



Crossing grazing calendars and bulk milk analysis : is on-field validation for grass-diet in cattle possible ?

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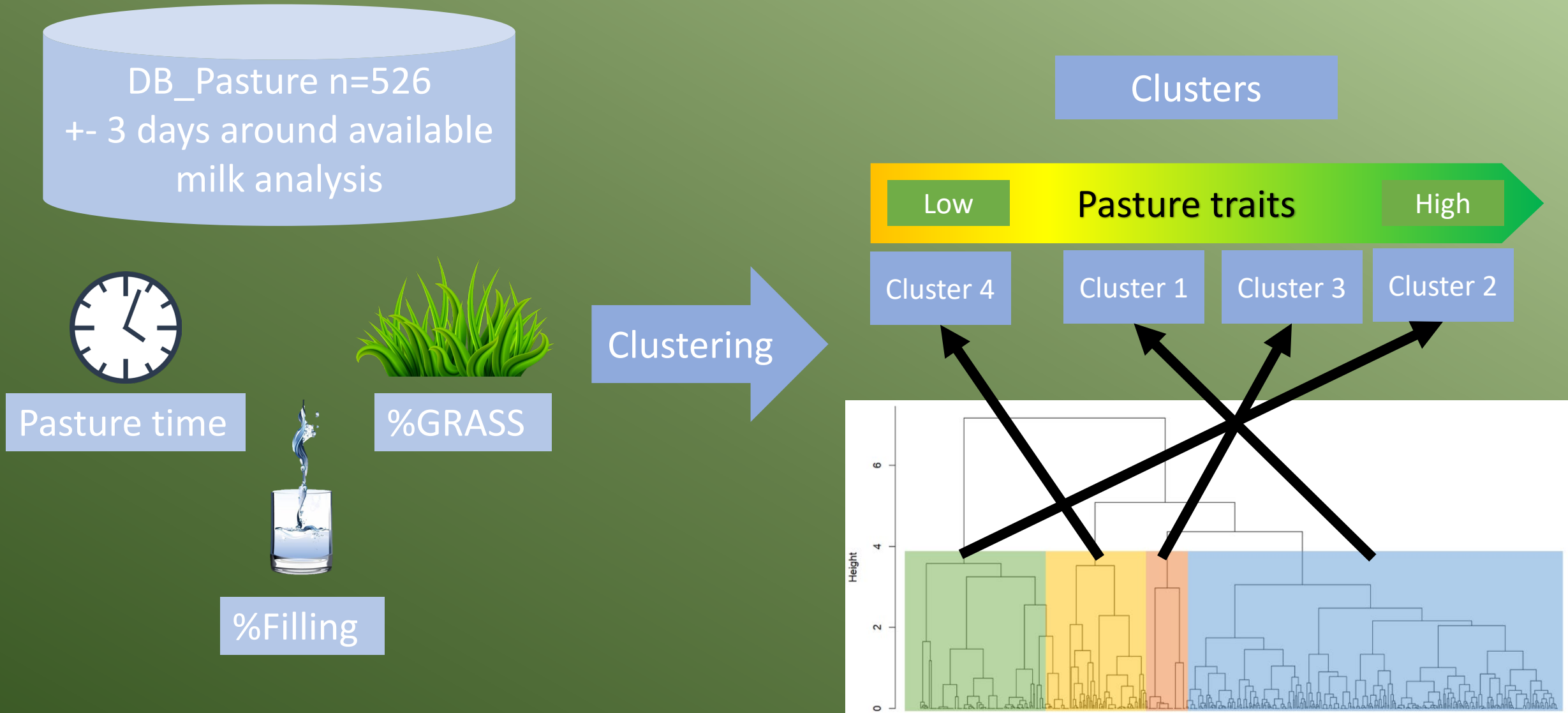
Grazing calendars



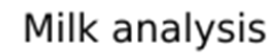
7 Farms
Over 2019-2020



Workflow – database and hierarchical clustering

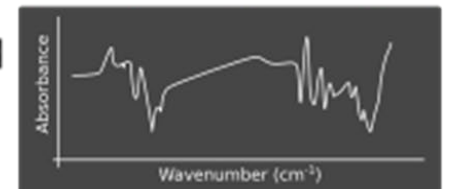


A magnifying glass with a silver handle and a light blue lens is positioned over a white milk carton. The carton has the word "MILK" in blue capital letters and a blue cartoon cow face below it. The entire scene is set against a dark green background with a white circular border.



