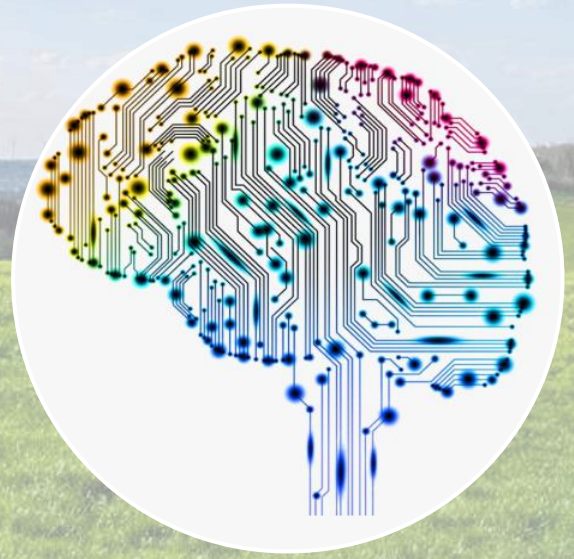
Robustness of derivative-based AI pipelines for inferring herbage consumption from milk FT-MIR indicator

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



Context

Grazing certification

Grazing calendars

Context

Bulk Tank Milk FT-MIR spectral predictions

Availability

Low-cost

Automatic

Context

Bulk Tank Milk FT-MIR spectral predictions

Grazing indicator

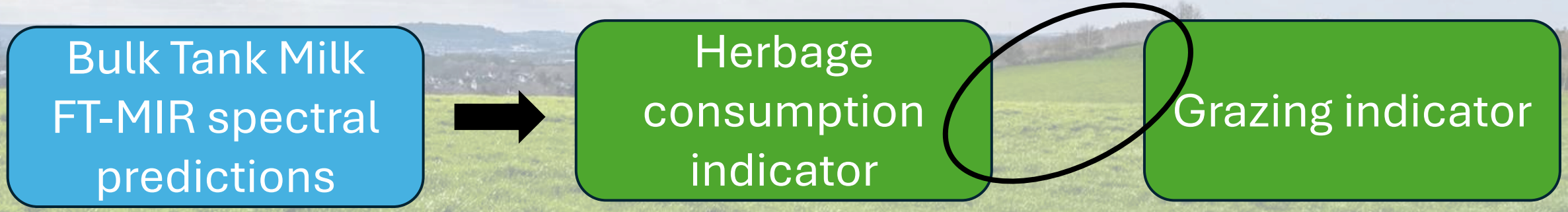
Context

Bulk Tank Milk FT-MIR spectral predictions

Herbage consumption indicator

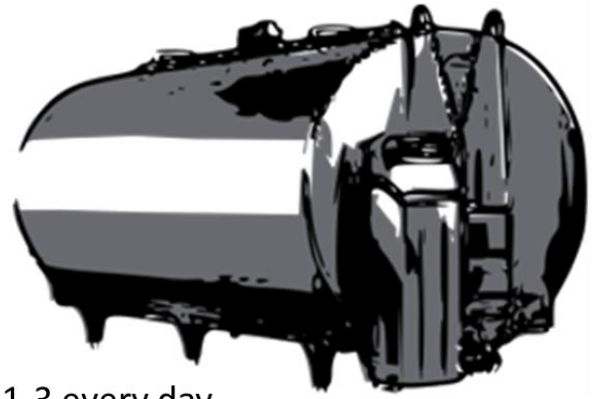
Grazing indicator

Context


Bulk Tank Milk FT-MIR spectral predictions
Herbage consumption indicator
Grazing indicator

