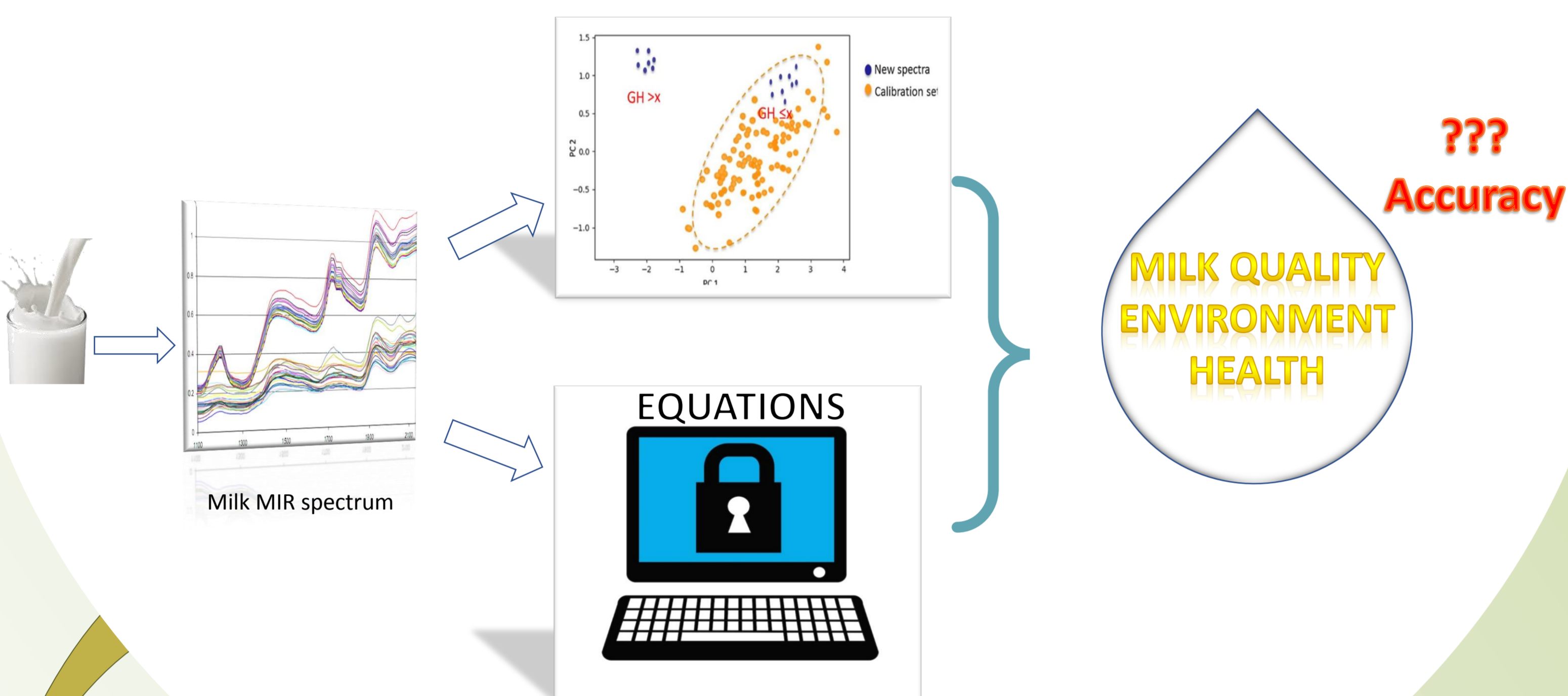


1 INTRODUCTION

Milk MIR spectrometry enables to predict traits related to milk quality, dairy cow health and environment but the prediction accuracy can fluctuate.

