

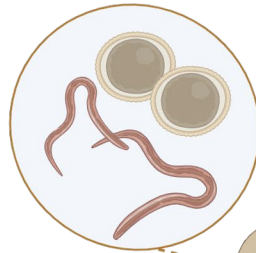
Effect of a natural solution on gastrointestinal parasitism modulation in heifers

M. HALGRAIN, S. JULLIAND, E. COUDERT, S. POINT, A. EUZENOT, T. CHALVON-DEMERSAY AND C. OMPHALIUS



Chemical Antiparasitics: A Growing Controversy

Note written by the European Medicines Agency = developing different **management strategies** to **prevent infestation and/or keeping infestation pressure at low level** (EMA/CVMP/EWP/573536/2013).



Gastrointestinal parasitism (*strongyles and coccidia*) = impact on production, health and welfare of ruminants (Dauguschies and Najdrowski, 2005; Charlier et al., 2009; 2014).

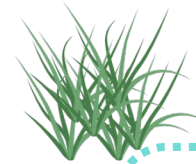
The metabolites of these anthelmintics are found in feces and have a harmful impact on the **environment** (Floate et al., 2005).



Synthetic anthelmintics can alter **digestive microbial communities** in ruminants (Xiaolong et al., 2020).



Using of chemical anthelmintics = most commonly method to control digestive parasites but **resistance** and **sustainability problem** (Rose et al., 2015).



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Development of a natural solution derived from a mix of plants known for their antiparasitic effects



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Main objective

Study the effects of this plant-based complex to reduce risks of digestive parasitism in ruminant farming

