

Lactose Discussion Opener

Moorepark Milk Quality Workshop
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B. O'Brien



The Irish Agriculture and Food Development Authority

Milk lactose

Product Problems in latter part of calendar year – due to seasonal system

Changed milk composition for cheesemaking

Due to (a) migration of different constituents into milk (from blood)
and
(b) enzymatic breakdown of some other constituents

Occurs due to altered physiology and metabolism of mammary gland
in late lactation

Lactose is associated with all of the above changes
Lactose may be used as indicator of the above changes

Recommendations for milk lactose level > 4.3%

Various cheesemaking trials have reported the association between
milk lactose levels and cheese quality (Lucey et al., 1992; Kefford
et al., 1995; Guinee et al., 2006)

Protein and Lactose levels

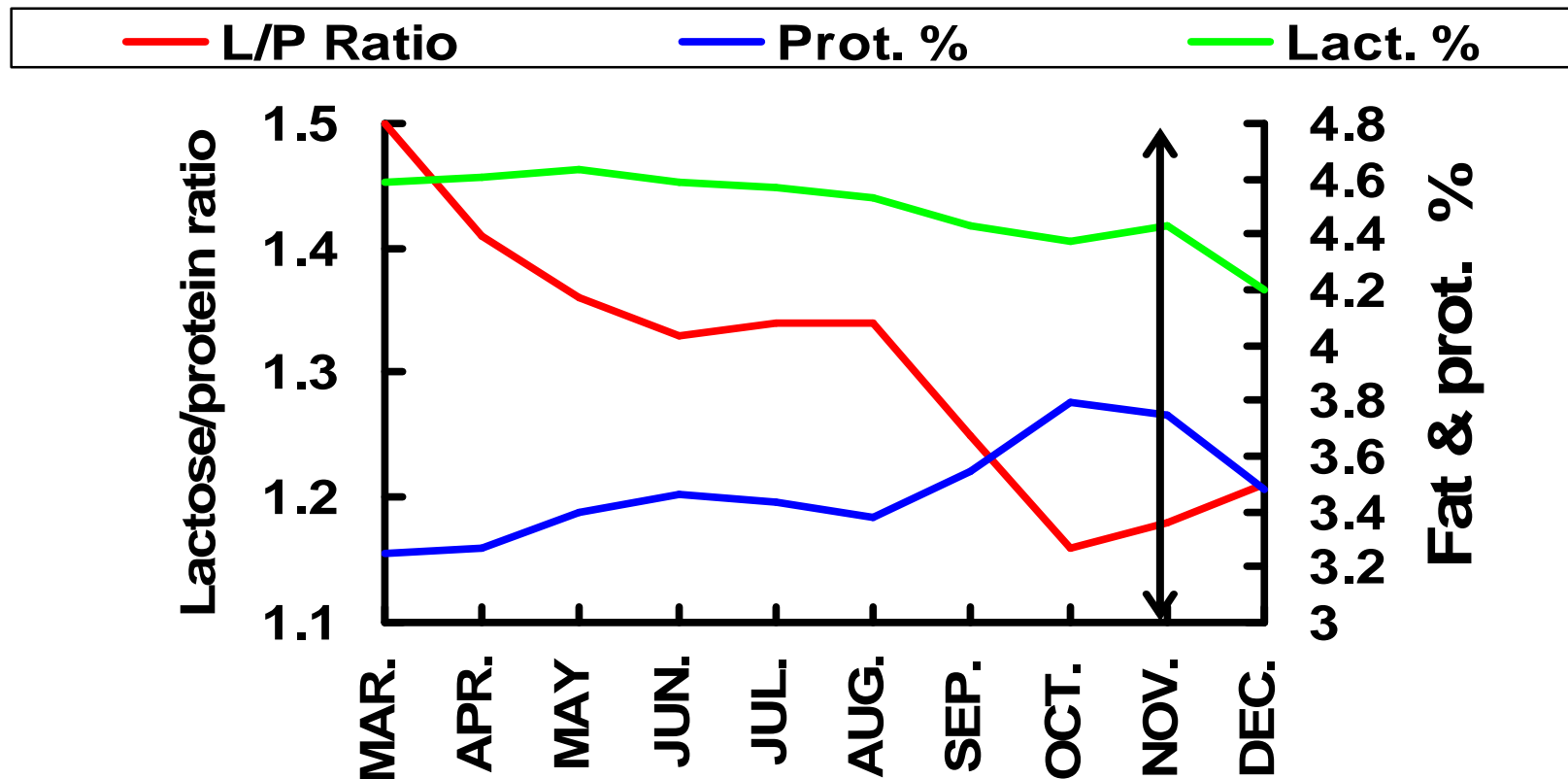
In past

- **Protein ↑ in late lactation**
- **Lactose ↓ in late lactation**
- **Lactose:Protein ratio ↓ in late lactation**

At present, if

- **Cows indoors on silage**
- **Protein ↓**
- **Lactose ↓**
- **Lactose:Protein ratio stable or increase**

Seasonality of Milk Composition(%) Protein, Lactose and L/P ratio (100% Spring-Calving)



Indicators of milk processability

- ➔ **Lactose not < 4.3 %**
- ➔ **Protein not < 3.5 %**
- ➔ **Lactose:Protein ratio not < 1.2**

Lactose – can be used as indicator of late lactation milk

- Why focus on lactose – penalty / bonus
- Using lactose as indicator of late lactation milk
- Other non-routine tests
- Lactose easily measured
- No further cost or labour

- Milk quality issues (Oct-Dec)
- Changed structure of udder
- Lactose indicator
- From previous work:
 - Lactose > 4.30 %
- Strong relationship between milk lactose level and milk yield
- 2 major influences:
- Stage of lactation, Cow nutrition

To
maintain
lactose
levels



- Dry off cows producing < 8-9 kg/d
- Feed 2kg meal to spring calvers in late lactation to maintain yields
- Length of lactation < 310d at low yield
- Dry off the herd < 10-11 kg/d - average
- Dry off high cell count cows
- Milking machine is working correctly

Low milk lactose % penalties

	Penalty (c/l)		Penalty (c/l)
>4.45	0	>4.35	Bonus (target)
4.301-4.45	0	4.21 – 4.35	No bonus
4.201-4.30	0	4 – 4.2	-2
4.101 - 4.20	-2.5	<4.0	-6 and reject
4.001 - 4.1	-5.0		
<4.0	-10.0	>4.20	-
		4.19 – 4.00	-2
>4.25	0	<4.00	-4
4.24 - 4.0	-1.0		
<3.99	-2.5	>4.36	0
		4.35-4.21	-0.27
>4.35	target	4.20-4.01	-1.77
>4.2	0	<4.01	-2.77
4.2 - 4.11	-5		
4.10 - 4.01	-10		
<4.0	-15		