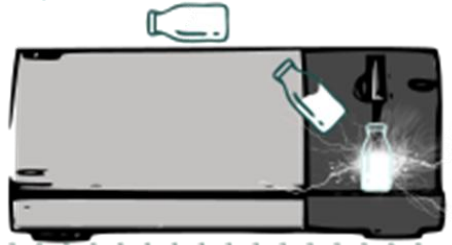
Bulk milk analysis

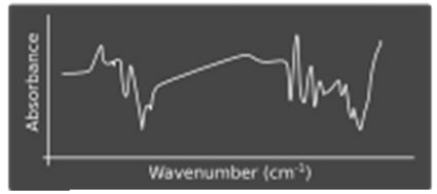
Milk sample
~1 / month



1-3 every day

Milk analysis





Mid infrared
spectrum
data

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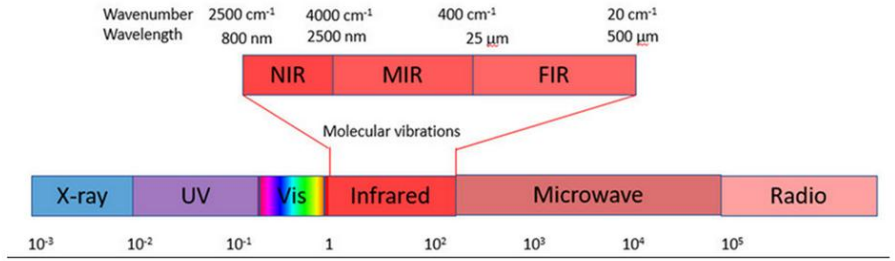
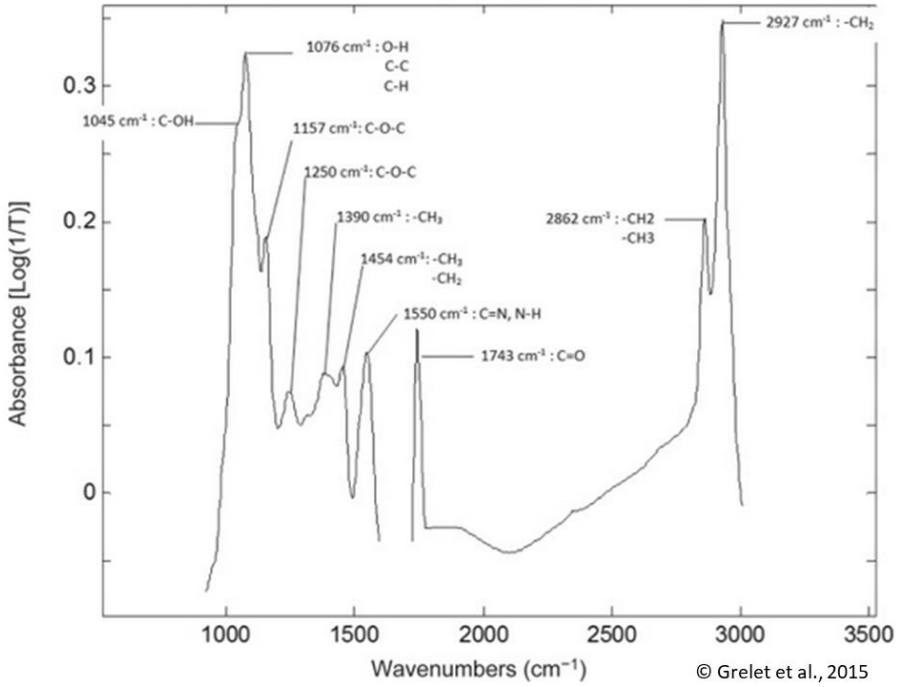
Bulk milk analysis



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



© Grelet et al., 2015

Herbage indicator

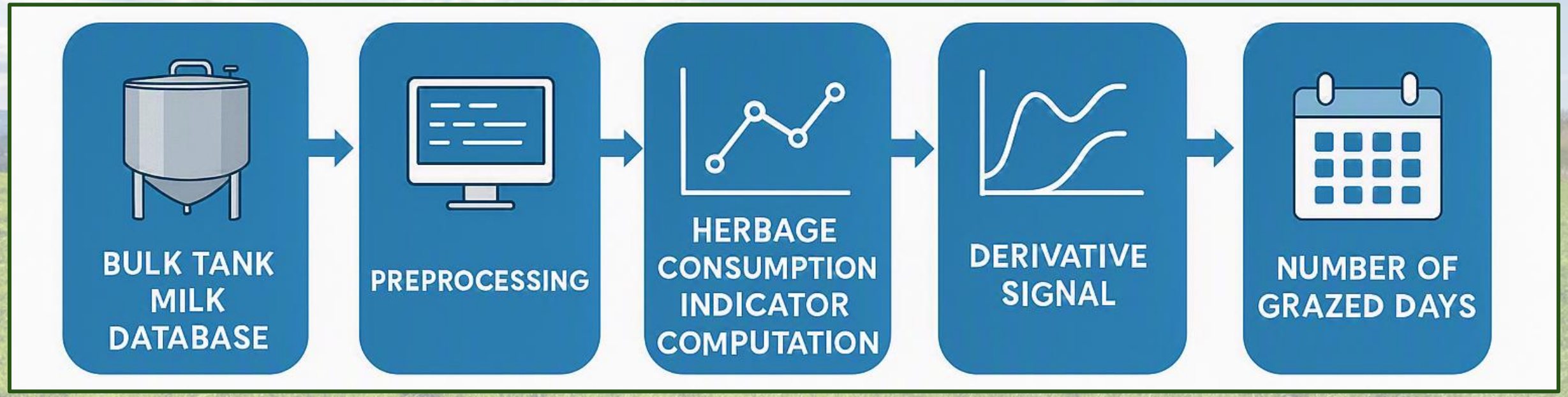
Modeling feed herbage proportion and modeling of the likelihood of feeding strategies focused on grazing and herbage consumption using milk Fourier-transform mid-infrared spectral analysis

