Effect of forage peas on performance of high yielding dairy cows

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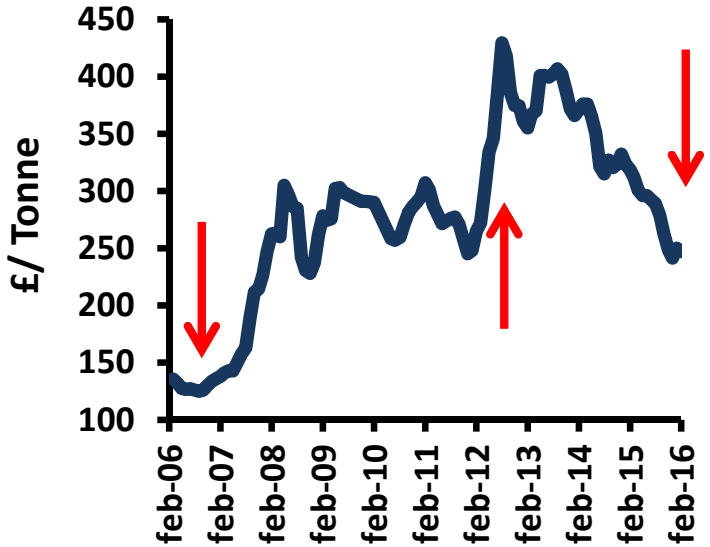
Cost of proteins

- Soyabean meal – demand and price have increased



- Utilisation of home grown protein rich forages

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Home grown forage proteins

a. Lucerne

b. Red clover

c. Forage peas

- High in rumen degradable protein
- Fix N
- Compliment low protein cereal forages
- Grows well in temperate regions

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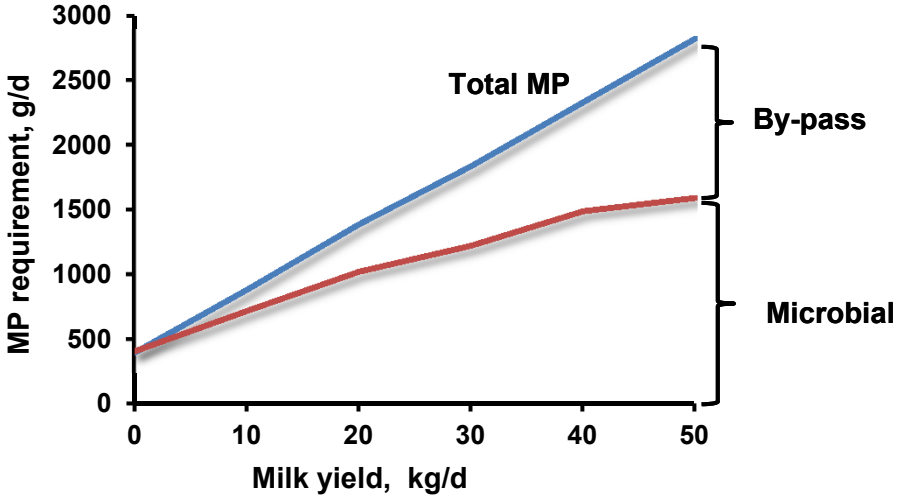
Protein quality



	Crude protein
Soya bean meal	538
Grass silage	140
Lucerne	200
Red clover	174
Pea silage	200

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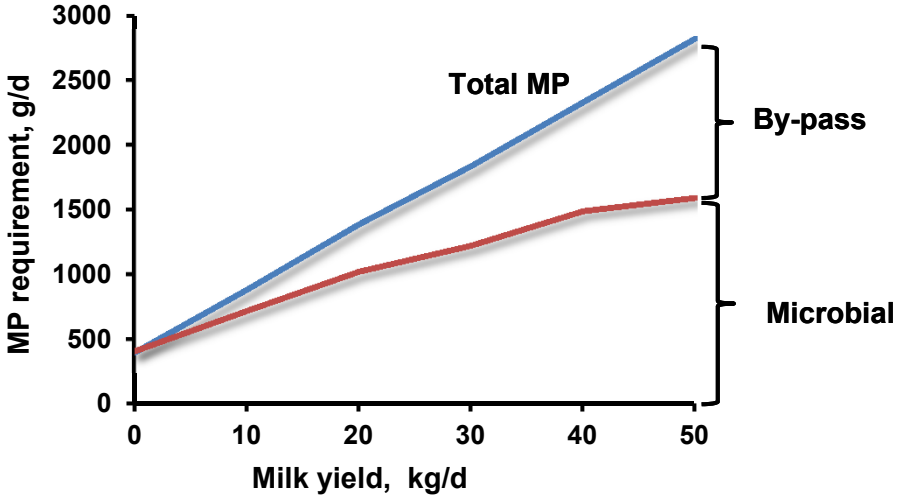
Protein quality