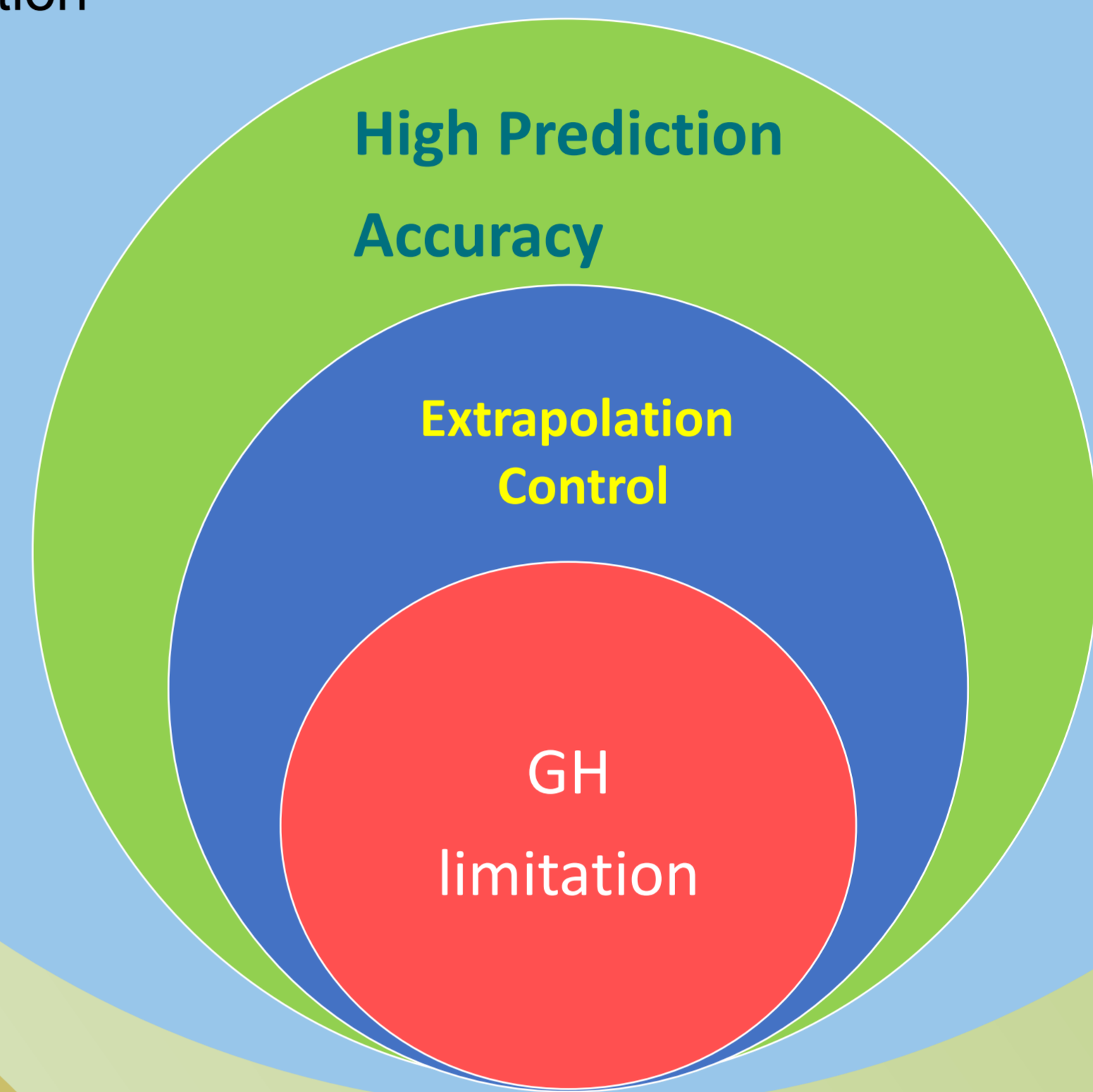
→ This study aims to estimate the interest of **calculating the Global Mahalanobis Distance (GH)** of a spectral record to improve the accuracy of its MIR predictions.



