



Session 3: Breeding for Resilience to Climate Change: Adaptation strategies.

Prediction of heat stress status by infrared spectroscopy in dairy sheep

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Outline

- Exposure to HS events has negative consequences on milk production - both in quantity and quality – fertility, health and wellbeing
- Identification of animals suffering from HS and characterization of their thermotolerance is important to improve adaptation to HS
- Definition of HS phenotypes easy to measure **at large scale** ~~(flocks)~~ is needed to improve adaptation to HS within breeding programs
- Mid-infrared (MIR) methodology - routinely used in quality assessment of milk samples - is presented as a promising tool

Aim

To examine if we can discriminate between animals under comfort or heat stress (HS) using Fourier transform infrared (FTIR) spectra

Data

- Milk sampling in a flock (n=232 ewes) throughout the year during 2 years. Visits took place during temperate/comfort (April, May and September) and hot/heat stress season (June to August)
- Ewes were primiparous (n=155) and multiparous (n=129)
- On each visit, a milk sample was collected and analyzed with Milkoscan (FOSS) to obtain the FTIR spectra (1060 points)
- FTIR data was used to discriminate (PLS-DA) between samples collected under comfort vs. heat stress (HS) conditions

RAW -DATA

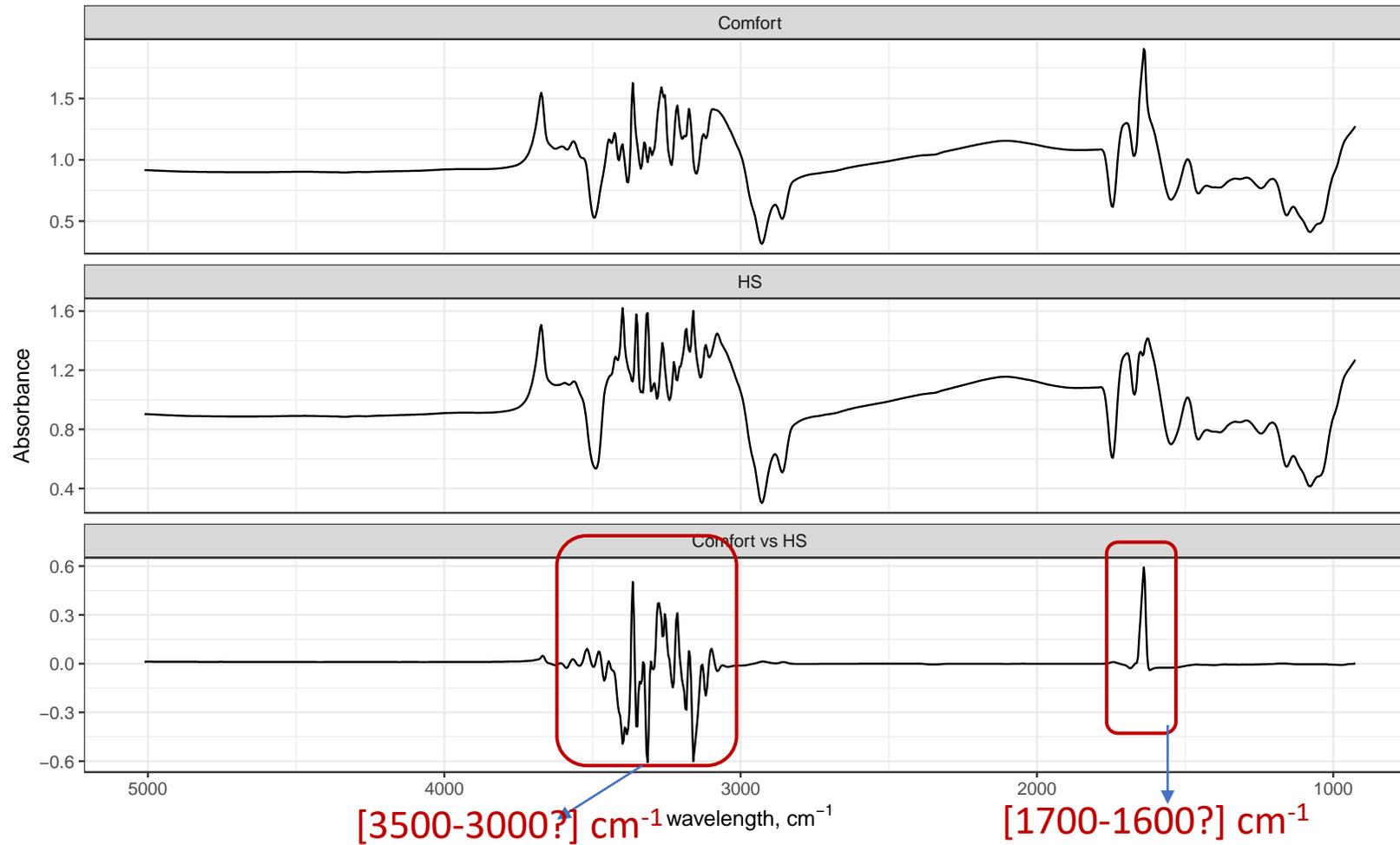


Figure #. Average FTIR spectra between animals under comfort and HS and their differences.

PLS-DA

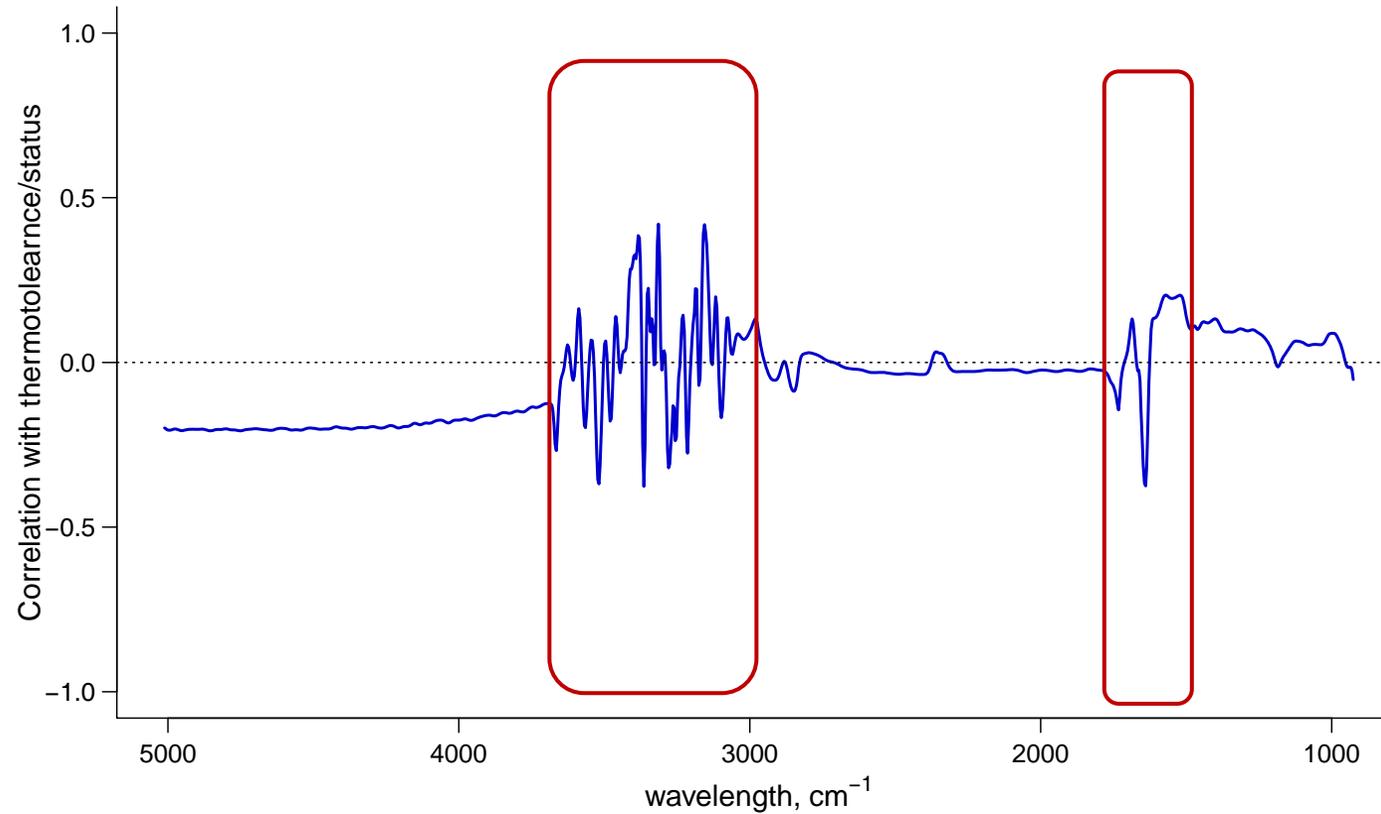


Figure #. Correlation between HS status (outcome) and milk FTIR spectra (predictors) data.