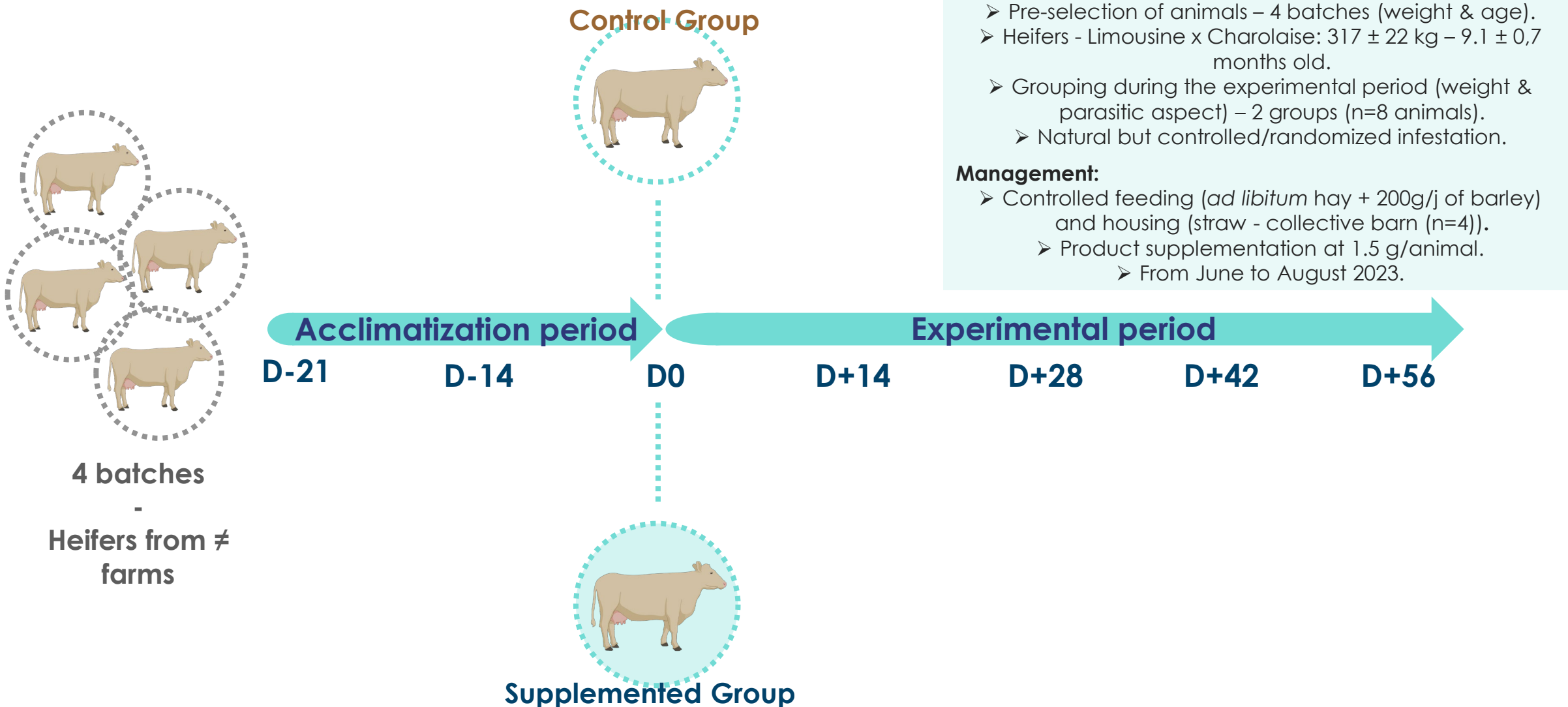
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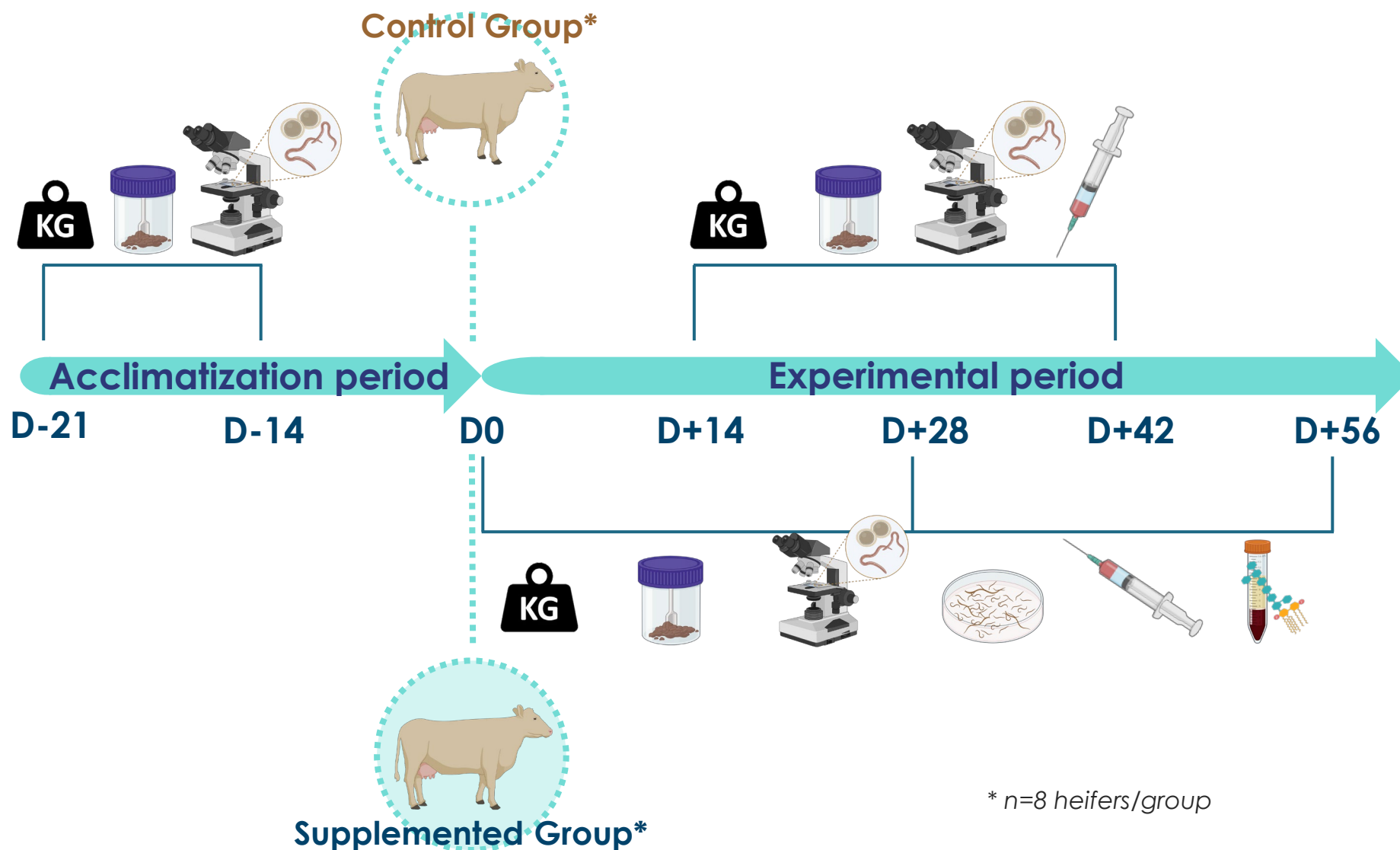
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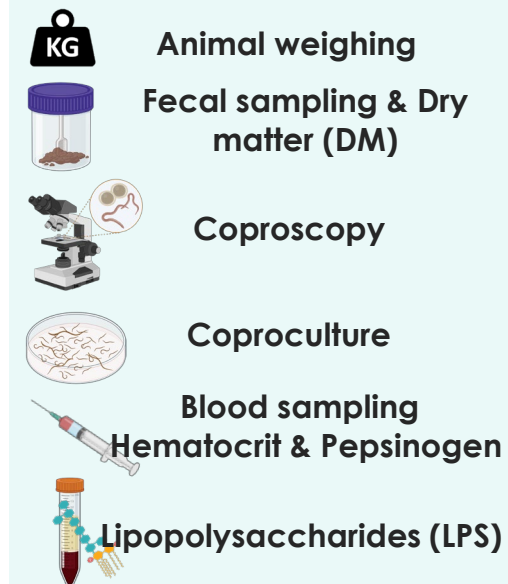
Experimental design