4 CONCLUSION

Improving the accuracy of milk MIR predictions requires:

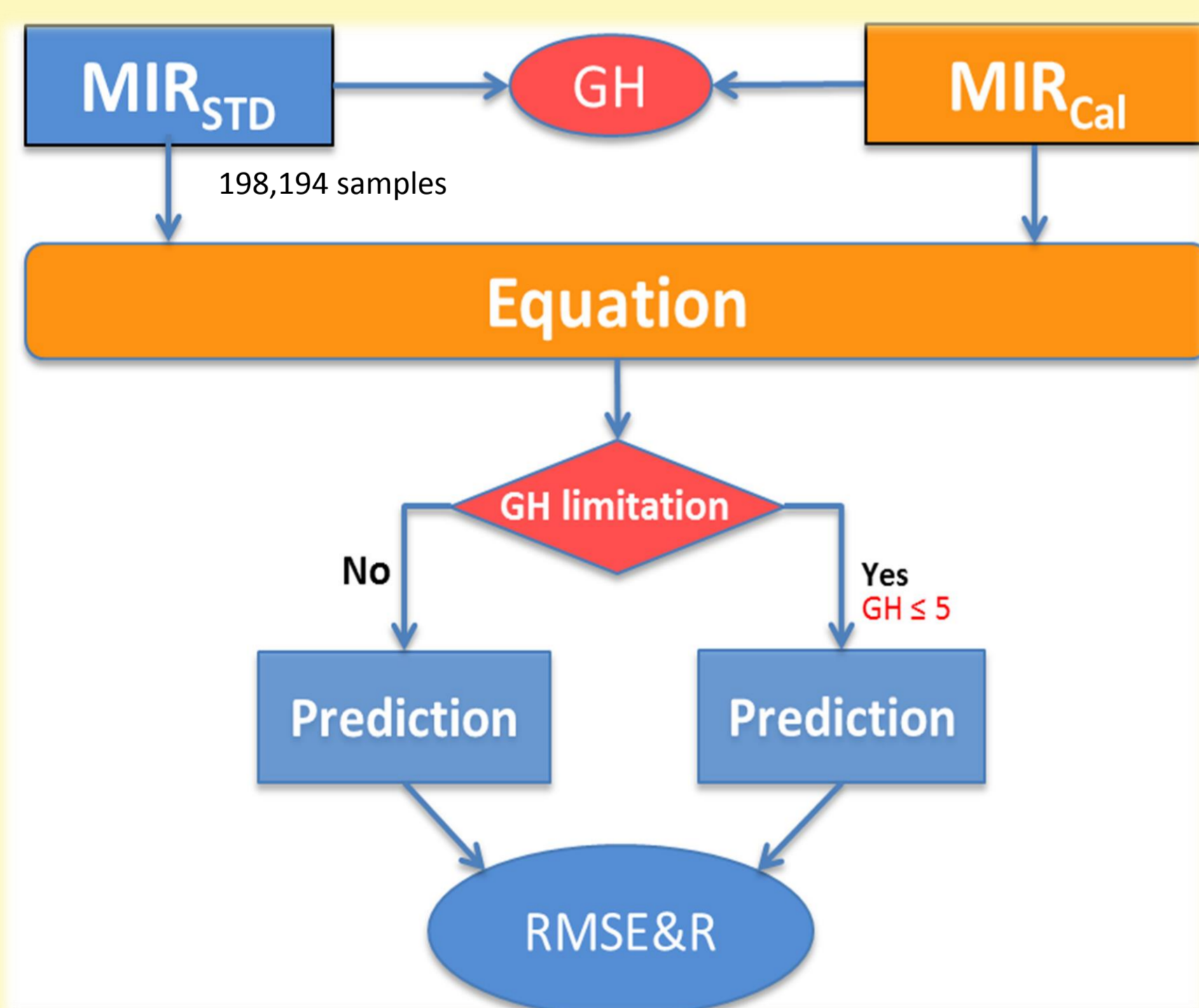
- The use of a **GH limitation** estimated based on the calibration set to avoid spectral extrapolation;
- And a relevant **high quality prediction equations** based on a calibration set representative of the dairy cow population



2 METHODS

Milk spectra obtained from 3 Bentley FTS machines.