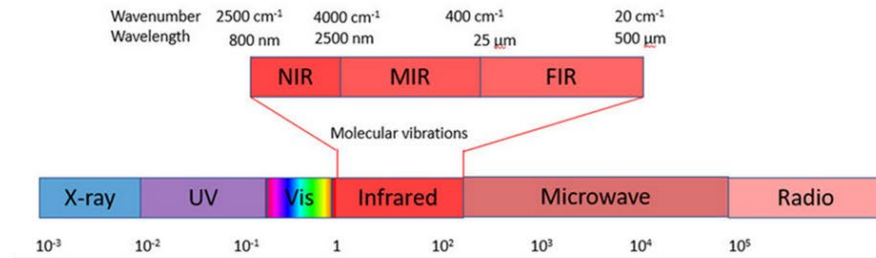
Milk sample
~1 / month

Mid infrared
spectrum
data

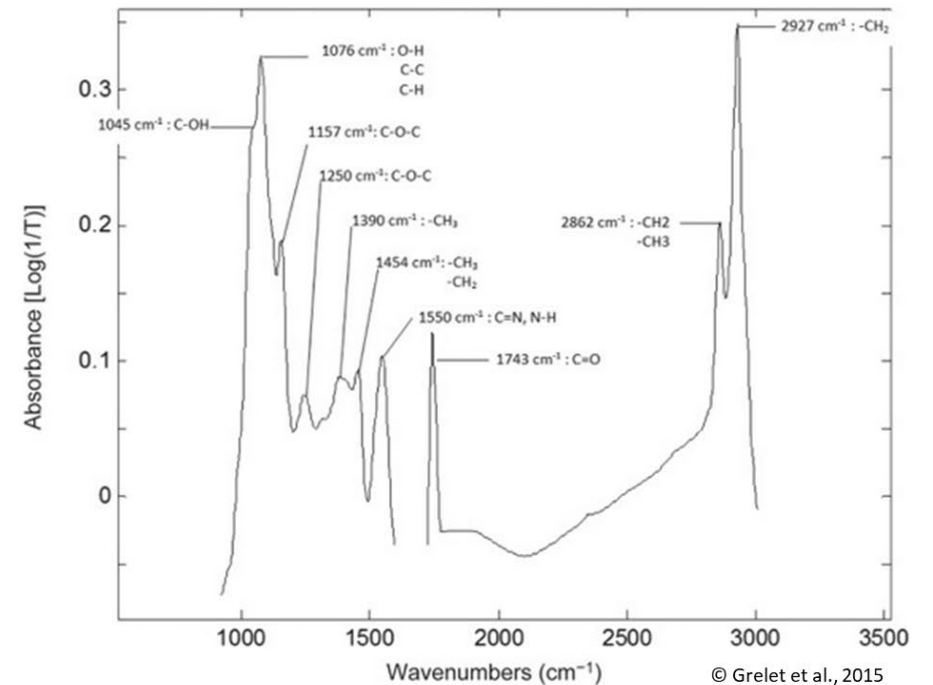


4