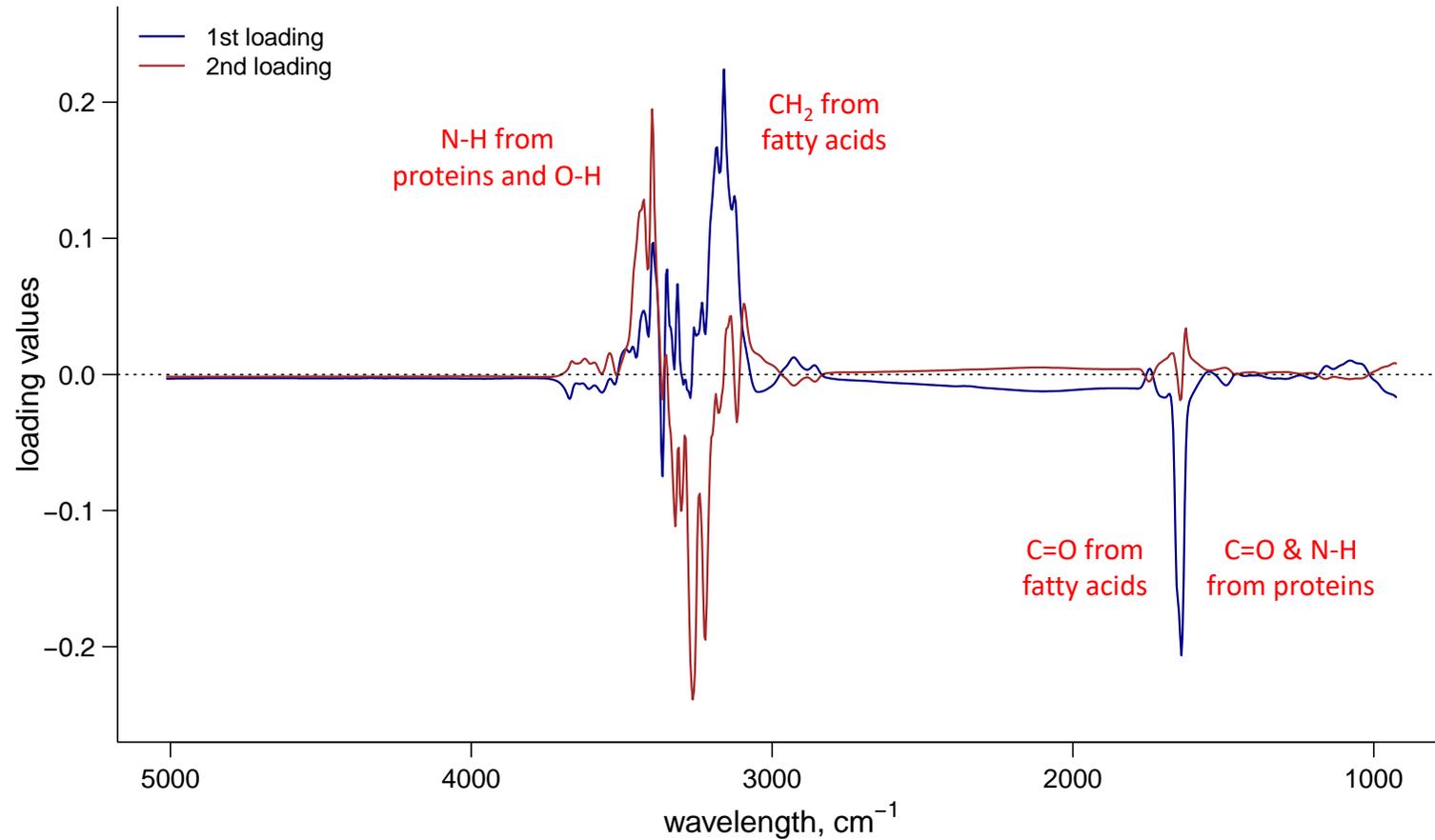


Figure #. PCA loadings from milk FTIR spectra data. First two PC/loadings were plotted.

