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# Timing of milk fatty acid profile responses to dietary oil additions: 21 days vs. shorter periods

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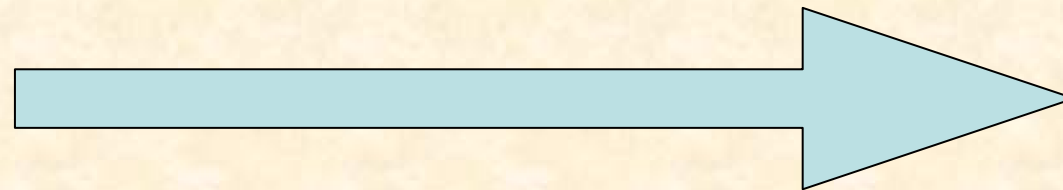
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# Introduction

- **FA enriched milk products** are increasingly present in human diets.
- **Waiting time** after introducing fat into dairy ruminant diets to check the effect on milk fat composition is **usually 3 to 4 weeks long**.
- There is a **scarcity of papers** dealing with kinetics of responses of milk fat fatty acids to plant oils inclusion in the diet of dairy ruminants. In most of reported papers **first milk sampling** is taken **two or seven days** after the introduction of the plant oil into the diets.
- The **most common plant oils** used in ruminant diets are canola, sunflower, soybean and linseed oil.

# Objective

Find out **minimum waiting period** after addition of high oleic or regular sunflower or linseed oil into goat diet before obtaining **milk fat FA changes** similar to those found at 21 days.



1 12 24 72 120 192 312 504 h



# Material and Methods

## Facilities, Animals & Timing

- ✓ Experimental Animal Unit CO/5/U at the Animal Production Department of the University of Cordoba.
- ✓ 12 midlactation multiparous Malagueña goats were used.
- ✓ Milk samples were collected at 1, 12, 24, 72, 120, 192, 312 and 504 h after introduction of experimental diets.
- ✓ Milking at 0, 1 and 12 h were stripped out by hand after an intravenous dose of oxytocin.



# Material and Methods

## Dietary Treatments

➤ **Basal diet:**

- ❖ Alfalfa hay 33%
- ❖ Pelleted concentrate 67%

➤ **Dietary Treatments.**

- ❖ **CON:** Basal diet, no oil addition.
- ❖ **OSO:** Basal diet + 48 g/d of high oleic sunflower oil.
- ❖ **RSO:** Basal diet + 48 g/d of regular sunflower oil.
- ❖ **LO:** Basal diet + 48 g/d of linseed oil.



## FA provided by experimental diets (g/d).

|                 | TREATMENTS |      |      |      |
|-----------------|------------|------|------|------|
|                 | CON        | OSO  | RSO  | LO   |
| 16:0            | -          | 1.8  | 2.9  | 2.6  |
| 18:0            | -          | 1.4  | 2.0  | 1.8  |
| 18:1-c9         | -          | 41.0 | 14.2 | 10.0 |
| 18:2-c9,c12     | -          | 2.7  | 27.9 | 8.0  |
| 18:3-c9,c12,c15 | -          | -    | -    | 23.9 |

# Material and Methods

- FA composition was analyzed by **gas chromatography** (ISO-IDF, 2002).
- **72 FA** were identified and quantified in milk fat.
- Repeated measures: **PROC MIXED** of SAS.
- FA at 0 h was used as a **covariate**.