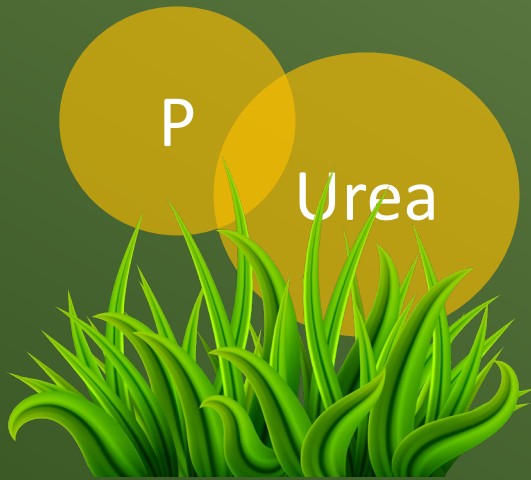
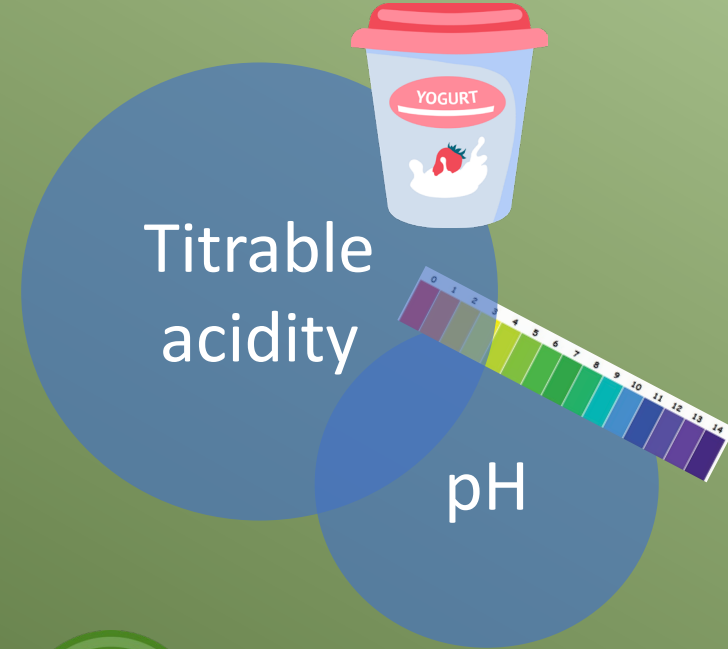
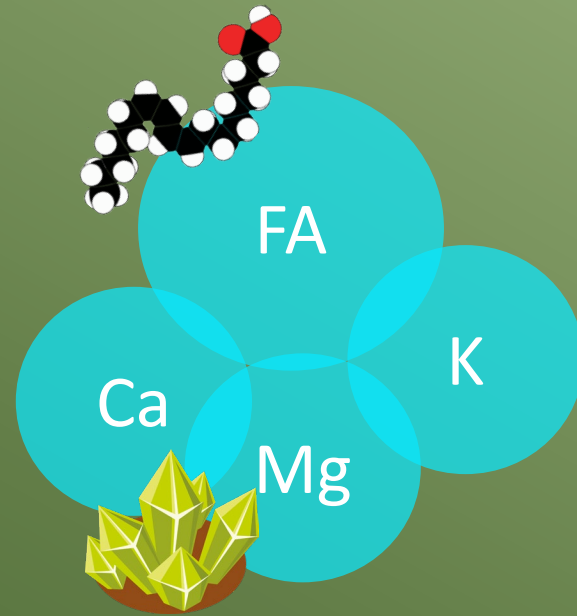
Bulk milk analysis