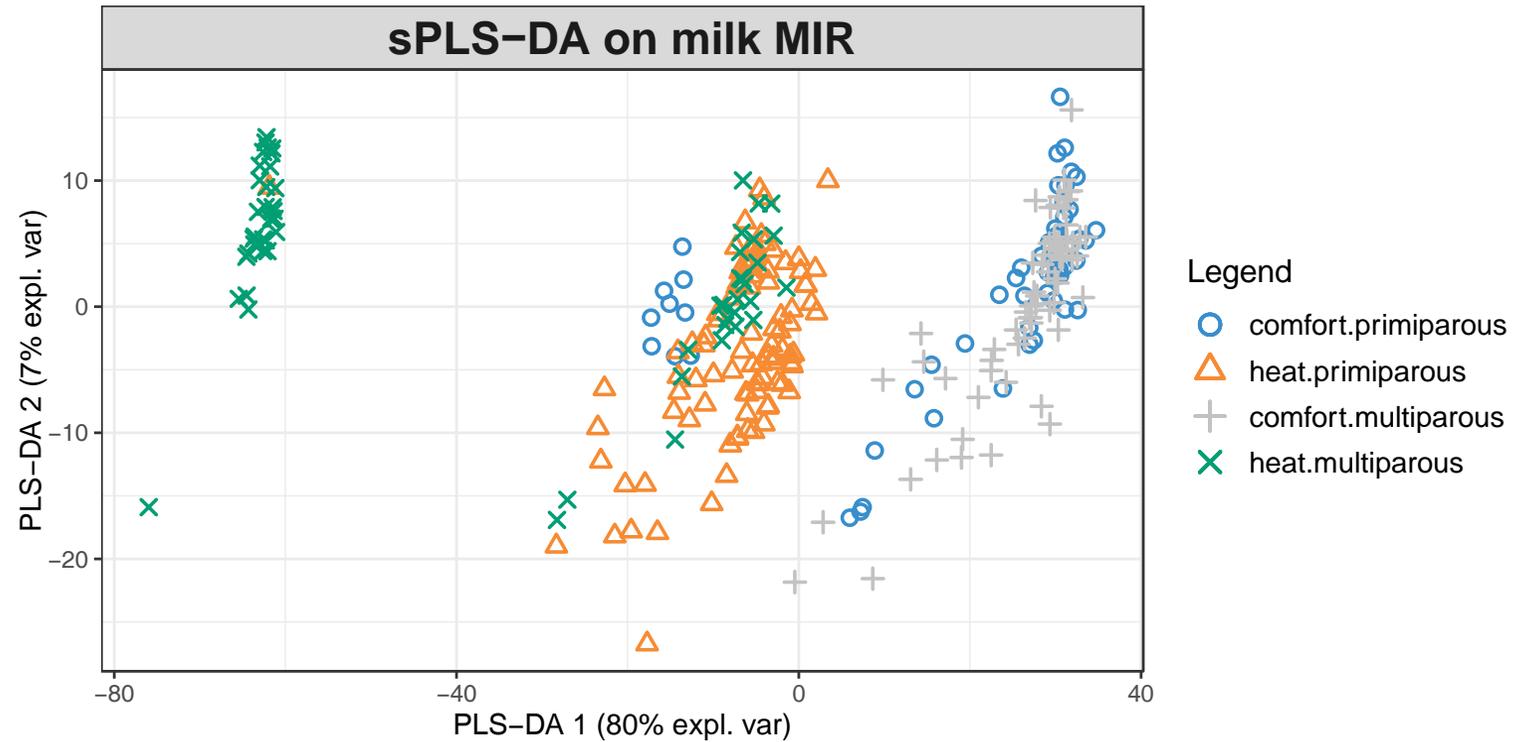


Figure #. Discrimination of milk samples from primiparous and multiparous ewes under confort and HS based on the PLS-DA model

Conclusions

1. MIR spectra appears as a promising tool to discriminate between ewes under comfort and HS
2. Collection of of FTIR data is not yet routinely performed in most populations (Round Table at ICAR 2023)
3. Further studies are needed to identify milk components that differ between comfort and HS situations



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**Thank you for your attention
Questions?**