, PARIS, [2]Actalia-Cécalait, Poligny, [3]INRAE UEP3R, Osmoy, [4]INRAE FERLUS, Lusignan, [5]INRAE IEPL, Le Rheu, [6]INRAE MoSAR, Thiverval-Grignon, [7]GenPhySE, université de Toulouse, INRAE, ENVT, Castanet-Tolosan, [8]INRAE, Université Clermont Auvergne, VetAgroSup, UMR Herbivores, , Saint-Genès-Champanelle, [9]PEGASE, INRAE, Institut Agro Rennes-Angers, Saint-Gilles, [10]Université Paris-Saclay, INRAE, AgroParisTech, GABI, Jouy-en-Josas

Abstract text

France is the leading European producer of goat milk. A large majority of this milk is used for cheese processing, with 97,960 tonnes of cheese produced (FAO, 2020) (1/6 of which is produced on the farm), and 15 PDO cheeses. The French goat industry therefore has an interest in producing quality milk. The rate of lipolysis of milk is a quality criterion which must be controlled to maintain the quality of milk and dairy products. Indeed, a high rate of lipolysis leads to a degradation of the organoleptic (rancid taste) and technological (inability to process) properties of the milk.

In France, a prediction equation has been calibrated using bovine mid-infrared spectra (MIR) to quantify the free fatty acids indicative of lipolysis. Although the use of MIR spectra has been developed strongly in dairy cattle since the end of the 2000s to phenotype new traits on a large scale, to date, there is no instrumental method to evaluate lipolysis in goat milk.

The present study aims to develop a prediction equation for milk lipolysis that is specific to goat milk. For this purpose, 518 milk samples were collected from 4 experimental farms, i.e., about 40 goats per farm sampled 3 times (spring, early summer and autumn 2021), to maximise the variability of diets, physiological stages, and breeds (Alpine, Saanen). A joint analysis of lipolysis according to ISO/TS 22113 (BDI method) and by MIR spectrometry was performed on each sample.

The level of lipolysis measured on our population by the BDI method is on average 0.85 mmol/100 g fat, with a median value of 0.51 mmol/100g fat and a standard deviation (sd) of 1.00 mmol/100 g fat.

The equation was developed by partial least squares regression after square root transformation. It has a coefficient of determination R^2=0.91, with a residual standard deviation (Sy,x) of 0.20 mmol/100 g fat.

The relatively high accuracy of this equation should allow to use it to explore the genetic determinism of milk lipolysis in goats. This work offers new perspectives to deepen our knowledge of the mechanisms of lipolysis in goat milk and to improve its control on the farm by a more refined management of the herd, or even by selection.

This work was carried out within the framework of the LIPOMEC project which aims to better understand the molecular mechanisms controlling the degradation of milk fat. The LIPOMEC project was funded by the French Research Agency (ANR-19-CE21-0010 LIPOMEC project).

The authors would like to thank the staff of the experimental units P3R (https://doi.org/10.15454/1.5483259352597417E12), Grignon, Ferlus (https://doi.org/10.15454/1.5572219564109097E12) and IE PL (https://doi.org/10.15454/yk9q-pf68) for their contribution to the data acquisition.

By sending this information you have answered these statements as follows:

I hereby confirm, by submitting this abstract, that I am the author (or I have express and verifiable authorisation of the author) and therefore I hold the Congress organisers harmless in case that this submission would be against the intellectual property rights of others. For submissions with multiple authors I hereby confirm that I have express authorization of all the co-authors to submit the information included in this submission form.

All abstracts accepted for presentation will be published and will be made available both on the website of the Conference and on ICAR website within the official abstracts' publication of the meeting. I hereby authorize my abstract, in case of being accepted by the committee, to be published in the format chosen by the Congress organisers.
Yes