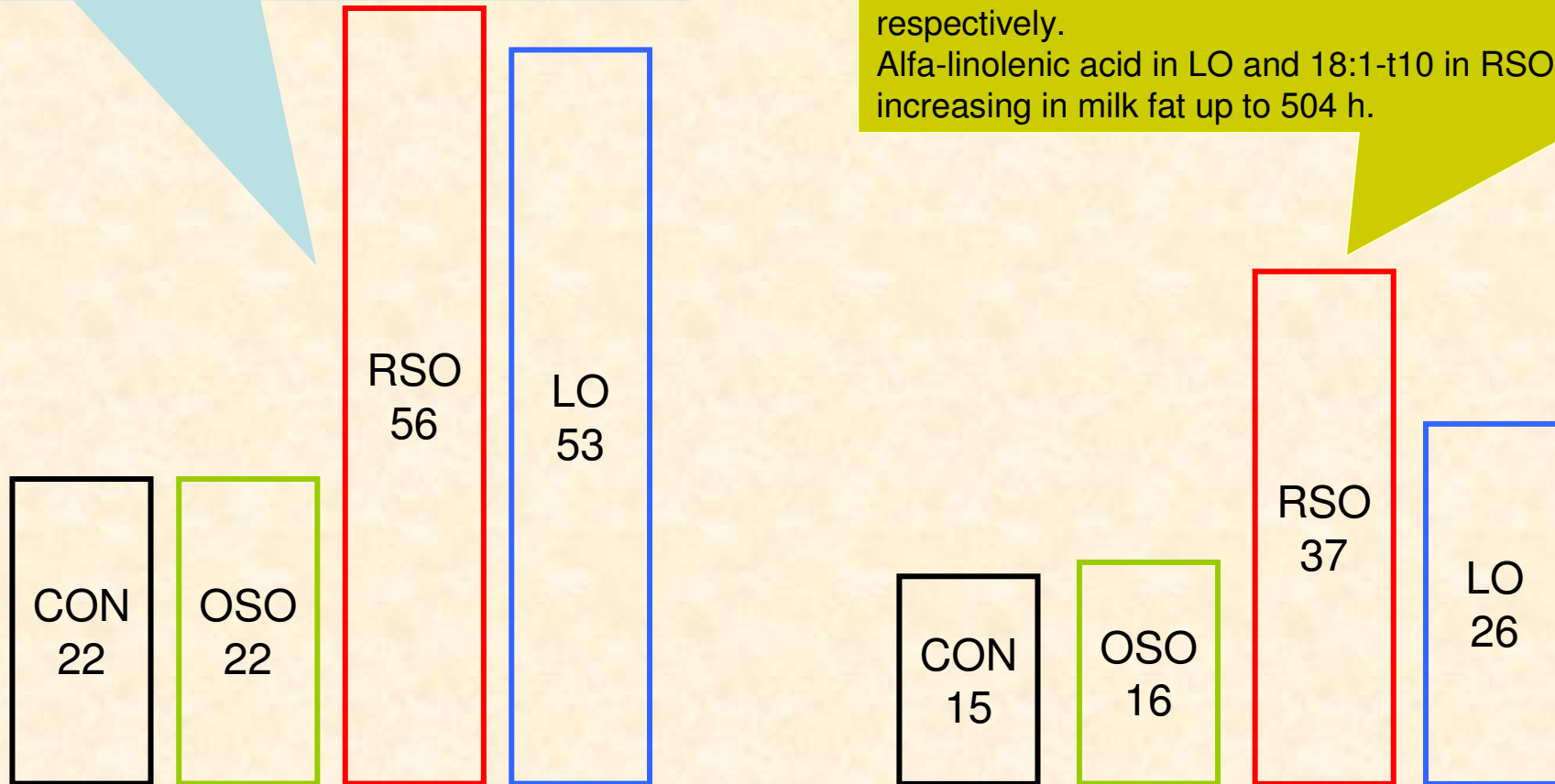


# Results

22, 22, 56 and 53 FA showed significant differences at one or more sampling times with their respective 504 h value in CONTROL, OSO, RSO and LO treatments, respectively.

15, 16, 37 and 26 FA stopped being different of the corresponding 504 h value at 72 h or lower sampling times in CONTROL, OSO, RSO and LO treatments, respectively.

Alfa-linolenic acid in LO and 18:1-t10 in RSO kept increasing in milk fat up to 504 h.

