

Association of milk composition traits as indicators of feed efficiency in Chios dairy ewes

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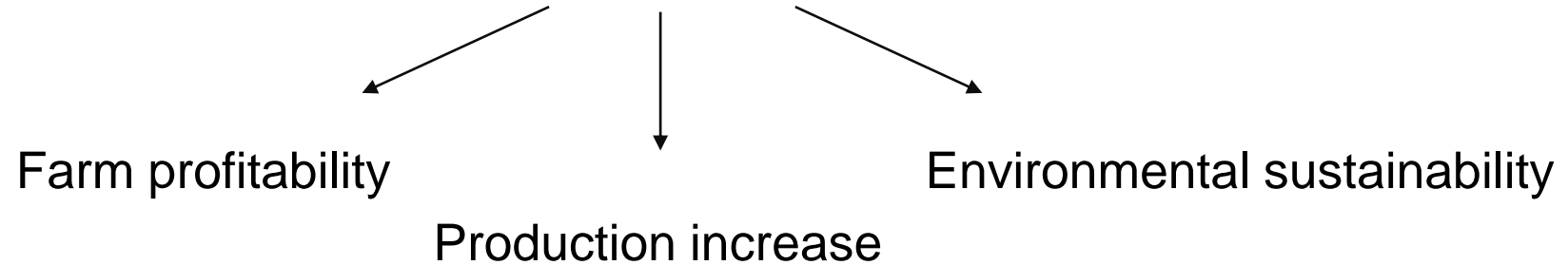
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Background

Feed efficiency

Improving feed efficiency of ruminants is a desirable breeding goal



- Measuring feed efficiency in commercial farms is challenging
- Need for easy to measure indicators
- No conclusive evidence in dairy sheep



Objective

Investigate the association of **milk composition traits**
as indicators of **feed efficiency**
in **Chios dairy ewes**



Materials and Methods

Animals

- Chios breed
- 1 purebred flock
- 38 dairy ewes
- 3rd month of lactation period



Materials and Methods

Study design & data collection

- Group housing
 - Group A (n=18)
 - Group B (n=20)
- Nutritional management
 - Pelleted concentrate diet (1.5 kg/animal/ day)
 - Lucerne Hay (1.5 kg/animal/day)
 - Wheat straw (0.3 kg/animal/day)

Parameter	Lucerne Hay	Wheat straw	Pellet
DM (/kg)	0.85	0.88	0.87
UFL (/kg DM)	0.47	0.37	1
Crude protein (g/kg DM)	148	35	158.6

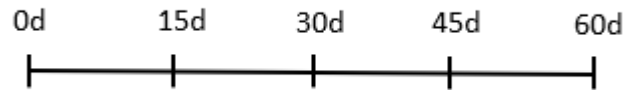
Concentrate feed (kg/animal/day)	Group A	Group B
Corn	0.90	0.63
Wheat bran	0.35	0.37
Soybean	0.25	-
Lupin	-	0.125
Pea	-	0.125
Vetch	-	0.125
Faba bean	-	0.125



Materials and Methods

Study design & data collection

- Study days



- 5 time point measurements

- BCS
- Milk yield recording (electronic milk meters)
- Milk sampling for composition (fat, protein, lactose, SNF contents)
- Pellet and hay refusals recording per group



Materials and Methods

Data handling

- Daily milk yield → AT method of ICAR
- Energy corrected milk yield for 6% fat (ECMY) →
$$ECMY = [0.28 + 0.12 + Fat (\%)] \times Milk\ yield\ (kg)$$
- Average individual animal intake
- Feed efficiency → $ECMY\ (kg) / Energy\ intake\ (UFL)$



