ASSESSING THE VIABILITY OF NEAR INFRARED SPECTROSCOPY FOR CLASSIFYING GOAT MILK SAMPLES BASED ON BREED, LACTATION PERIOD AND SAMPLING PERIOD

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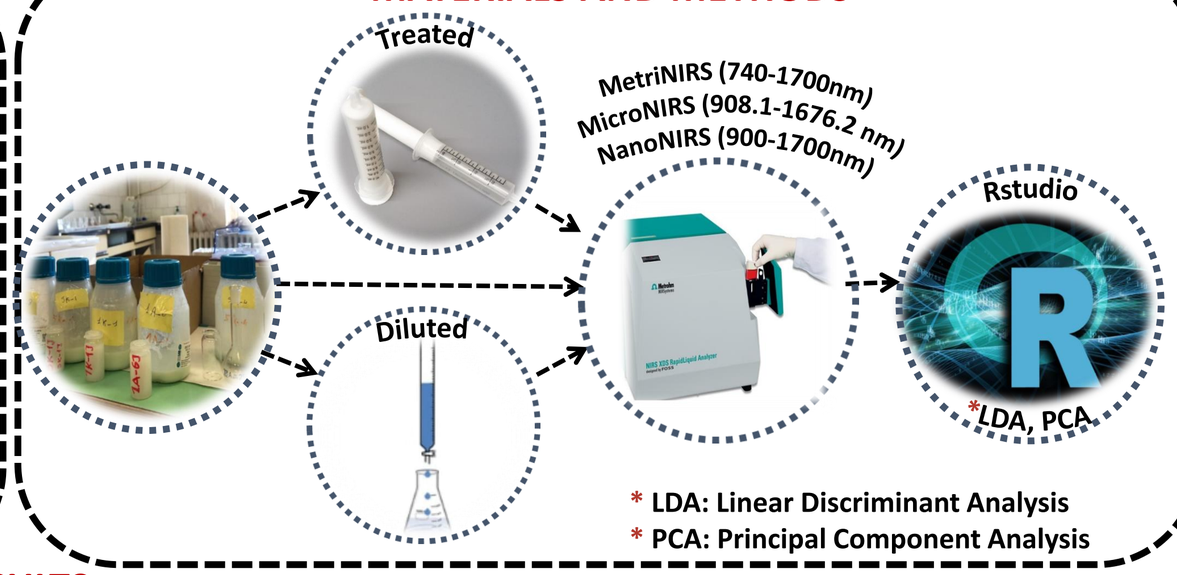
INTRODUCTION

- Goat milk is a vital, sustainable dairy product source that contributes significantly to the global dairy market, and therefore its composition and quality need to be monitored.
- Near Infrared Spectroscopy (NIRS), as a versatile and non-destructive approach, can be used to evaluate different milk parameters.
- By developing NIRS models for the classification of goat's milk samples based on goat's breeds, lactation period, and sampling period, The aim of this study is to evaluate the utilization of NIRS as an efficient and economical alternative compared to traditional laboratory methods.