	Crude protein	Rumen available
Soya bean meal	538	0.67
Grass silage	140	0.79
Lucerne	200	0.83
Red clover	174	0.81
Pea silage	200	0.79

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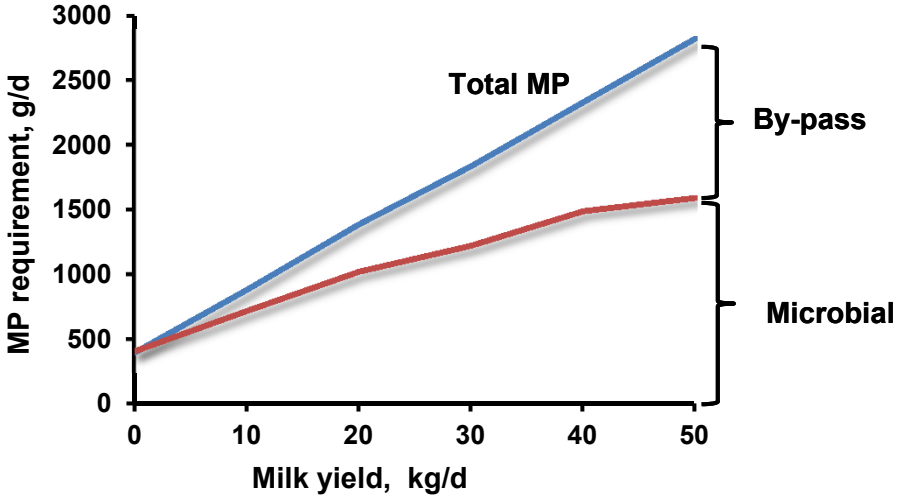
Protein quality



	Crude protein	Rumen available	By-pass
Soya bean meal	538	0.67	0.33
Grass silage	140	0.79	0.18
Lucerne	200	0.83	0.17
Red clover	174	0.81	0.12
Pea silage	200	0.79	0.18

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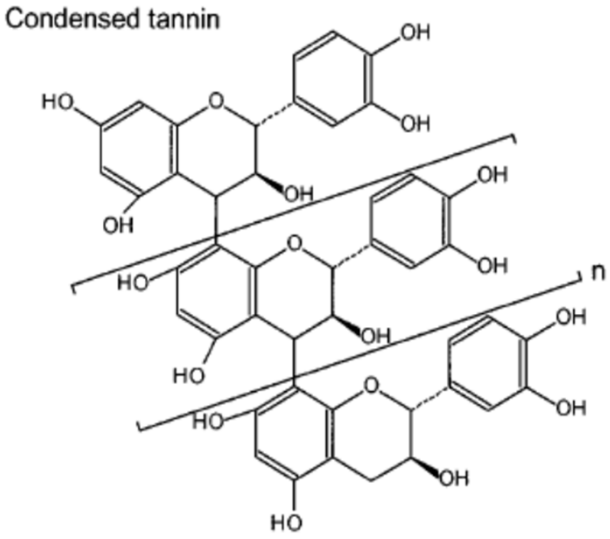
Tannins

- Any phenolic compound of high molecular weight
- Contain reactive phenolic hydroxyl or carboxyl groups
- Protection of polyunsaturated FA from biohydrogenation in the rumen
- Endogenous or added as a supplement
- pH dependent
- Condensed or hydrolysable



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Hypothesis and Objectives

- **Hypothesis**
  - Utilisation of N can be improved by naturally occurring tannins improving performance and milk fatty acid profile in high yielding dairy cows

- **Objectives**
  - To determine the effects of inclusion of peas differing in flower colour as a replacement for grass silage in the diet of high yielding dairy cows on performance and milk fatty acid profile

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Methodology

- Pea varieties:-
  - Daytona - coloured
  - Montana – white
- Harvest date :- 3rd July 2014
- Growth stage 206
- Wilted for 48 hours
- Biotal Axcool Gold
- Silage clamps

Crop yield (t DM/ha)	
Coloured	White
6.8	7.4

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Methodology

- 18 dairy cows were allocated to one of three treatments

Diets (DM basis) – 55:45 forage to concentrate

- Control (**C**): 40:60 grass to maize silage
- White (**W**): 40:60 white flower pea to maize silage
- Red (**R**): 40:60 red flower pea to maize silage
- 3x3 Latin square design, each period of 28 days

Roughage intake feeders

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Forage Analysis

	Maize silage	Grass silage	White flower pea silage	Red flower pea silage
DM, g/kg	365	376	333	389
Crude protein	82.5	180	195	208
Ash	38.6	117	117	129
pH	4.17	4.63	4.34	4.53

