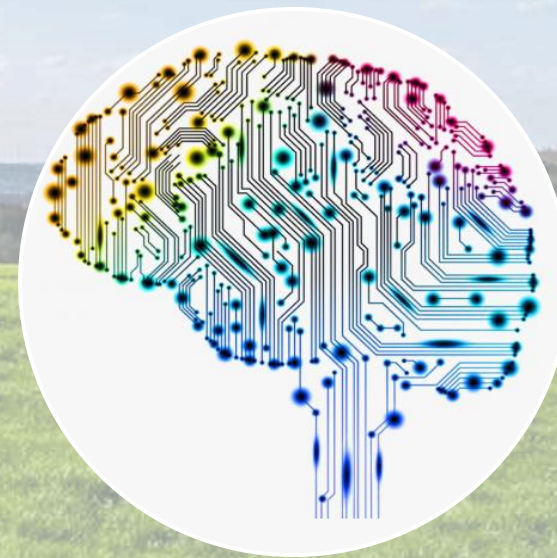


Robustness of derivative-based AI pipelines for inferring herbage consumption from milk FT-MIR indicator

K. Dichou, D. Veselko, A. Marvuglia, H. Soyeurt



Context



Grazing certification

Grazing calendars



Context

Bulk Tank Milk
FT-MIR spectral
predictions

Availability

Automatic

Low-cost

Context

Bulk Tank Milk
FT-MIR spectral
predictions

Grazing indicator

Context

Bulk Tank Milk
FT-MIR spectral
predictions

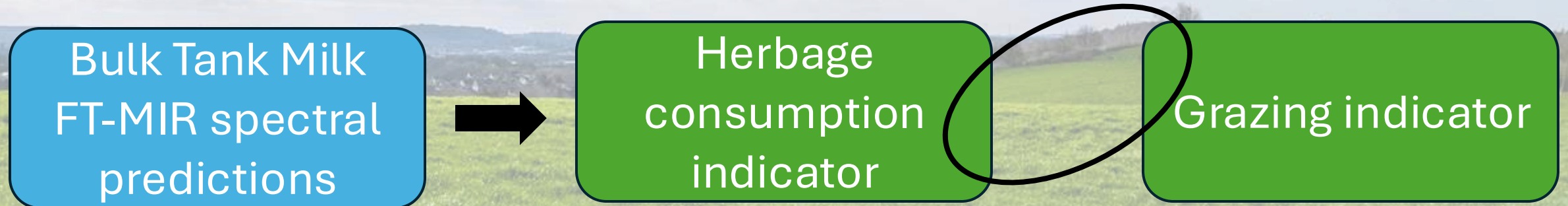


Herbage
consumption
indicator

Grazing indicator



Context



[illegible]

