The supplementation with Omega 3 fatty acids enhances the reproductive performance in dairy cattle

López-Paredes, J[1]., Cadie, M[1]., Puyalto, M[1]., Mallo, JJ[1].

[1]NOREL S.A., Madrid, Spain

The 75th EAAP Annual Meeting, 1/5 September 2024, Florence, Italy

INTRODUCTION

ABSTRACT Nº 2215445

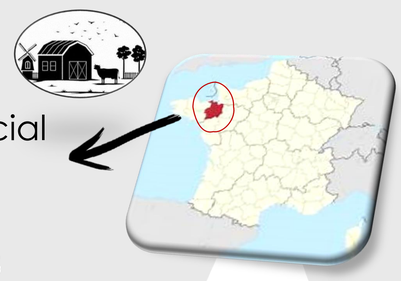
The supplementation with fat has been shown as a suitable strategy to satisfy the energy requirements of the livestock production animals, especially relevant in the case of **high-level production cows**. In addition, it has been found **positive effects on the reproduction activity in ruminants**. In that's sense, it is found a relationship between Polyunsaturated fatty acids – specifically **Omega 3** – and the regulation of the synthesis of prostaglandins (PG3a) related to the ovulatory follicles´ growth (Camacho et al., 2021; Gulliver et al., 2012). In addition, for an **adequate supplementation** is necessary a protection **avoiding rumen degradation** obtaining an optimal availability for the animal

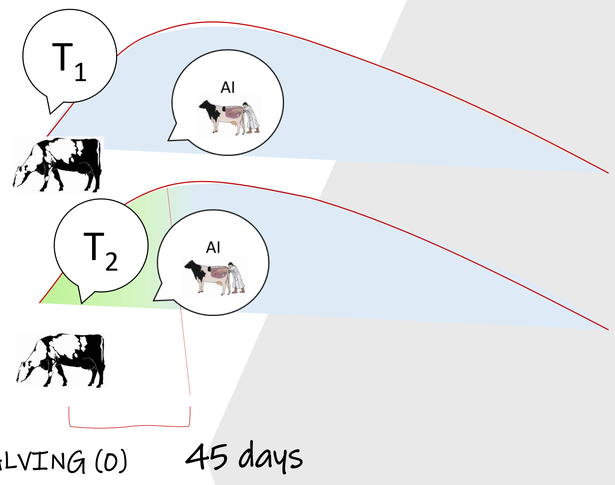
OBJECTIVES

The aim of this study was to estimate the impact of the supplementation with **rumen protected** source of **Omega 3 fatty acids** (Hi-Flax) on the **reproductive performance** in dairy cattle, pregnancy, open days, and number of artificial inseminations

MATERIAL & METHODS

1. DATA were collected in a commercial farm located in Department Ille et Vilaine (France) from March 2022 to January 2023





2. TREATMENTS (T)

T_1 (n=15) → control basal diet

T_2 (n=16) → control basal diet + **250 g/cow/day** rumen protected source of Omega 3 (**Hi-Flax**) **in the first 45 days post-calving**.

3. PARAMETERS

- PR

Pregnancy per artificial insemination

(YES=1 | NO=0)

- OD

Open days (days from calving to pregnancy)

- N.AI

Nº of artificial inseminations until pregnancy

4. STATISTICAL ANALYSIS

Pregnancy rate per AI (Random)

$PR \sim \mu + n.ai + T + cow + e$

Generalised linear mixed model (LOGISTIC)

PROB. & ODDS RATIO

Open days

$OD \sim \mu + n.ai + T + e$

Generalised linear model

Number of AI until pregnancy

$N.ia \sim \mu + T + e$

Generalised linear model

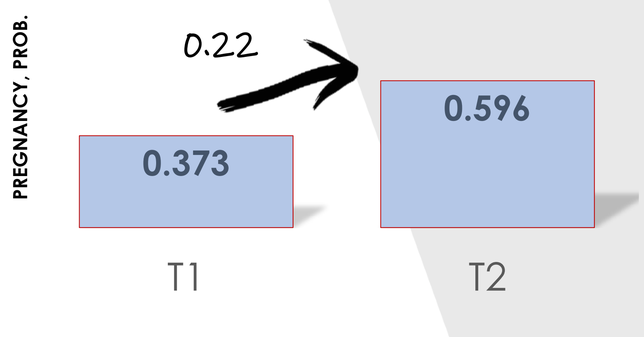
ANOVA & comparison of means (least square means)

R Studio

T = treatment; μ = intercept; n.ai =number of artificial insemination; cow = random effect of the cow, e = error

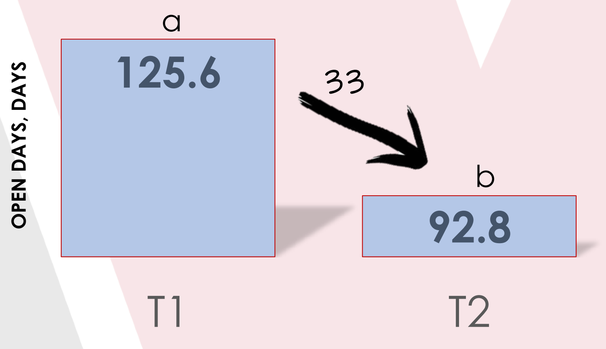
RESULTS & DISCUSSION

PREGNANCY



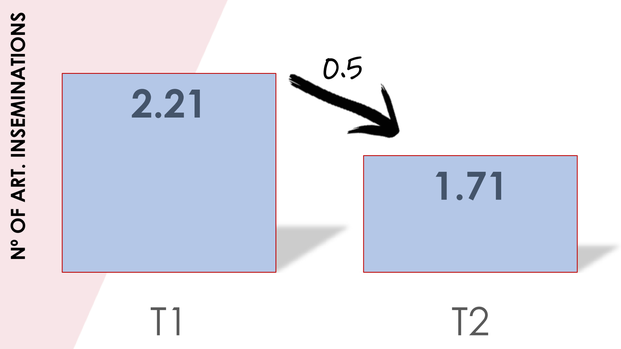
ODDS RATIO	T_2/T_1	2.47(1.28)	P=0.08
PROB.	T_2-T_1	0.22(0.12)	P=0.08

OPEN DAYS



	T_2-T_1	-32.8 (12.5)	P=0.01

Nº ARTIFICIAL INSEMINATIONS



	T_2-T_1	-0.50(0.26)	P=0.06

These results showed an increase of **pregnancy** rate in 0.22 (p=0.08), with a reduction of the **open days** in 33 days (p=0.01) and the subsequent decrease of the **number of AI** needed until pregnancy (0.5, p=0.06). Interpretation of these findings suggests a tangible enhancement in dairy cow fertility ensuing from Omega-3 supplementation, presumably mediated by the **upregulation of PG3a production**. This biological mechanism is implicated in **bolstering corpus luteum and follicular development while concurrently diminishing the PG2a signal**. Consequently, such physiological enhancements involve cost savings attributable to reduced veterinary, labour, and management expenses, alongside **decreased non-productive and dry periods**, ultimately culminating in an **improvement in overall profitability** the individual cow and the dairy farm

CONCLUSSIONS

In summary, this study underscores the benefits of Hi-Flax supplementation, which **engenders a significant improvement in reproductive performance** and, by extension, augments the economic viability of dairy farming