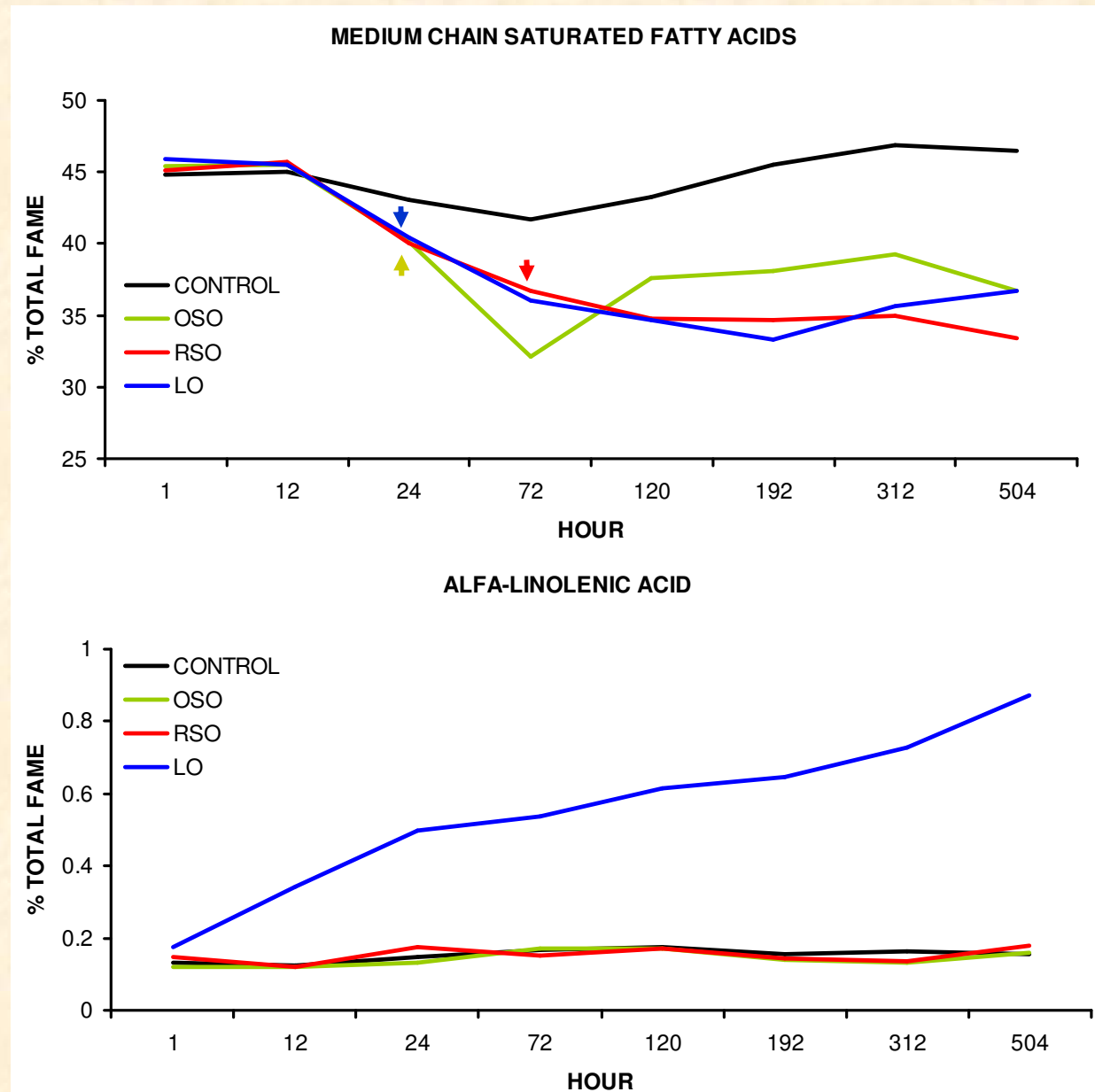


Nº of FA that showed differences with their corresponding 504 h values

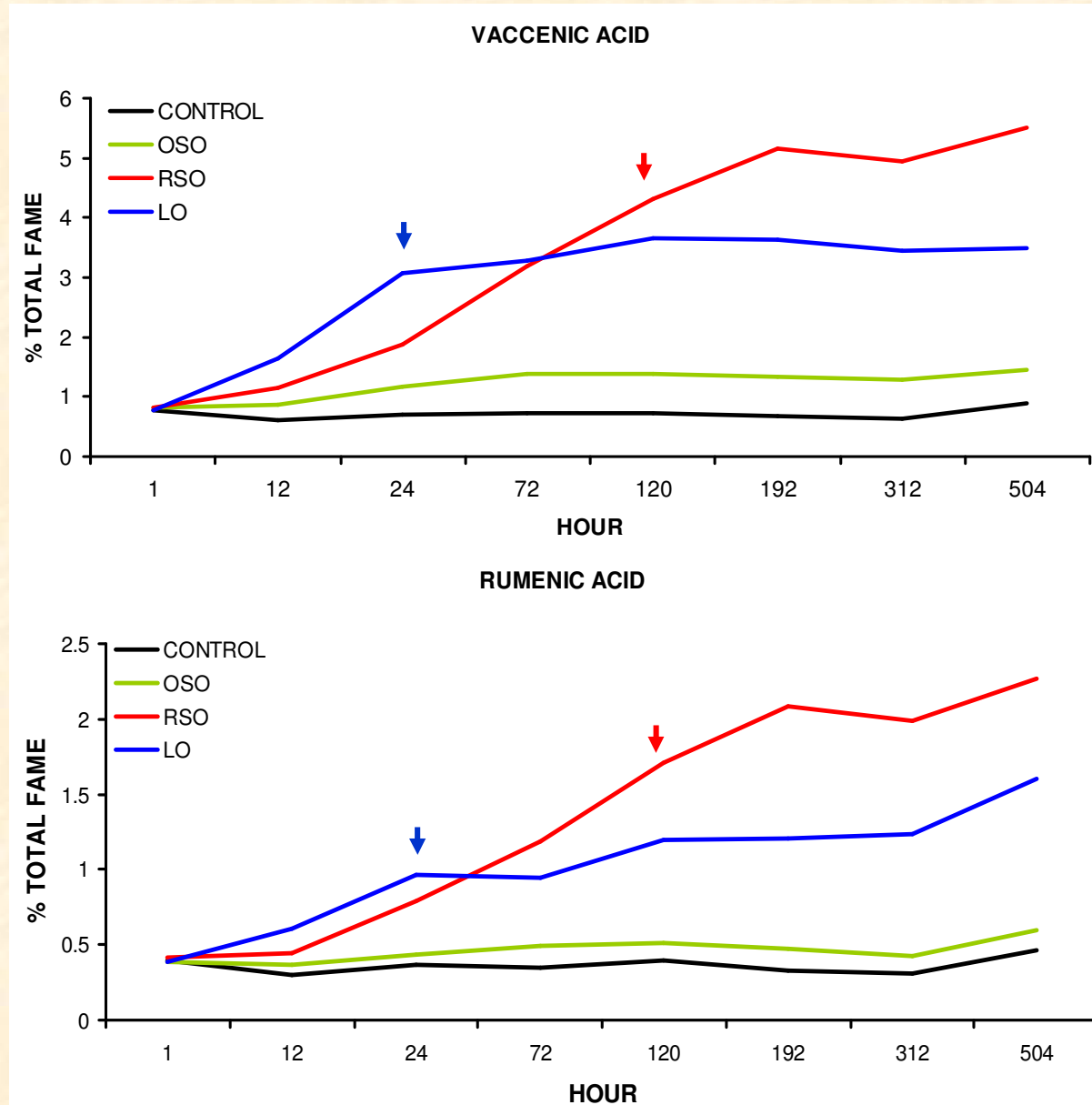
Nº of FA that stopped being different of their corresponding 504 h values at 72 h or lower sampling times



# Results of Selected FA



# Results of Selected FA



# Conclusions

- **General changes** in milk FA profile due to dietary oil addition:
  - ✓ Were less and occurred faster with **OSO**.
  - ✓ Were more in number with **RSO** and **LO**.
  - ✓ Occurred slower with **LO**.
- **Specific changes** for selected FA due to dietary oil addition:
  - ✓ **Medium chain saturated FA** decreased and stopped being different of the 504h value at 24 (**OSO** & **LO**) or 72h (**RSO**).
  - ✓  **$\alpha$ -linolenic acid** only increases with time, and never stop being different of the 504h value for **LO**.
  - ✓ **Vaccenic and Rumenic acids** stopped being different of their respective 504h value at 24h (**LO**) or 120h (**RSO**).