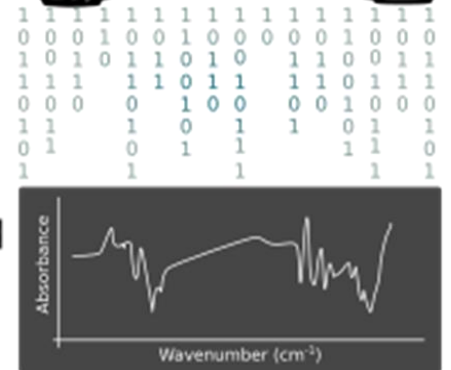
1-3 every day



Milk sample
~1 / month



Milk analysis

Mid infrared
spectrum
data

© A. Tedde 2023

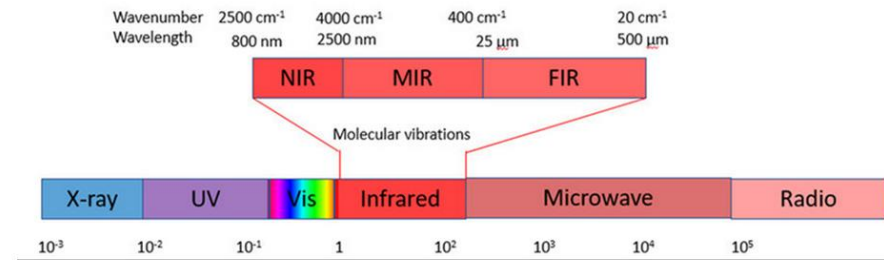
Bulk milk analysis



Milk analysis

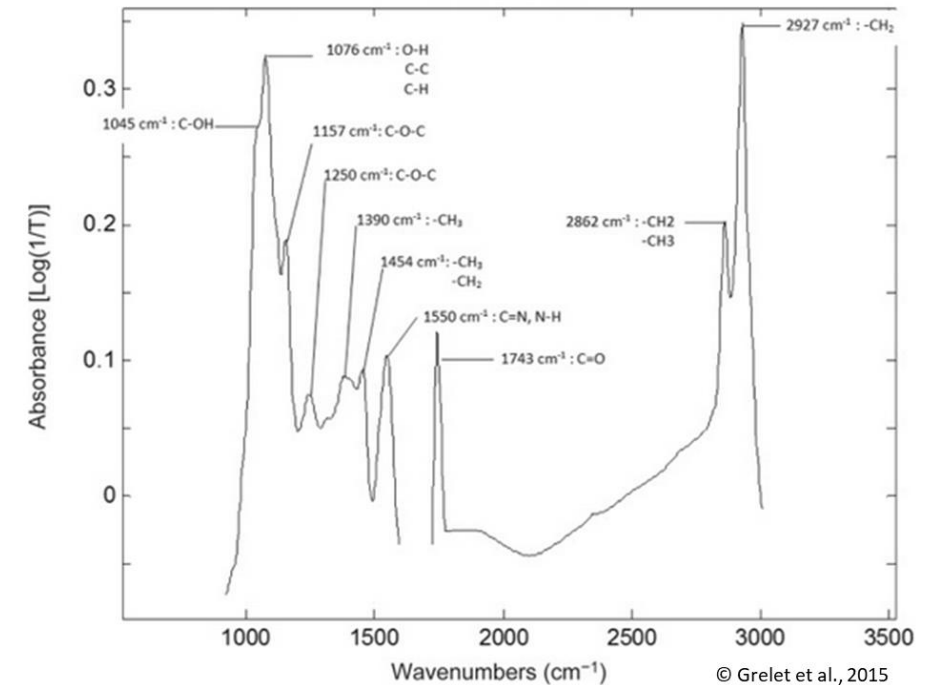


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© Foss

MIR spectra
 =
 Absorption of infrared
 radiation at frequencies
 associated with the
 vibrations of specific
 chemical bonds.



© Grelet et al., 2015

Herbage indicator



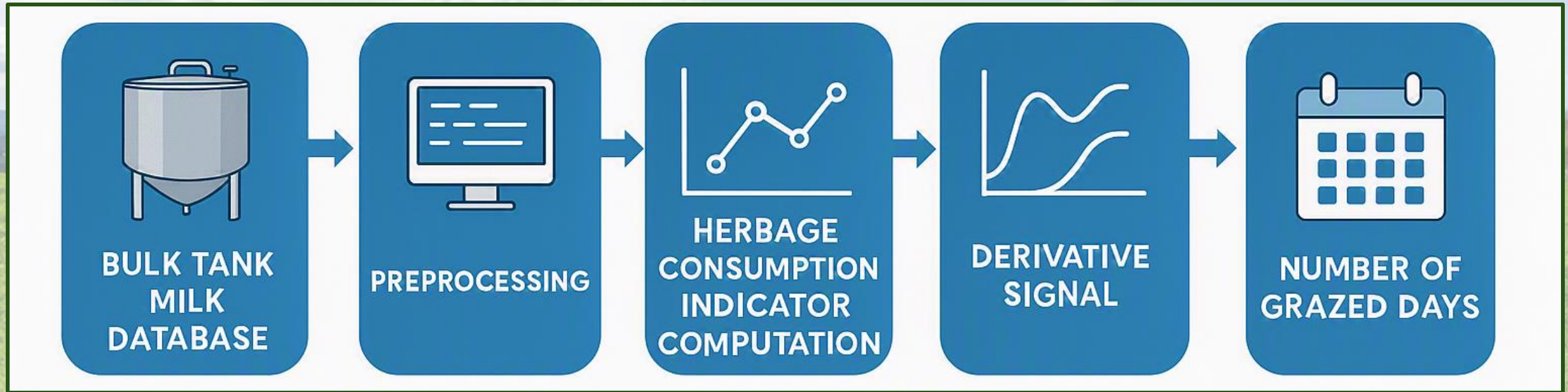
Modeling feed herbage proportion and modeling of the likelihood of feeding strategies focused on grazing and herbage consumption using milk Fourier-transform mid-infrared spectral analysis

Killian Dichou ¹, Charles Nickmilder ², Gérard Conter ³, Romain Reding ⁴, Antonino Marvuglia ⁵,
Hélène Soyeurt ²

Affiliations + expand

PMID: 40912556 DOI: [10.3168/jds.2025-26794](https://doi.org/10.3168/jds.2025-26794)

Workflow



(Illustration generated with Microsoft Copilot)