GH was calculated for each spectrum based on principal components estimated from the calibration set.



$$GH = \frac{DM}{nPCs}$$

$$DM(\vec{x}) = \sqrt{(\vec{x} - \vec{\mu})^T S^{-1} (\vec{x} - \vec{\mu})}$$

\vec{x} : Scores of spectral principal component (PC)

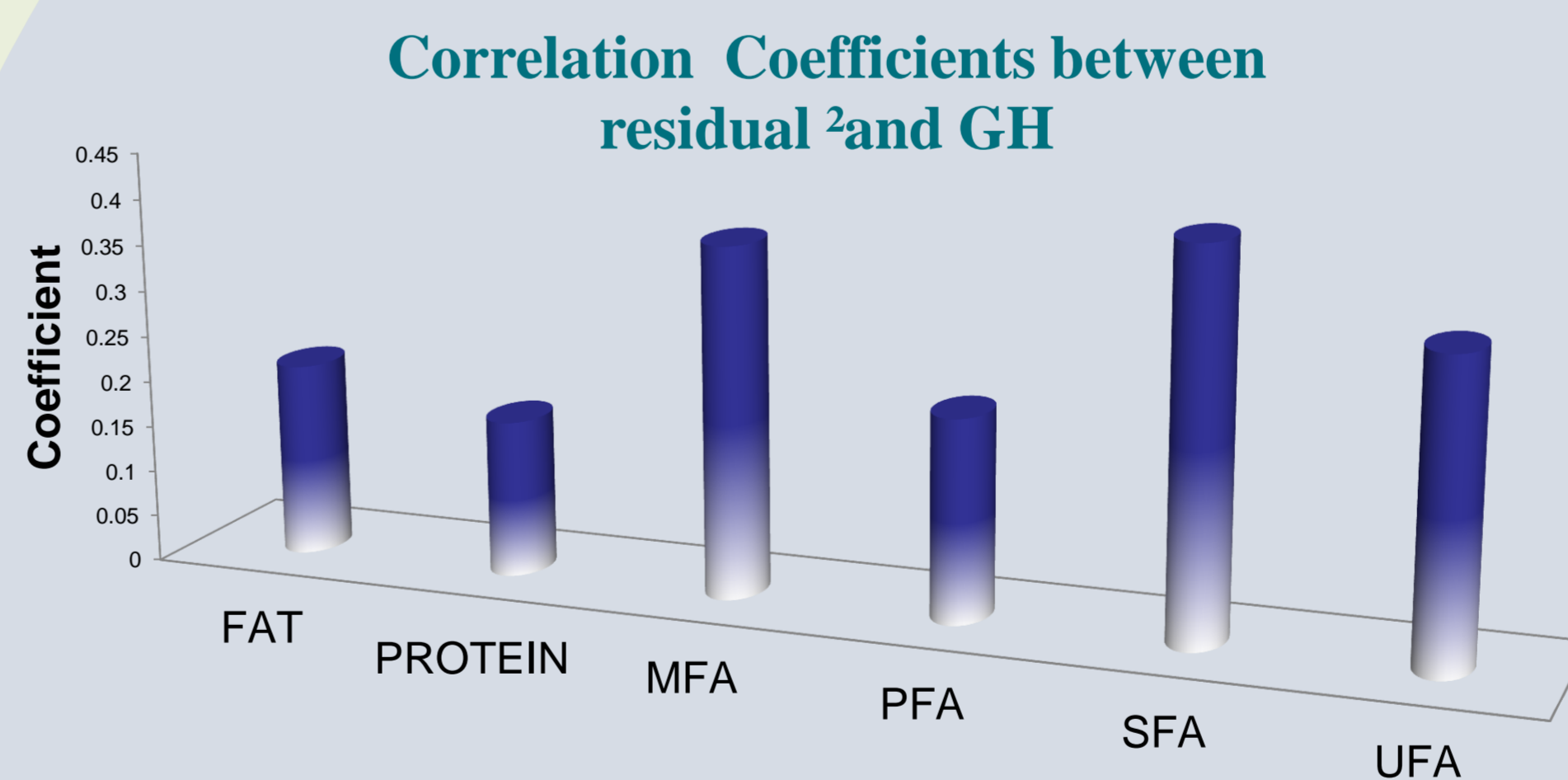
$\vec{\mu}$: mean of PC scores in the calibration set