Materials and Methods

Data analysis

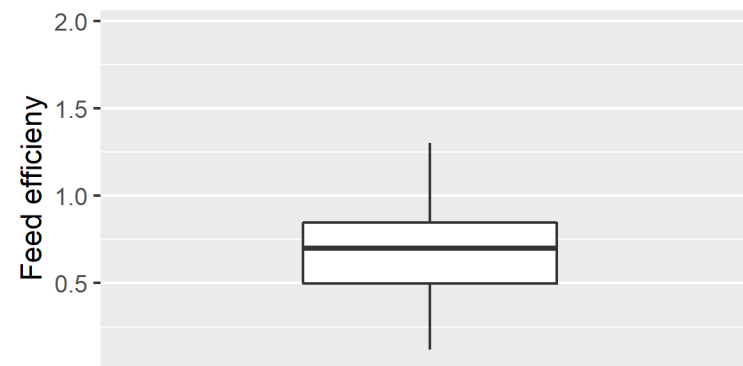
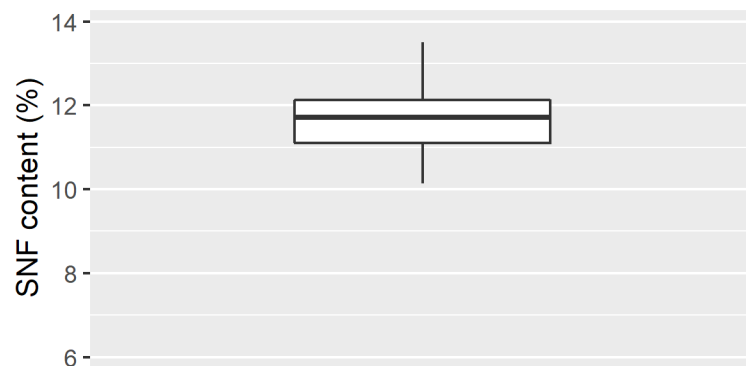
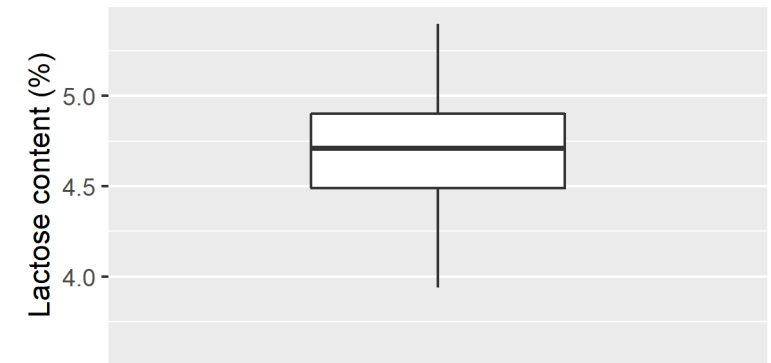
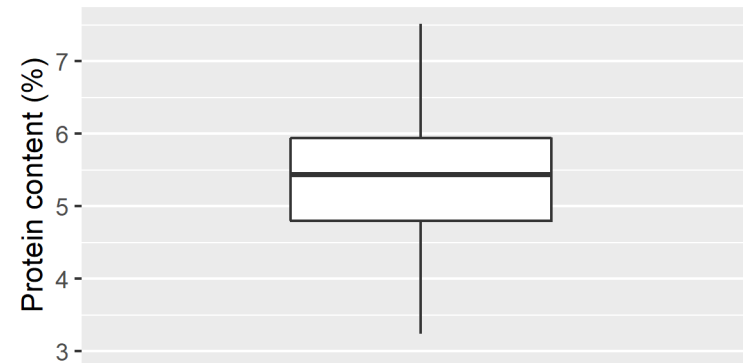
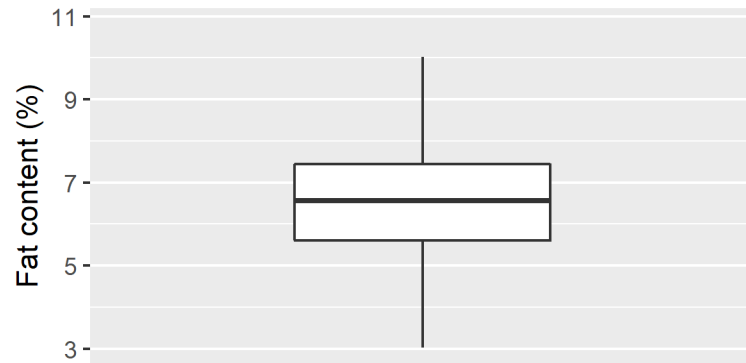
- Association of each milk composition trait with feed efficiency
 - Linear mixed models
 - Fixed effects
 - Milk composition traits
 - Group
 - Sampling time
 - Milk yield after weaning
 - BCS
 - Random effect of ewe
- R package “lme4”