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



Bulk milk analysis



Workflow - ANOVA

Clusters

Components of interest

Low

Pasture traits

High

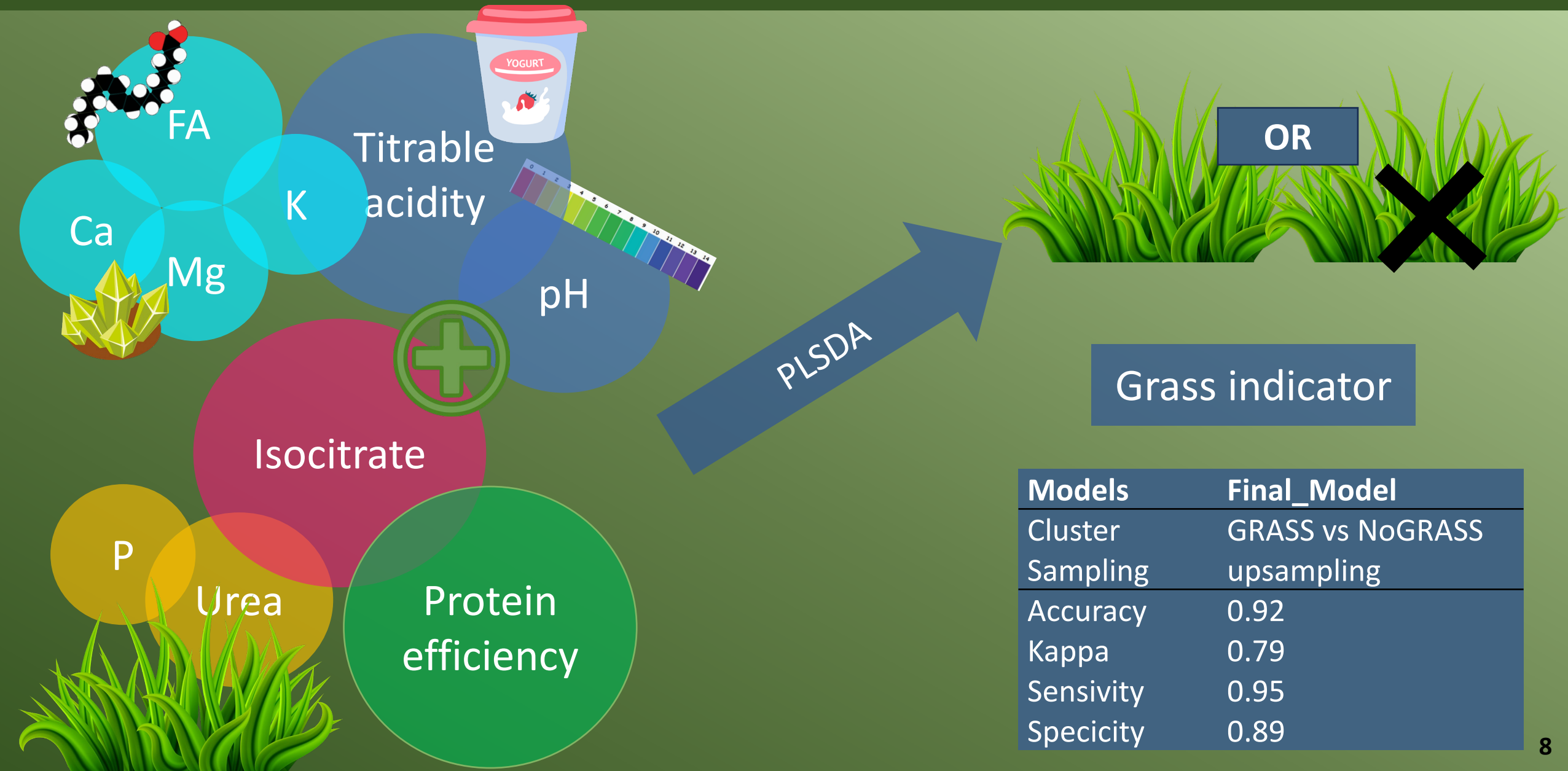
NoGRASS

GRASS

DB_milk n=75

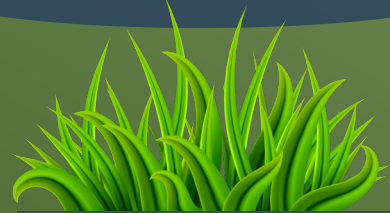
FT-MIR based-traits	Unit	GRASS	NoGRASS	p-value
Milk yield	kg/day	24.00	27.33	***
C14:1	g/dL	0.04	0.05	*
C16	g/dL	1.15	1.30	*
Total of C18:1 trans	g/dL	0.15	0.13	***
MCFA	g/dL	2.03	2.24	*
Total of trans FA	g/dL	0.20	0.17	***
Ca	mg/kg	1174.82	1257.21	**
P	mg/Lkg	975.67	1017.16	*
K	mg/kg	1489.80	1496.56	***
Mg	mg/kg	102.77	107.05	***
Urea in milk	mg/L	154.40	176.00	***
Protein efficiency	%	16.22	14.26	*
pH	/	6.62	6.60	**
Titrate acidity	Dornic Degree	14.78	14.35	**
Isocitrate	mmol/L	0.15	0.17	***

