

Monitoring through milk: potential of milk fatty acids to warn for acidosis, ketosis and negative energy balance

Prof. Veerle Fievez

Ghent University

Laboratory for Animal Nutrition and Animal Product Quality

Member of the Food2Know network – www.food2know.be

Jorjong. 2016. PhD dissertation UGent.



Van der Drift et al. 2012. J Dairy Sci, 98, 5211.

Rojo-Gimeno et al. submitted




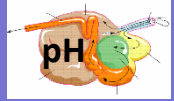

Current milk-based tests

Disorder	Model		
NEB	fat / protein		
Hyperketonemia	BHBA		
SARA	fat / protein		


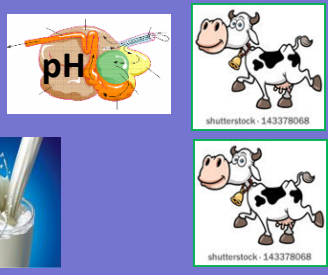
Current milk-based tests

Disorder	Model		
NEB	fat / protein		
Hyperketonemia	BHBA		
SARA	fat / protein		


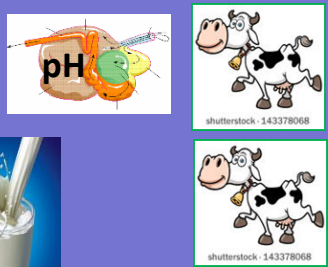
Current milk-based tests

Disorder	Model	  Se (%)	  
NEB	fat / protein		
Hyperketonemia	BHBA		
SARA	fat / protein		



Current milk-based tests

Disorder	Model	 Se (%)	 Sp (%)
NEB	fat / protein		
Hyperketonemia	BHBA		
SARA	fat / protein		


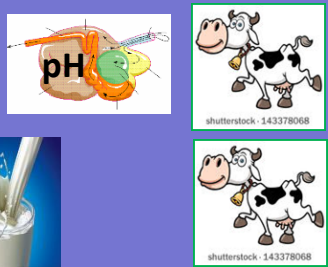
Current milk-based tests

Disorder	Model	 Se (%)	 Sp (%)
NEB	fat / protein	40.0	90.0
Hyperketonemia	BHBA	83.0	76.0
SARA	fat / protein	72.0	31.4

Current milk-based tests



Disorder	Model	 Se (%)	 Sp (%)
NEB	fat / protein	40.0	90.0
Hyperketonemia	BHBA	83.0	76.0
SARA	fat / protein	72.0	31.4

Current milk-based tests

Disorder	Model	 Se (%)	 Sp (%)
NEB	fat / protein	40.0	90.0
Hyperketonemia	fat / protein; acetone & BHBA; test day info	82.4	83.8
SARA	fat / protein	72.0	31.4


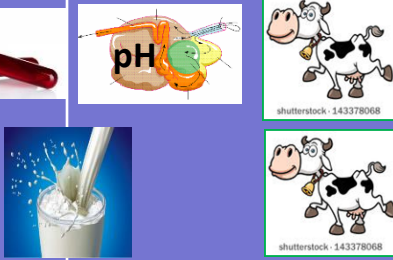
Jorjong et al.2014. J Dairy Sci 97, 7054.
 Jorjong et al.2015. J Dairy Sci, 98, 5211.
 Colman et al. 2015. Comp Electron Agric, 111, 179.

Milk fatty acid biomarkers (early)

Disorder	Model	 Se (%)	 Sp (%)
NEB	C18:1c9		
Hyperketonemia	C18:1c9/C15:0		
SARA	iso (-), anteiso (+), odd (+), C18:1t10 (+), C18:2c9t11 (+), C18:1t11 (-)		



Jorjong et al.2014. J Dairy Sci 97, 7054.
 Jorjong et al.2015. J Dairy Sci, 98, 5211.
 Colman et al. 2015. Comp Electron Agric, 111, 179.

Milk fatty acid biomarkers (early)

Disorder	Model	 Se (%)	 Sp (%)
NEB	C18:1c9	50.0	90.0
Hyperketonemia	C18:1c9/C15:0	50.0	90.0
SARA	iso (-), anteiso (+), odd (+), C18:1t10 (+), C18:2c9t11 (+), C18:1t11 (-)	64.2	88.8



Jorjong et al.2014. J Dairy Sci 97, 7054.
 Jorjong et al.2015. J Dairy Sci, 98, 5211.
 Colman et al. 2015. Comp Electron Agric, 111, 179.