Experimental design



LEGEND



Statistical analysis

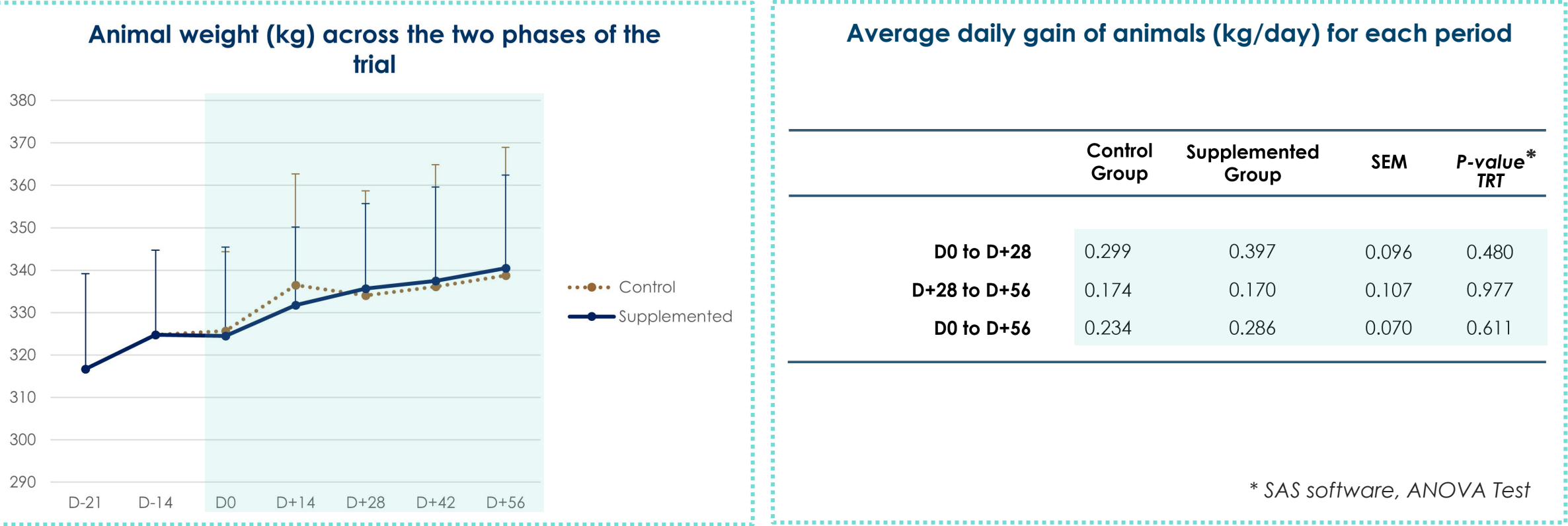
SAS Software, ANOVA test (repeated measures) with Time*Group interaction & Fisher Test for larvae mobility