In all cases
P=0.05



Results

- Distribution of milk composition traits and feed efficiency



Results

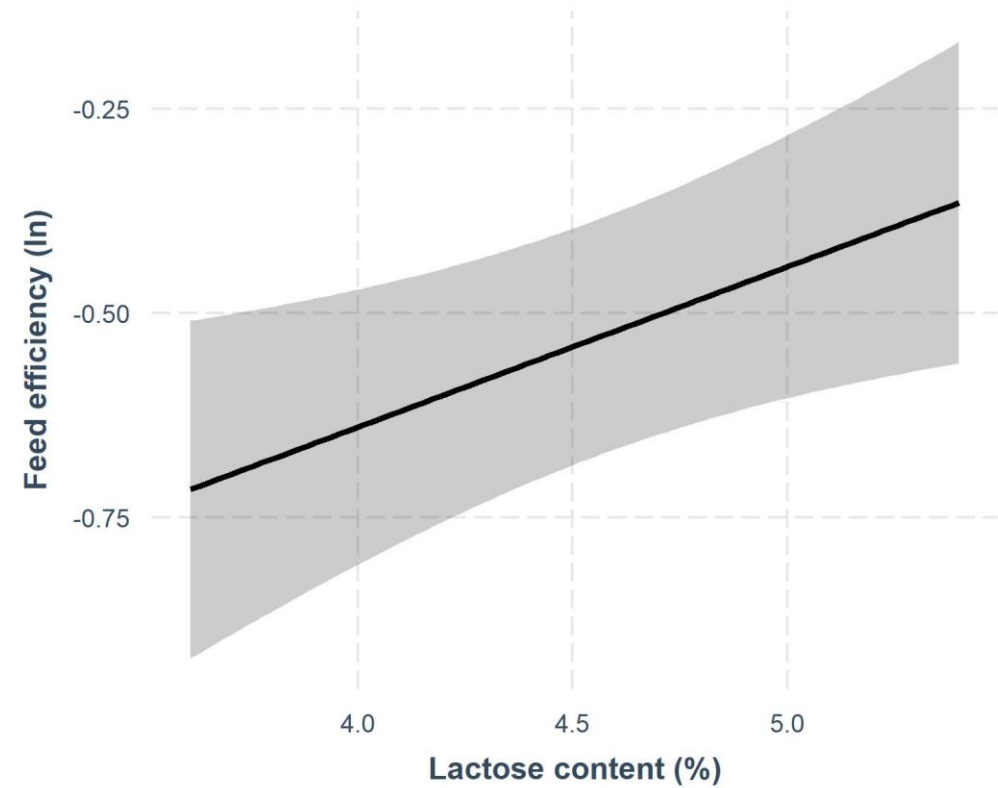
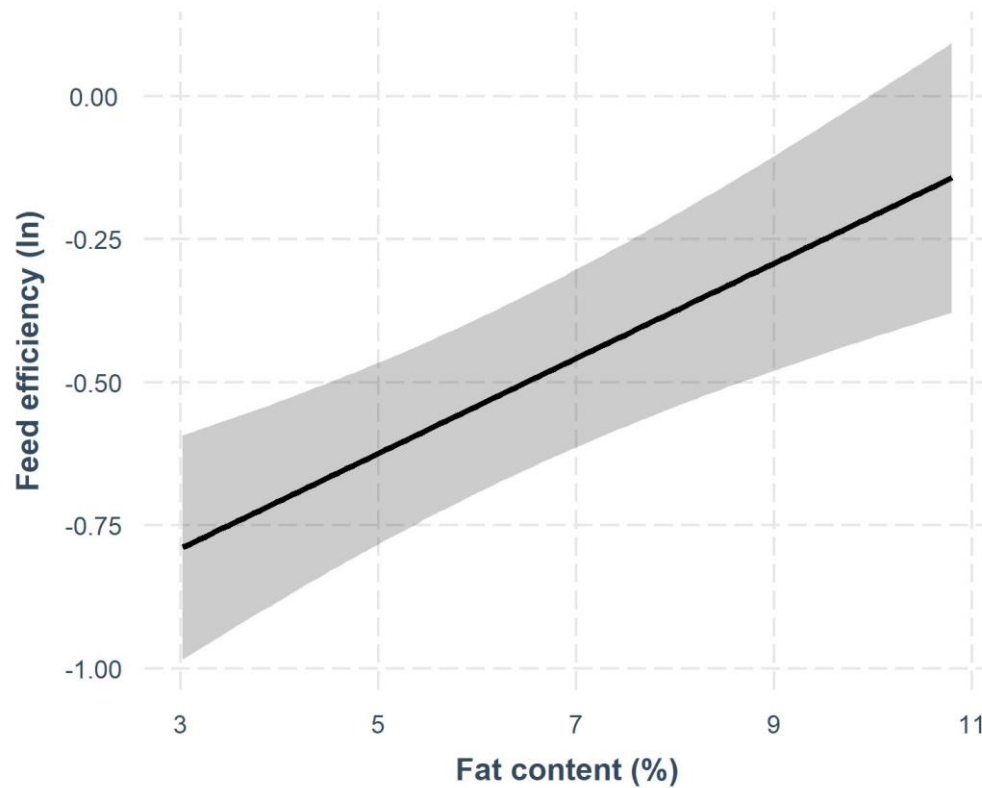
- Association of milk composition traits as indicators of feed efficiency

Trait	β -coefficient	SE	P-value	
Fat content (%)	0.083	0.020	0.0004	→ 8.7%
Protein content (%)	0.069	0.050	0.1679	
Lactose content (%)	0.196	0.080	0.0146	→ 21.7%
SNF content (%)	0.0001	0.027	0.9965	



Results

- Association of milk composition traits as indicators of feed efficiency



Conclusions

Higher milk fat and lactose content →
Higher efficiency in utilization of dietary energy



Milk fat and lactose content could be used as indicators of
selection towards increased feed efficiency



ACKNOWLEDGEMENTS

This work was undertaken as part of the SMARTER project that has received funding from the European Union's H2020 research and innovation programme (772787)