Dataset



20 330 bulk tank milk
analyses

Data availability :
every 1 – 3 days

2181 farms

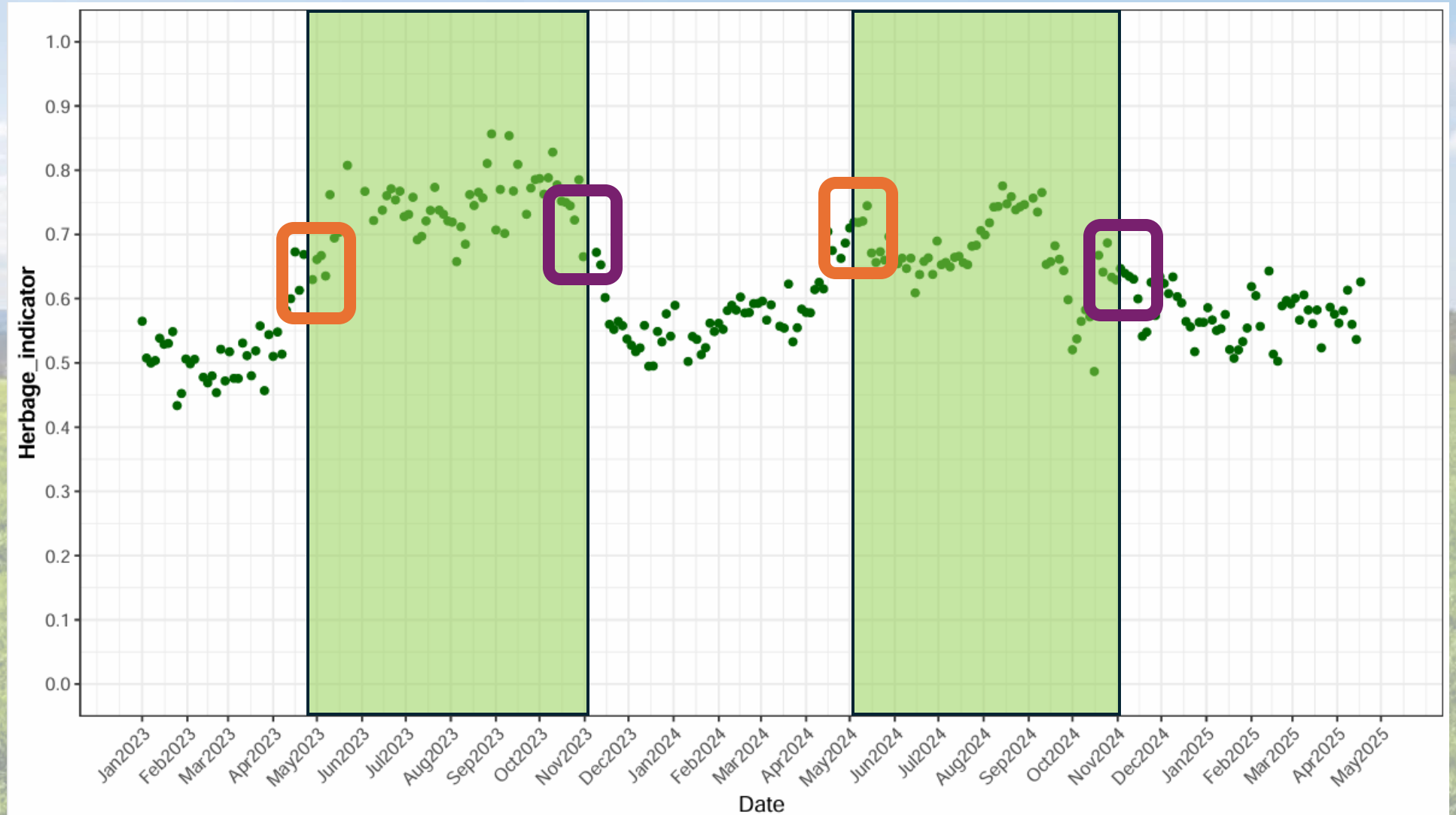
2023-2024

The data – Herbage consumption indicator

Pasture

Start

Stop



Effect of the parameters (2024)

Mean expectation : 210 days (april-october)

Observations to smooth	Observations to compute derivative	Days on pasture (mean $\pm$ SD)	Number of detected periods (mean $\pm$ SD)
4	4	193.48 $\pm$ 45.82	3.86 $\pm$ 1.67
7	4	196.18 $\pm$ 44.77	4.00 $\pm$ 1.64
10	4	196.27 $\pm$ 44.66	4.00 $\pm$ 1.64
4	7	206.47 $\pm$ 43.43	4.26 $\pm$ 1.66
7	7	210.71 $\pm$ 42.54	4.42 $\pm$ 1.62
10	7	210.88 $\pm$ 42.31	4.43 $\pm$ 1.62
4	10	216.37 $\pm$ 41.32	4.44 $\pm$ 1.41
7	10	222.19 $\pm$ 39.52	4.64 $\pm$ 1.38
10	10	222.29 $\pm$ 39.57	4.64 $\pm$ 1.38

Conclusion

- interpretable baseline for detecting transition regimes
- consistent range of value



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- WALLeSmart, SPW, [grant number D65-1435]
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- SIMBA project, F.R.S-FNRS (Belgium), [T.0221.19]

Contact :
killian.dichou@uliege.be