- Baseline (D0) as covariate

- Significance threshold: $p \leq 0.05$

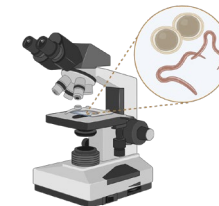
Results

ZOOTECHNICAL PERFORMANCE - WEIGHT & AVERAGE DAILY GAIN



No significant difference on weight and average daily gain between the two groups.

Results



PARASITISM EVALUATION - DATA FROM COPROSCOPY – PARASITE EGG COUNT

Means of parasitic counts before and during the experimental period (EPG)

	Control Group	Supplemented Group	SEM	P-value* TRT	P-value* Time	P-value* TRTxTime
<i>Ostertagia ostertagi</i> (EPG)						
D-21	81	58	32	0.541		
D-14	62	41	7	0.056		
D0	91	94	18	0.898		
D0 to D+56	95	81	15	0.516	0.697	0.781
<i>Eimeria bovis</i> (EPG)						
D-21	613	756	222	0.655		
D-14	331	334	87	0.980		
D0	656	444	206	0.478		
D0 to D+56	301	188	58	0.195	<0.001	0.447

* SAS software, ANOVA Test

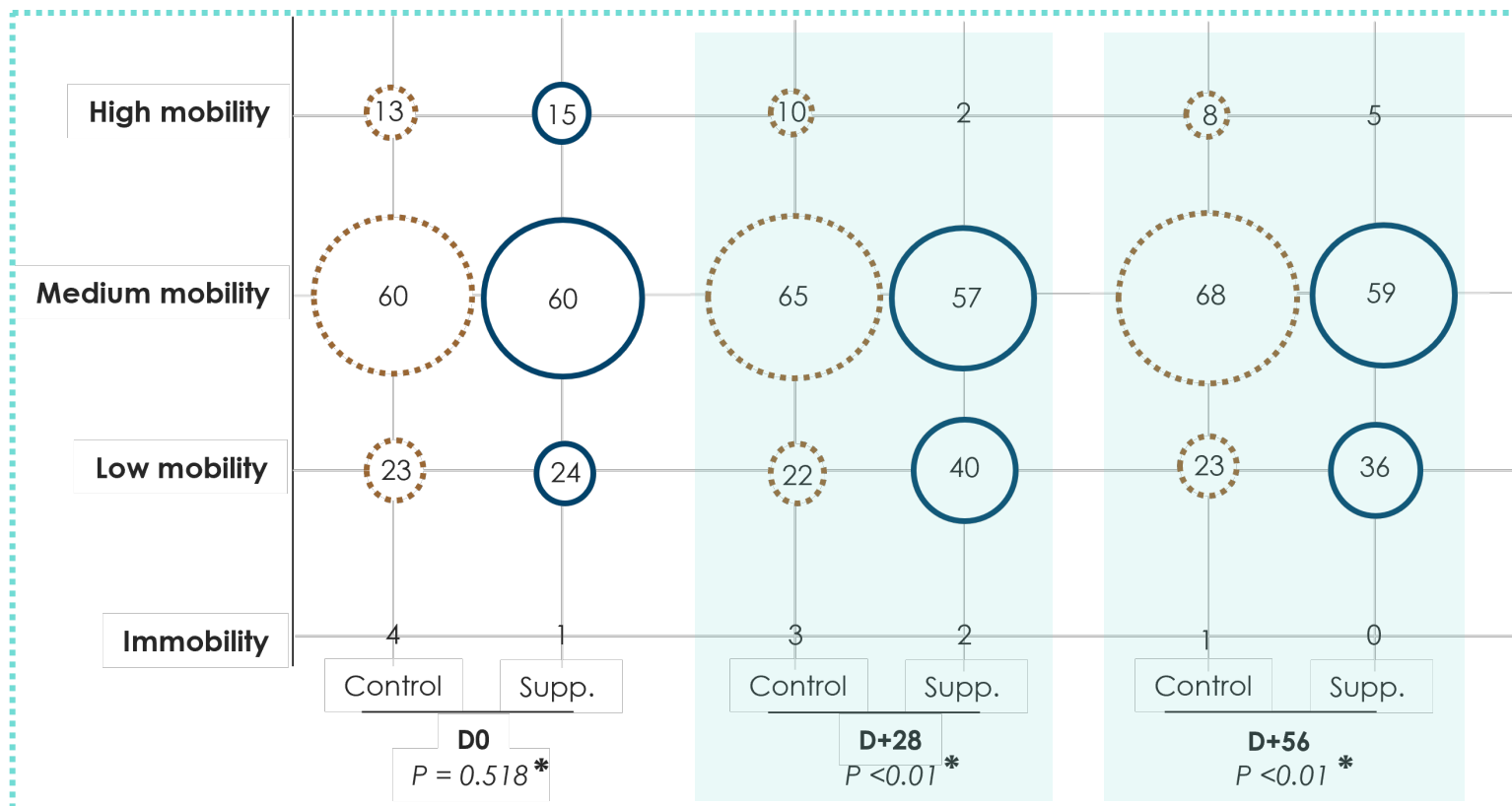
- Pre-experimental period : no differences between groups.
- **Experimental period:** suppl. with plant extracts = no significant effect but a **continuous ↓ in the count of coccidia oocysts** was observed in both groups.

The product does not impair the fertility of the parasites...

Results



PARASITISM EVALUATION - DATA FROM COPROCULTURES – LARVAE MOBILITY

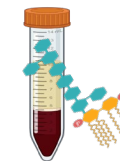


* SAS software, Fisher Test after evaluation by scoring

- At D0, no statistically significant difference was observed in larval mobility.
- Effects of the plant mixture were observed on this parameter at D+28 and D+56.
- **Animals receiving the supplementation = ↓ highly mobile or mobile larvae and ↑ weakly mobile larvae** compared to the control group.

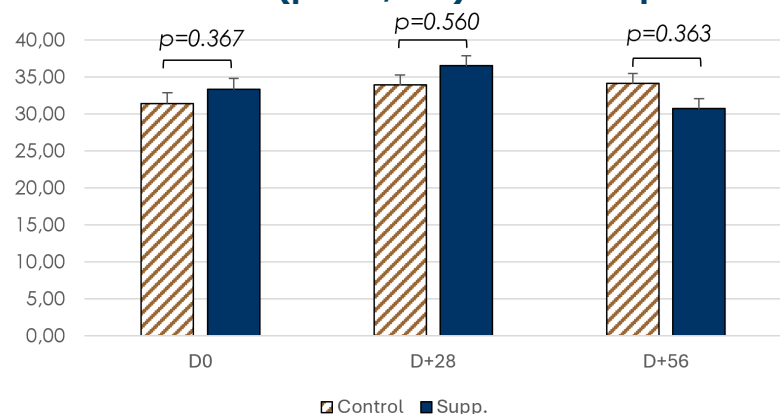
...However, the larvae from eggs of the treated group seem to be altered...

