CHANGES IN THE MILK AND CHEESE FATTY ACID PROFILE OF EWES FED EXTRUDED LINSEED

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INTRODUCTION

- Oilseeds
  - C18:3n-3 and C18:2n-6
  - In ruminant diets increase milk:
    - C18:3n-3 and C18:2 c9, t11 (rumenic acid, RA)

- Previous reports
  - Effects of whole linseed, linseed oil or extruded linseed on milk fatty acid (FA) composition in ewes

- Extensive grazing conditions?
INTRODUCTION

- Chile (South America)
  - Sheep milk and cheese are gourmet products
  - Increasing demand
  - Diversified market
  - Bioactive foods
RATIONALE

- Enhance n-3 and RA levels in ewes’ milk fat under field conditions (commercial farm) by dietary means (extruded linseed) in a short period of time
- Evaluate the effect of dietary supplementation of extruded linseed on milk and cheese FA profile of ewes under extensive grazing conditions
MATERIALS AND METHODS

- Lactating ewes (Latxa × Milchaf × Corriedale)
- Extensive grazing conditions
- Milked twice a day
- First 6 days (control; TC)
  - 50% corn + 50% oats (1000 g/ewe/d)
- Day 7 to 20 (extruded linseed; TEL)
  - 25% corn + 25% oats + 50% extruded linseed (1000 g/ewe/day)
- From day 21 to 26 the ewes were fed TC
Milk fatty acid profile from ewes supplemented with extruded linseed

- **C12:0**: 0 g/100g (Control), 0 g/100g (Extruded linseed)
- **C14:0**: 10 g/100g (Control), 10 g/100g (Extruded linseed)
- **C16:0**: 25 g/100g (Control), 25 g/100g (Extruded linseed)
- **C18:0**: 15 g/100g (Control), 15 g/100g (Extruded linseed)
- **C18:1 t11**: P<0.05
- **C18:1 c9**: P<0.05
- **C18:2 c9, t11**: P<0.05
- **C18:2 n-6**: P<0.05
- **C18:3 n-3**: P<0.05

Bar charts show the comparison between Control and Extruded linseed treatments for different fatty acids.
Cheese fatty acid profile from ewes supplemented with extruded linseed

![Bar chart showing the comparison of fatty acid profiles between control and extruded linseed groups.](chart.png)

- **C10:0**, **C12:0**, **C14:0**, **C16:0**, **C18:0**, **C18:1 t11**, **C18:1 c9**, **C18:2 c9, t11**, **C18:2n-6**, **C18:3n-3**

- **Control**
- **Extruded linseed**

- Statistical significance: **P<0.05**
Fatty acid composition in milk from ewes receiving a diet supplemented with extruded linseed

![Graph showing fatty acid composition in milk from ewes receiving a diet supplemented with extruded linseed.](image)

- **SFA**
  - Control: 70 g/100g
  - Extruded linseed: 60 g/100g
  - P<0.05

- **MUFA**
  - Control: 30 g/100g
  - Extruded linseed: 20 g/100g
  - P<0.05

- **PUFA**
  - Control: 5 g/100g
  - Extruded linseed: 3 g/100g
  - P<0.05

- **Atherogenicity index**
  - Control: 2.5
  - Extruded linseed: 2
  - P<0.05

- **Thrombogenic index**
  - Control: 3.5
  - Extruded linseed: 3
  - P<0.05
Fatty acid composition in cheese from ewes receiving a diet supplemented with extruded linseed

![Graph showing fatty acid composition in cheese from ewes receiving a diet supplemented with extruded linseed. The graph compares the levels of saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), and polyunsaturated fatty acids (PUFA) in the control group and the group receiving extruded linseed.](image)

- **SFA**
  - Control: [Value]
  - Extruded linseed: [Value]

- **MUFA**
  - Control: [Value]
  - Extruded linseed: [Value]

- **PUFA**
  - Control: [Value]
  - Extruded linseed: [Value]

![Graph showing the atherogenicity index and thrombogenic index for the control group and the group receiving extruded linseed.](image)

- **Atherogenicity index**
  - Control: [Value]
  - Extruded linseed: [Value]

- **Thrombogenic index**
  - Control: [Value]
  - Extruded linseed: [Value]

*P* < 0.05
Temporal pattern of C18:0 and C18:1 t11 of milk fat from ewes receiving a diet supplemented with extruded linseed.
Temporal pattern of C18:2 c9, t11 and C18:3n-3 of milk fat from ewes receiving a diet supplemented with extruded linseed
CONCLUSIONS

- Supplementation (500 g/ewe/d) of extruded linseed in ewes under grazing conditions increased MUFA and PUFA and decreased SFA and thrombogenic index in milk.

- Alternative lipid source supplement that can result in cheeses from ewes with nutritional added value when pastures are scarce or are not actively growing.
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