Goat kids are affected by the intramammary administration of lipopolysaccharides at parturition

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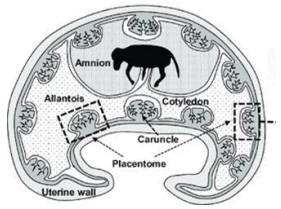
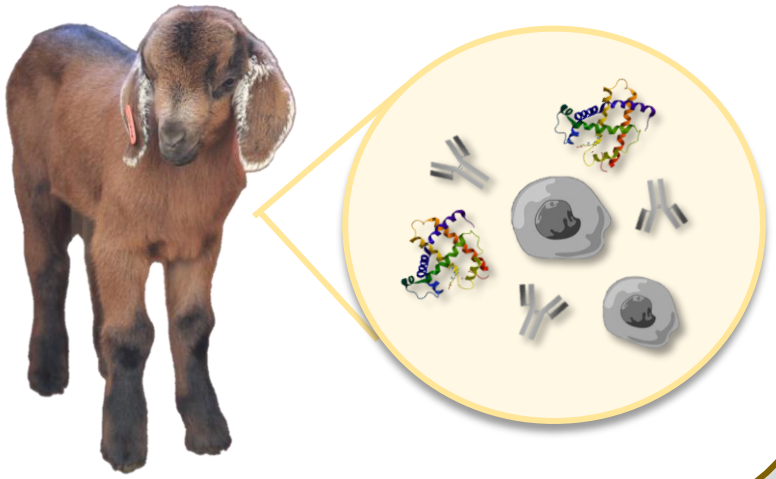
Background

Passive Immune Transfer

Synepitheliochorial placenta

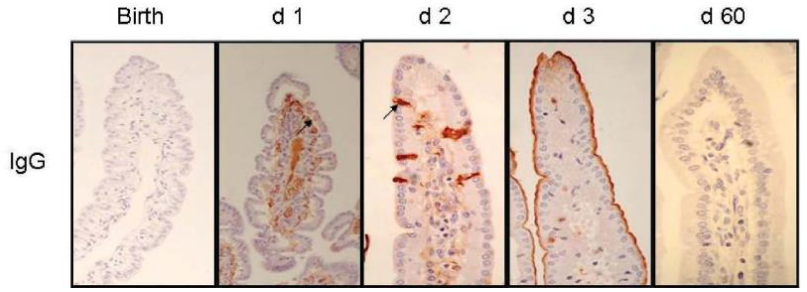


Carlson et al. (2021)



Intestinal absorption

Timing



Castro-Alonso et al. (2008)

Quality

Table 3. Immunoglobulin G (least squares means) blood serum in kids fed high, medium, and low concentrations[1] of IgG from lyophilized paste.

Time	H-IgG	M-IgG	L-IgG	SEM	*P*
0	0	0	0	0	0.001
12	9.02[a]	4.03[b]	1.55[b]	0.36	
24	9.53[b]	4.69[b]	3.26[b]	0.36	
36	10.28[a]	5.63[b]	4.54[b]	0.51	
48	8.85[a]	4.42[b]	3.65[b]	0.34	
60	8.43[a]	3.99[b]	2.81[b]	0.27	
72	8.14[a]	3.63[b]	2.39[b]	0.23	
84	7.50[a]	3.24[b]	2.02[b]	0.27	
96	7.23[a]	3.26[b]	2.34[b]	0.27	
108	6.79[a]	3.42[b]	2.26[b]	0.24	

Castro et al. (2005)

Background

Failure of Passive Transfer

Neonatal mortality

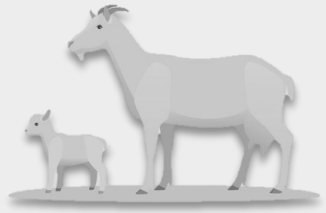
IgG (mg/ml) serum concentrations in dead and alive kids

Time (h)	Alive	Dead	Viability effect ($P<$)
0	0	0	0.018
12	8.60 ± 10.36	0.47 ± 1.24	
24	15.18 ± 13.22	5.19 ± 11.20	
36	16.09 ± 17.09	6.04 ± 11.52	
48	15.92 ± 13.46	4.85 ± 9.03	
60	14.98 ± 13.03	7.15 ± 11.90	
72	11.55 ± 8.11	7.73 ± 12.35	
84	15.33 ± 11.70	8.78 ± 11.98	

Results in mean ± standard deviation.