Milk fatty acid biomarkers (early)

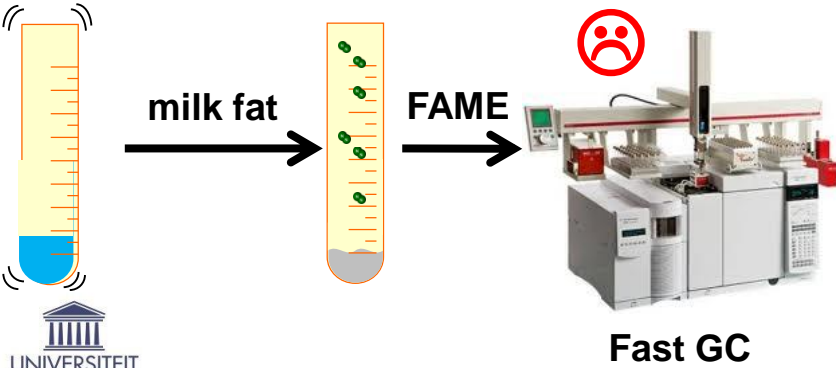
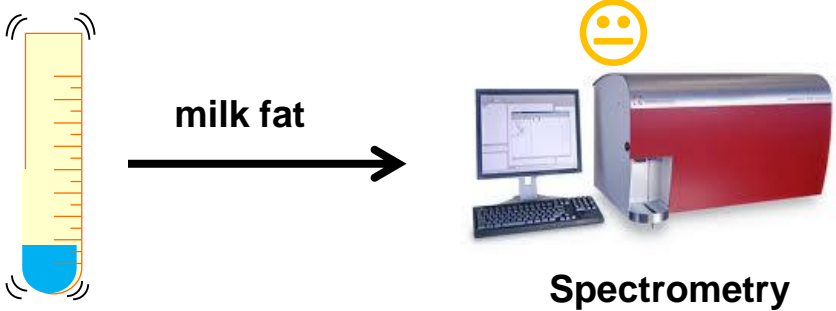
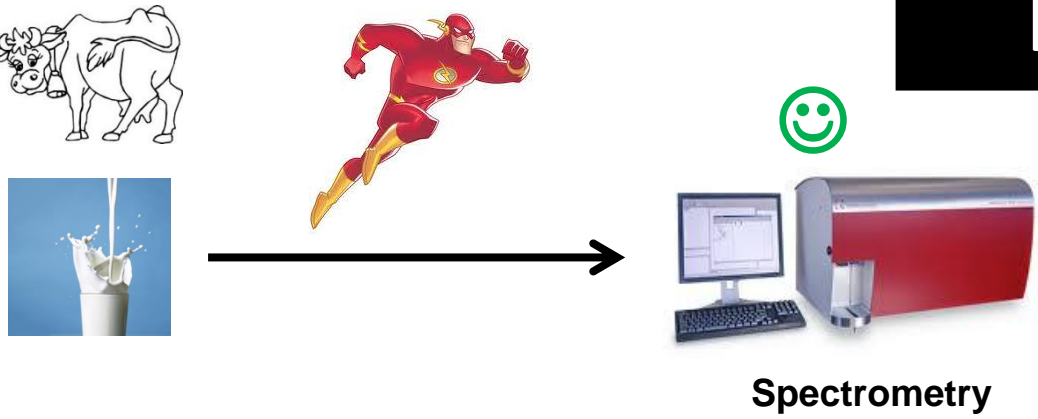
Disorder	Model	 Se (%)	 Sp (%)
NEB	Corrected C18:1c9	55 - 58	90.0
Hyperketonemia	C18:1c9/C15:0	50.0	90.0
SARA	iso (-), anteiso (+), odd (+), C18:1t10 (+), C18:2c9t11 (+), C18:1t11 (-)	64.2	88.8

Jorjong et al.2014. J Dairy Sci 97, 7054.
 Jorjong et al.2015. J Dairy Sci, 98, 5211.
 Colman et al. 2015. Comp Electron Agric, 111, 179.

Milk fatty acid biomarkers (early)

Disorder	Model	 Se (%)	 Sp (%)
NEB	Corrected C18:1c9 + fat/protein; test day info	?	90.0
Hyperketonemia	C18:1c9/C15:0	50.0	90.0
SARA	iso (-), anteiso (+), odd (+), C18:1t10 (+), C18:2c9t11 (+), C18:1t11 (-)	64.2	88.8

Milk FA biomarkers: routine analysis



Disorder	Model	
NEB	C18:1c9	😊
Hyperketonemia	C18:1c9/C15:0	😊 😞
SARA	iso, anteiso, odd C18:1t10, C18:2 c9t11, C18:1t11	😞 😊

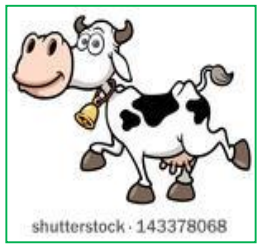
De Ridder. 2014. MSc dissertation UGent.
Rojo Gimeno et al. 2015. ISVEE conference.