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

Workflow



(Illustration generated with Microsoft Copilot)

Dataset

20 330 bulk tank milk analyses

Data availability : every 1 – 3 days

2181 farms

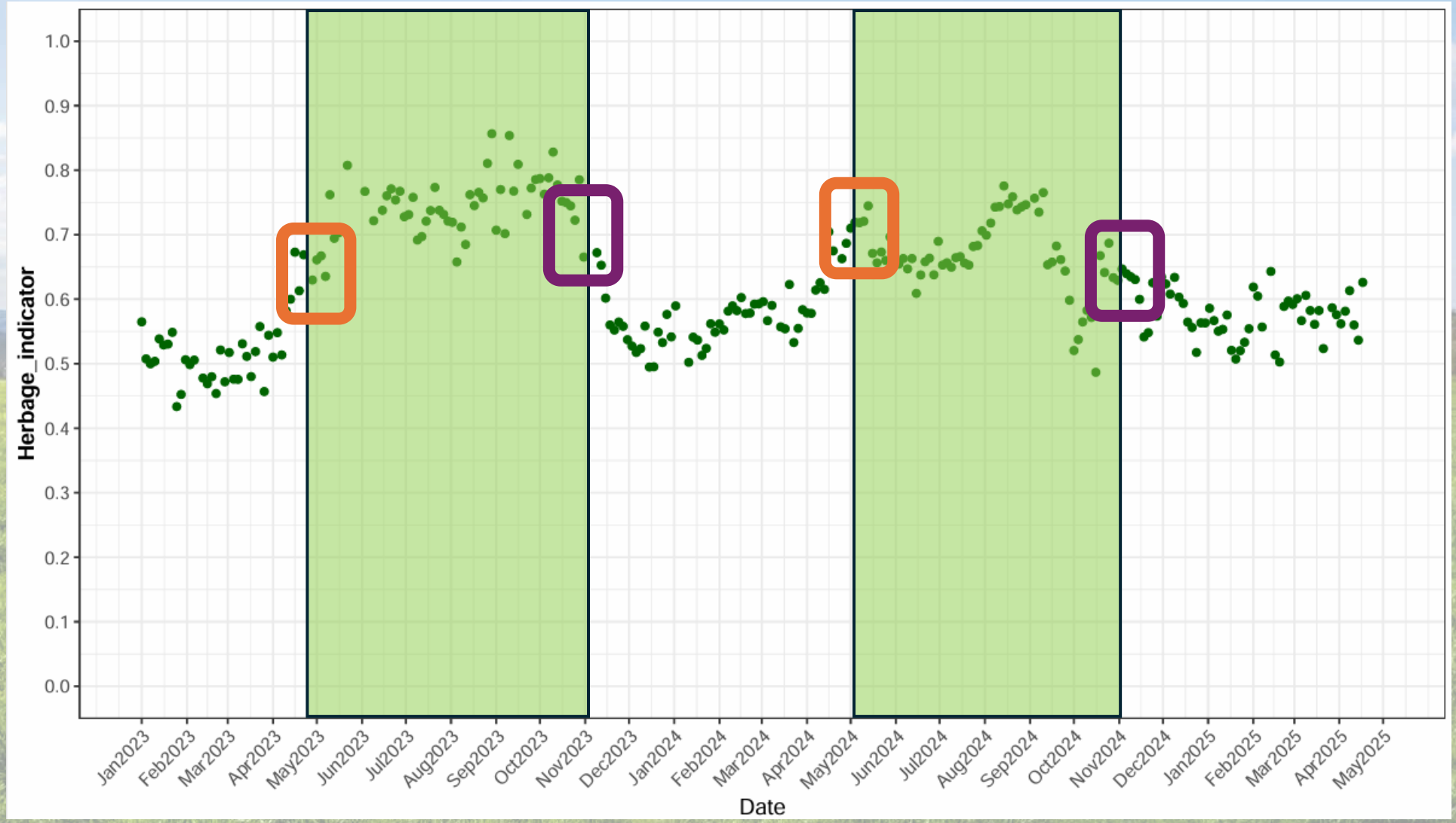
2023-2024

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 ± SD)	Number of detected periods (mean ± SD)
4	4	193.48 ± 45.82	3.86 ± 1.67
7	4	196.18 ± 44.77	4.00 ± 1.64
10	4	196.27 ± 44.66	4.00 ± 1.64
4	7	206.47 ± 43.43	4.26 ± 1.66
7	7	210.71 ± 42.54	4.42 ± 1.62
10	7	210.88 ± 42.31	4.43 ± 1.62
4	10	216.37 ± 41.32	4.44 ± 1.41
7	10	222.19 ± 39.52	4.64 ± 1.38
10	10	222.29 ± 39.57	4.64 ± 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]

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