Results

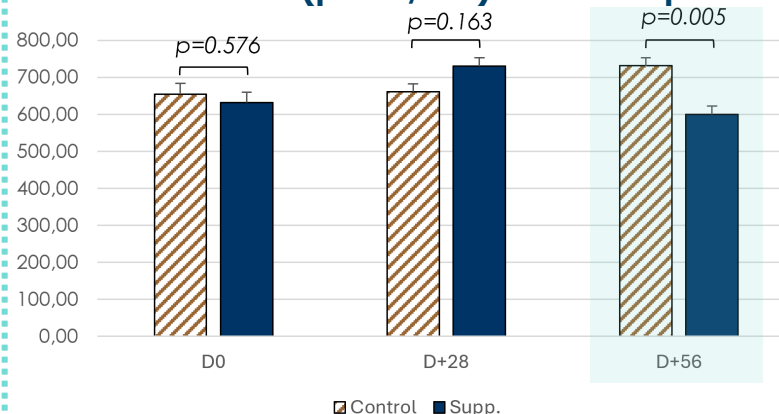


MARKERS OF INTESTINAL ABSORPTION AND BARRIER INTEGRITY – LIPOPOLYSACCHARIDES (LPS)

Esterified C14 (pmol/mL) for each period*

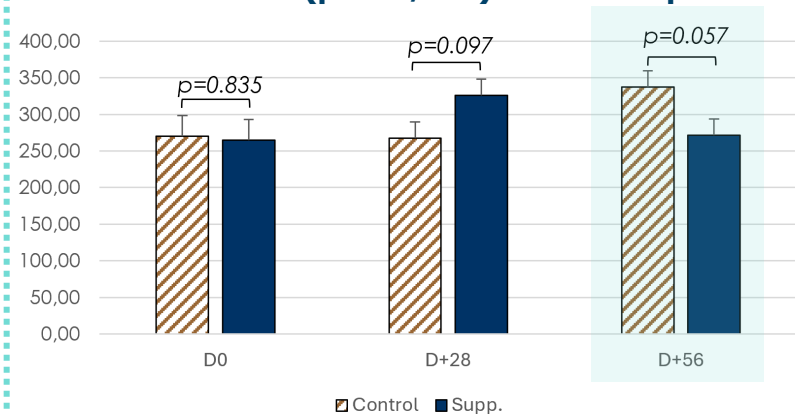


Esterified C16 (pmol/mL) for each period*



- At D0 and D+28: plasma concentrations of LPS did not differ between groups.
- At D+56: **Concentrations significantly ↓ for C16** (supp. vs Ctrl) and a **similar trend** was observed for C18.

Esterified C18 (pmol/mL) for each period*



The reduction in blood LPS could result from less damage to the intestinal mucosa...
Direct or indirect effect?

* SAS software, ANOVA Test

Conclusion



- This study aimed to **investigate the effect of a natural solution on gastrointestinal parasitism** following a natural infestation in young animals.
- Our **results** show that:
 - ***Ostertagia ostertagi***: Counting of strongyle eggs, pepsinogen and hematocrit measurement (data not presented) did not reveal any differences between the two groups but larvae cultured from feces of supp. animals were less vigorous compared to those from the control group = ↓ reinfestation and pathogenicity or alteration of development cycle?
 - ***Eimeria bovis***: No difference observed but steady decline in the number of oocysts = effect of rearing conditions ? Natural immunity?
- **Lower plasma LPS concentrations after 56 days** in the supp. animals = better intestinal mucosal integrity = effect of the solution on permeability of the intestinal epithelial barrier? Indirect effect?
- **These results suggest that the tested solution could favorably modulate gastrointestinal parasitism in livestock without negatively affecting the animals' performance.**
- A **complementary study** is currently underway to further investigate and better understand the mode of action of our solution on the intestinal ecosystem.

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Thank you !