TMR Analysis

	C	W	R
DM, g/kg	451	444	464
Crude protein	169	164	162
Ash	74.5	74.5	79.9

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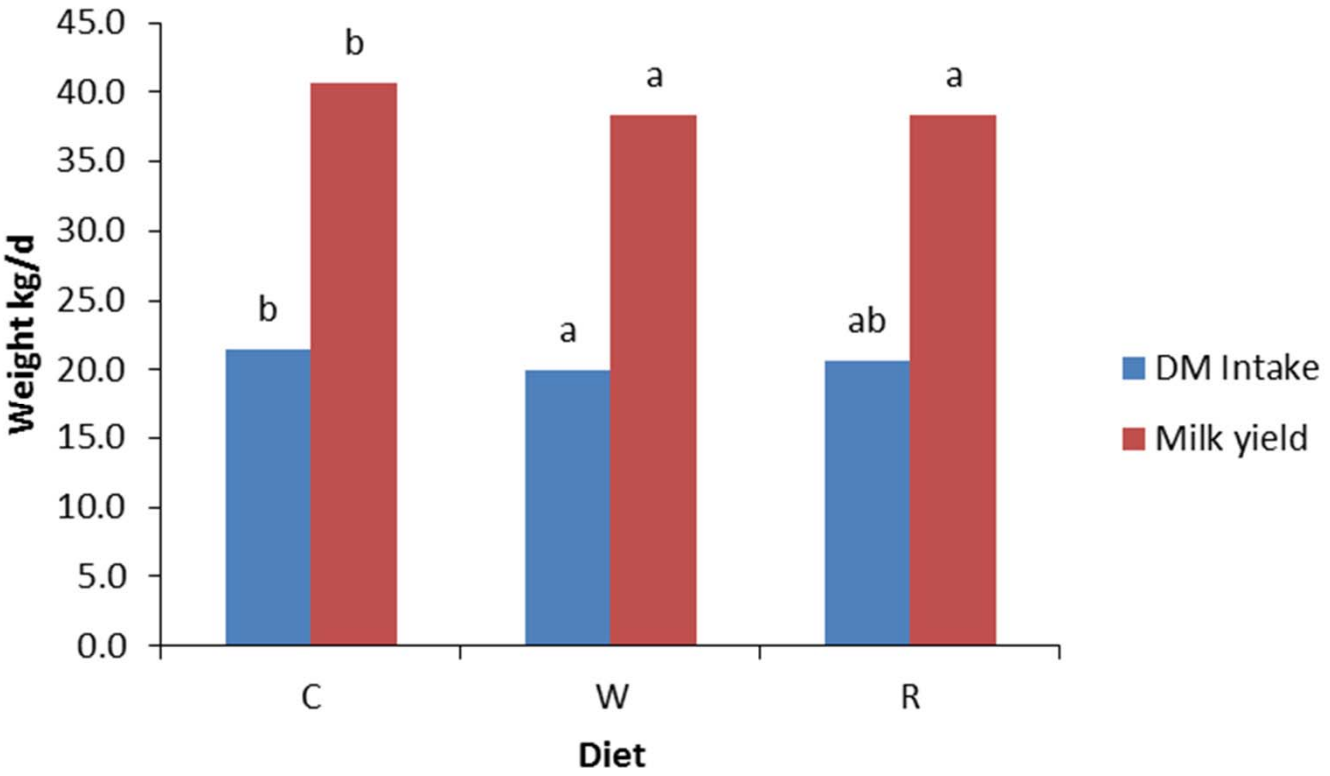
DM intake and Milk yield



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Milk Composition

	C	W	R	s.e.d	P-value
Milk fat, g/kg	37.5	39.6	37.9	0.12	0.165
Milk protein, g/kg	30.8^{b}	30.2^{a}	30.1^{a}	2.64	0.045
Milk lactose, g/kg	45.2^{a}	45.5^{ab}	45.6^{b}	1.64	0.026

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Milk fatty acid profile

Item	C	W	R	s.e.d	P value
Fatty acid (g/100g)					
16:0	36.6^{a}	38.4^{b}	37.4^{a}	0.474	0.006
17:0	0.44^{a}	0.48^{b}	0.48^{b}	0.009	<0.001
18:0	7.14	7.08	7.12	0.209	0.940
18:2 *n* – 6	0.59^{b}	0.45^{a}	0.47^{a}	0.021	<0.001
18:3 *n* – 3	0.16^{ab}	0.16^{a}	0.18^{b}	0.025	<0.001

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Conclusions

- Dry matter intake and milk yield reduced by forage pea silages
- Forage pea silage had minor effects on milk FA profile

Further study

- A dairy cow study investigating the effects of the addition of hydrolysable tannins to lucerne or red clover silage

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