Biomarker - economics



24 Euro cow⁻¹ year⁻¹ e.g.
pedometer (insemination)

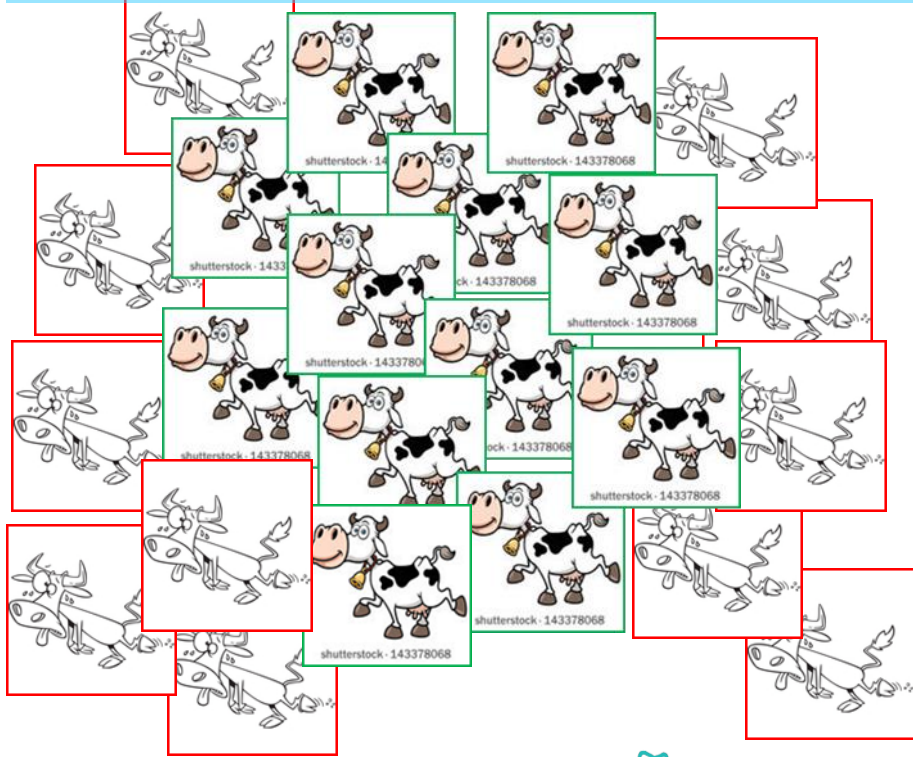
Improvement models (Se & Sp)



Se = 80%

Sp = 90%

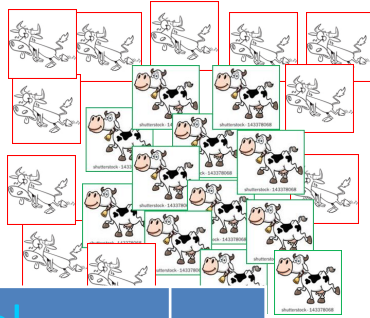
Targeted monitoring (prevalence ↑)



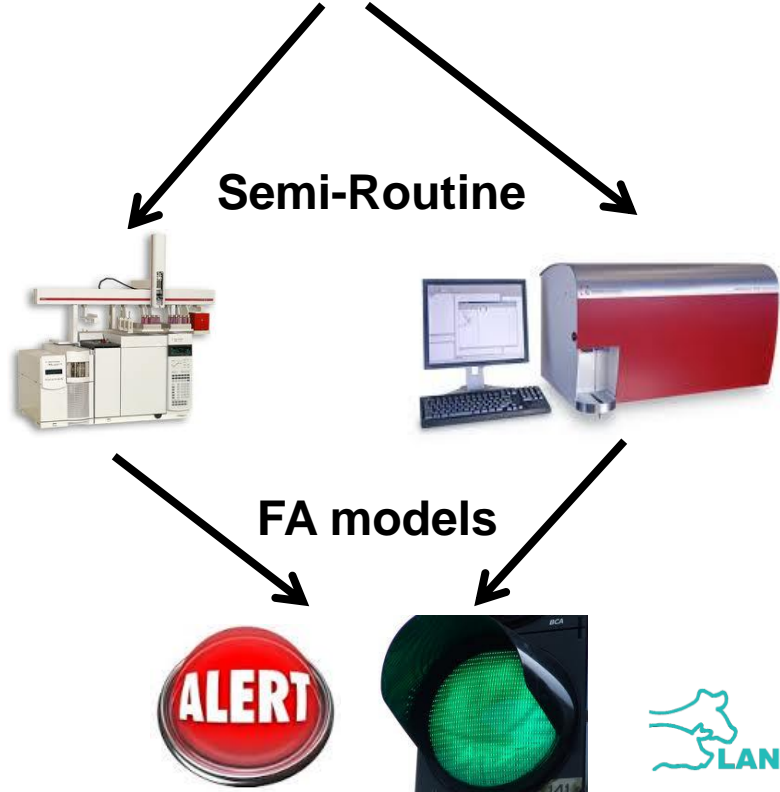


Monitoring - conclusion

Targeted monitoring



Disorder	Model	
NEB	C18:1c9	😊
Hyperketonemia	C18:1c9/C15:0	😊 😞
SARA	iso, anteiso, odd C18:1t10, C18:2c9t11, C18:1t11	😞 😐



**Thank you for
your attention**

Prof. Veerle Fievez
Veerle.Fievez@UGent.be



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