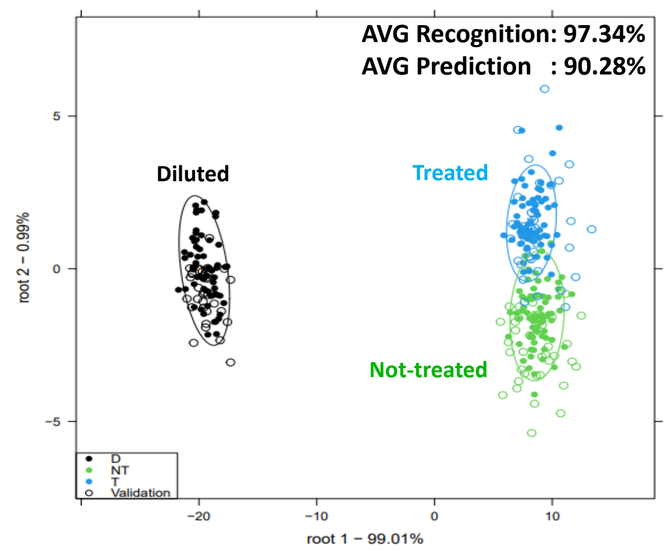
MATERIALS AND METHODS

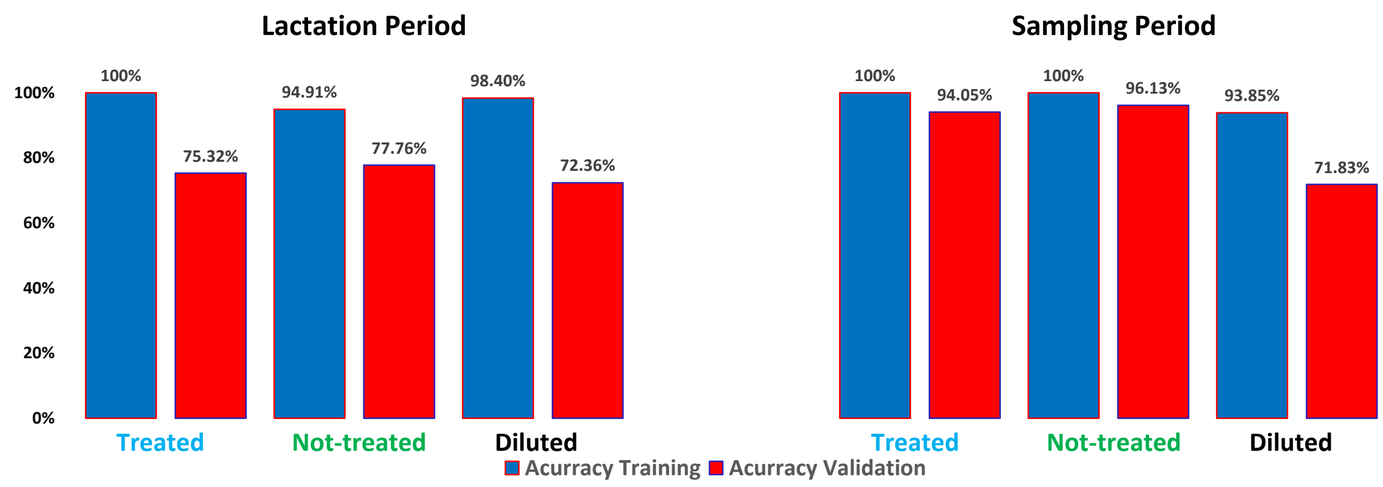


* LDA: Linear Discriminant Analysis
* PCA: Principal Component Analysis

RESULTS

MetriNIRS

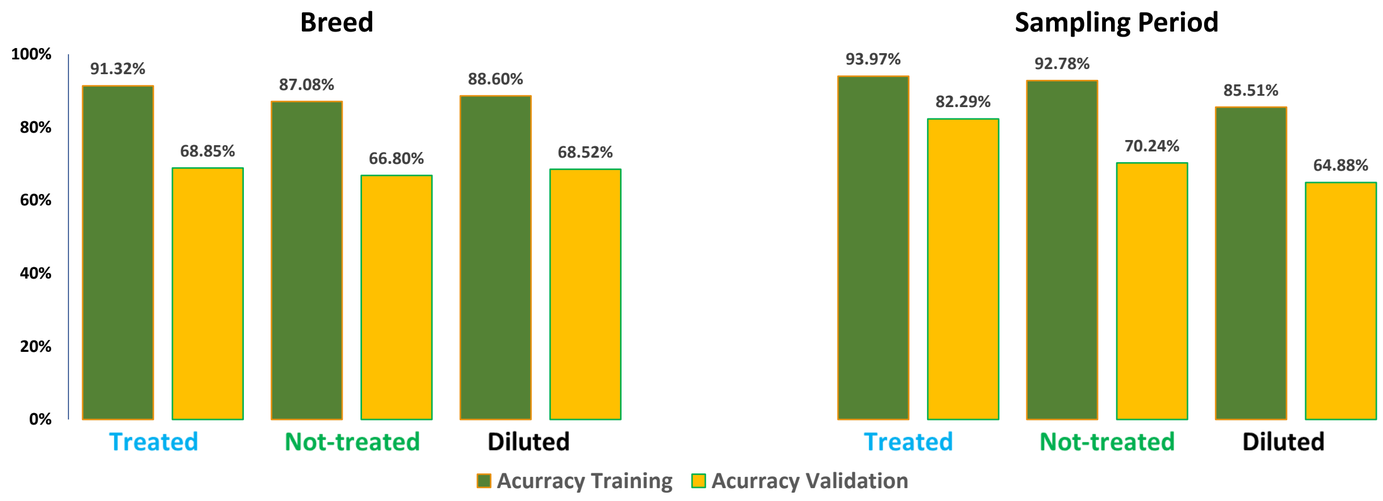




Classification results of goats' milk samples according to all treatment together and then based on lactation period and sampling period for each treatment alone.

MicroNIRS

		Diluted	Not-treated	Treated
Acurracy Training 92.29%	Diluted	100	0	0
	Not-treated	0	89.39	12.5
	Treated	0	10.61	87.5
		Diluted	Not-treated	Treated
Acurracy Validation 78.28%	Diluted	100	0	0
	Not-treated	0	73.48	38.64
	Treated	0	26.52	61.36

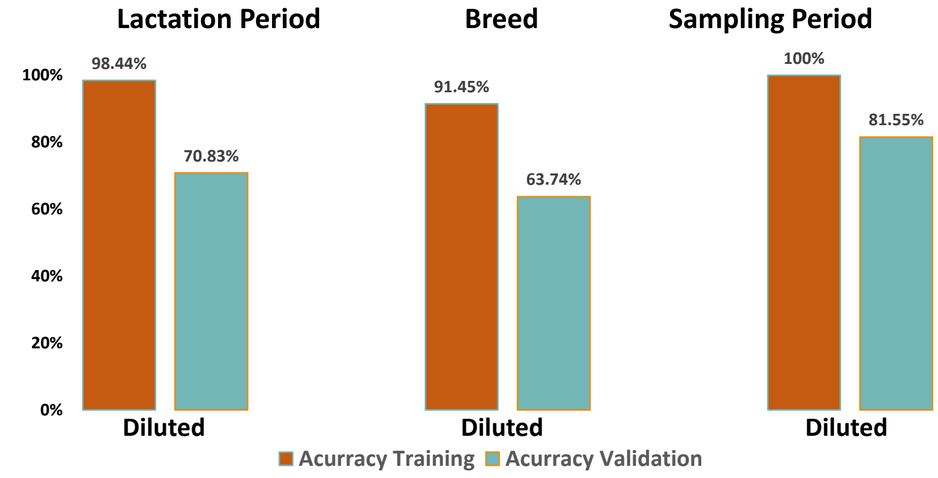


Classification results of goats' milk samples according to all treatment together and then based on breed and sampling period for each treatment alone.

NanoNIRS

		Alpin-July	Red-July	Red-May
Acurracy Training 98.52%	Alpin-July	100	4.44	0
	Red-July	0	95.56	0
	Red-May	0	0	100
		Alpin-July	Red-July	Red-May
Acurracy Validation 71.90%	Alpin-July	51.28	28.89	0
	Red-July	33.33	64.44	0
	Red-May	15.38	6.67	100

Classification results of goat's milk samples according to the race of the goats and sampling period for diluted milk.



Classification results of goats' milk samples based on lactation period, breed and sampling period for diluted milk.

CONCLUSIONS

Our investigation successfully facilitated the differentiation of goat's milk samples of different breeds (French Alpine and Autochthon Red goats) through the utilization of LDA (Linear Discriminant Analysis). Furthermore, accurate classification was achieved based on the lactation period (first and last) as well as the sampling period (May and July) for treated, untreated, and diluted milk samples.

The results confirmed that NIRS, as a rapid non-destructive analytical method for quality monitoring and milk analysis, can provide valuable insights for producers in their decision-making about milk production and processing, improving product quality and profitability.

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