S : covariance matrix between calibration PC scores

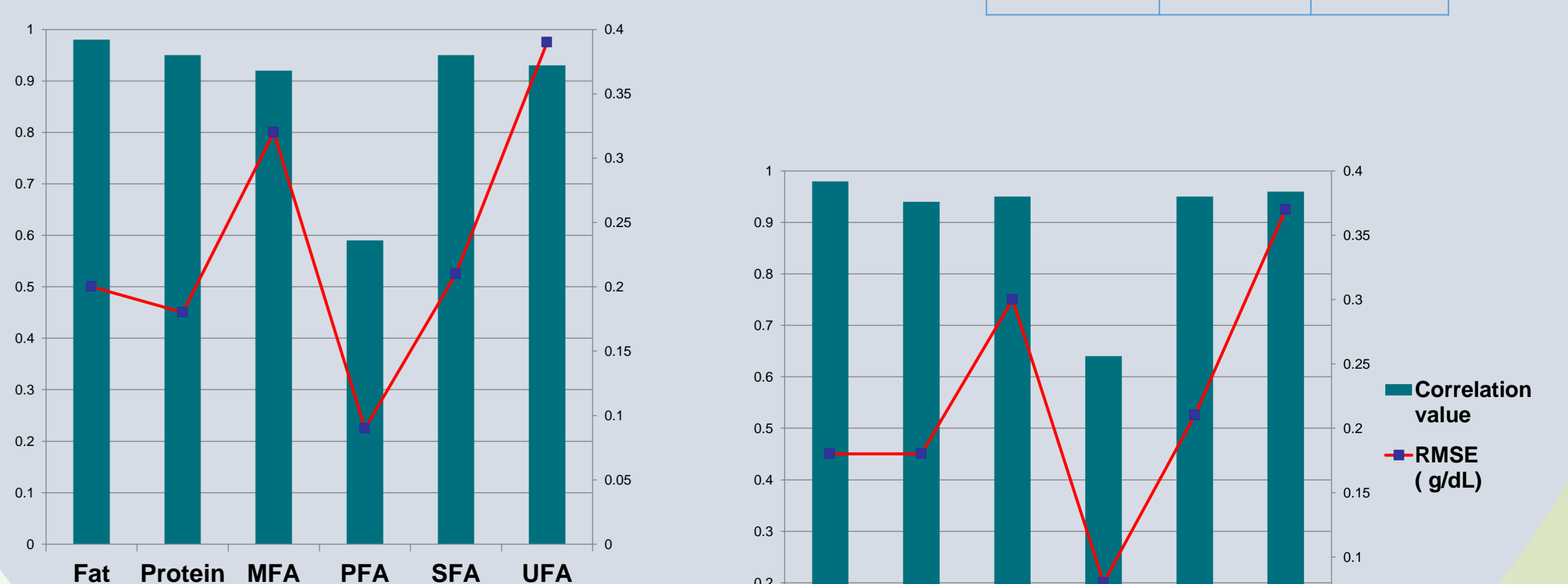
nPCs : number of principal components

3 RESULTS AND DISCUSSION

GH limitation improved the quality of both the correlation values and RMSE.



TRAITS	Content g/dL	Data with GH > 5
Fat	3.99	4.45%
Protein	3.53	4.33%
MFA	1.15	8.22%
PFA	0.15	9.27%
SFA	2.64	3.83%
UFA	1.29	8.22%



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