Workflow - PLSDA



Results

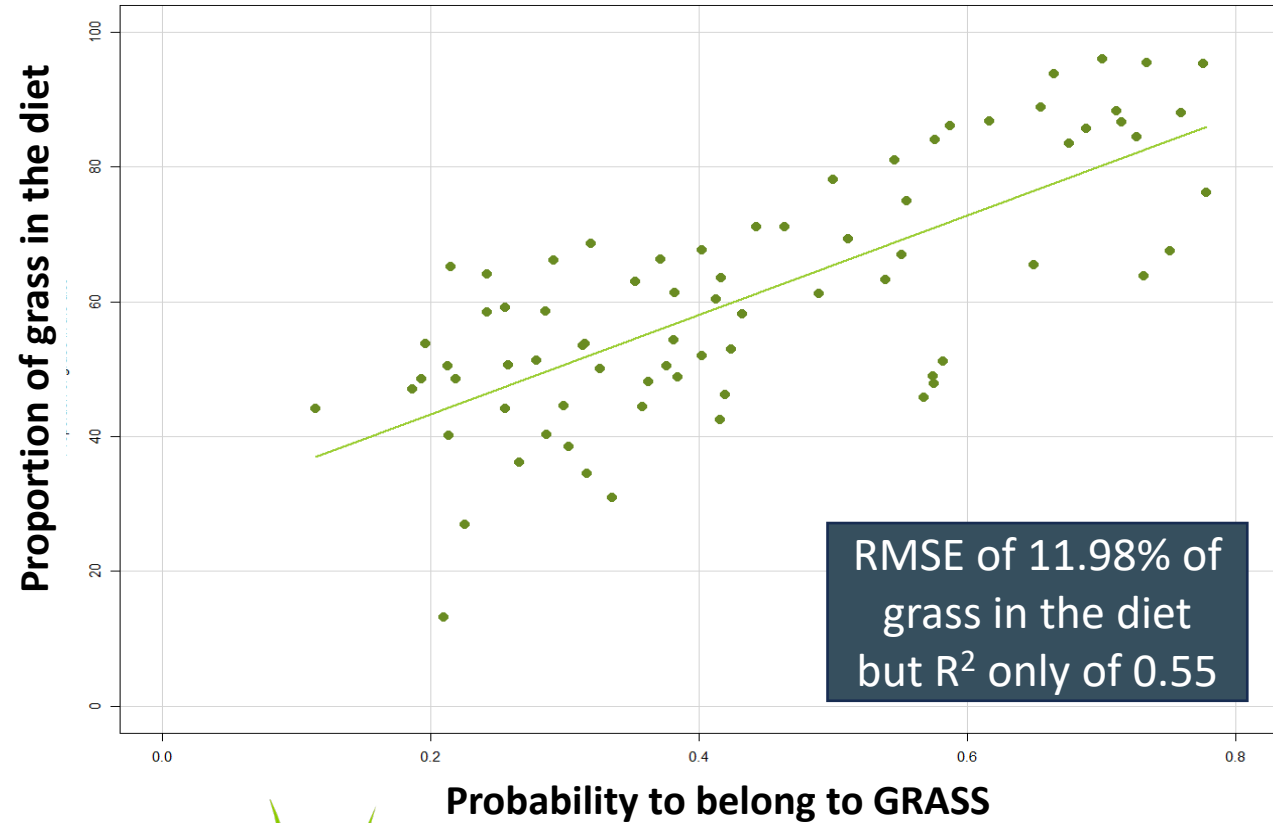
DB_Pasture n=526



%GRASS



Prediction of the proportion of GRASS in the diet



PLSDA

OR



Probability to belong to GRASS cluster

Conclusion

- Grass based diet can be assessed through milk analysis
- Equation could be used routinely on sample



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- WALLeSmart, SPW, [grant number D65-1435]
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