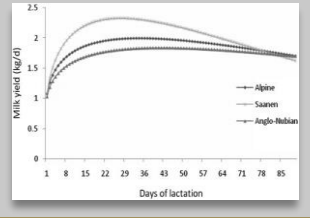
Argüello et al. (2004)

Average daily gain



Susceptibility to disease

Milk production



Weaver et al. (2000)

Hypothesis

Feeding colostrum from goats treated with an intramammary administration of bacterial lipopolysaccharides (LPS; Escherichia coli serotype O26:B6) at parturition can enhance the immunity acquired by the offspring.

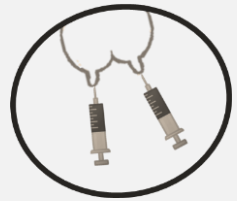
Objective

Evaluate the effect of feeding colostrum from goats treated with an intramammary administration of LPS on goat kid performance, immune system and blood metabolites during the first 4 weeks of life

Material and Methods

Animal experiment procedure: OEBA-ULPGC 28/2021

Experimental groups



LPS

50 µg de LPS in 2 mL saline solution 0.9%

n = 19

CONTROL

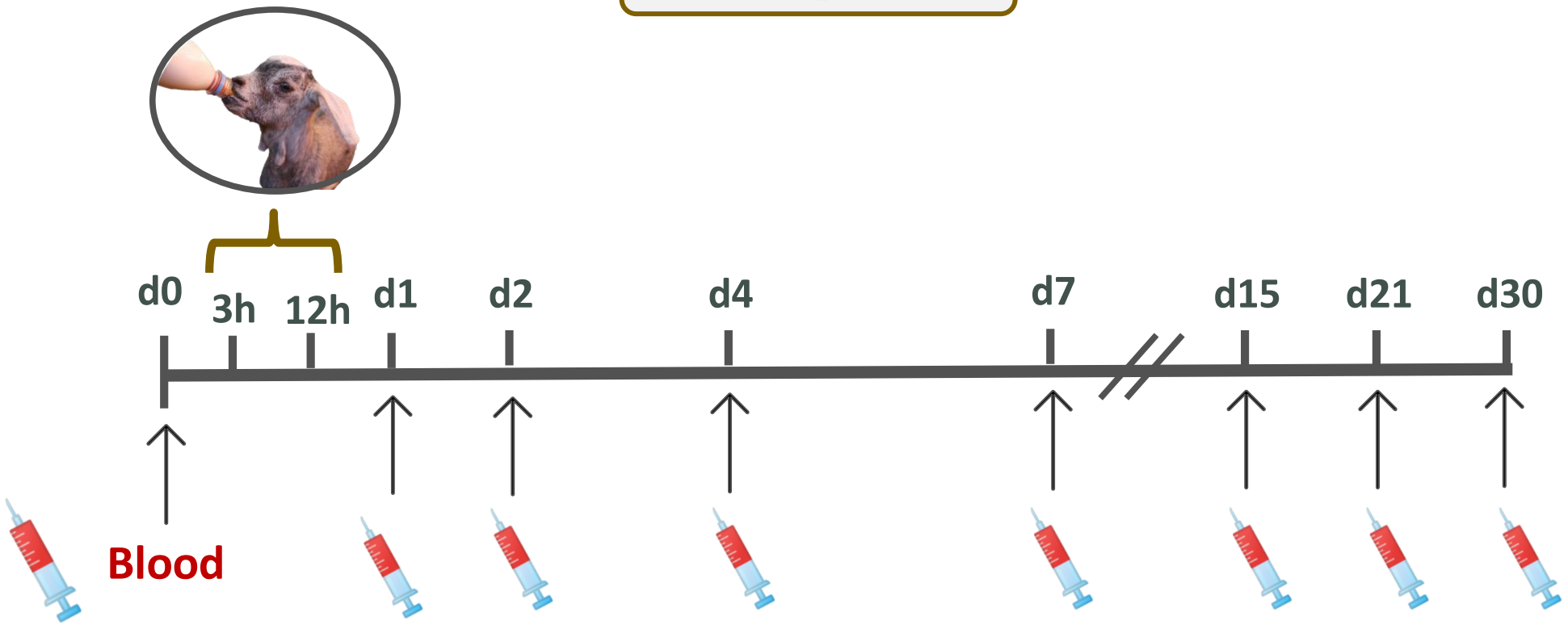
2 mL of saline solution 0.9%

n = 26

Gestation length was 150 ± 2 days; Litter size 2.1 ± 0.56

Material and Methods

Sampling



Animal experiment procedure: OEBA-ULPGC 28/2021

Material and Methods

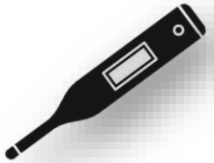
Variables

Blood

- Plasma IgG and IgM

- Serum

Glucose, calcium, lactate dehydrogenase and total proteins.



- Rectal temperature
- Milk intake
- Body weight

Statistical analysis

Mixed procedure

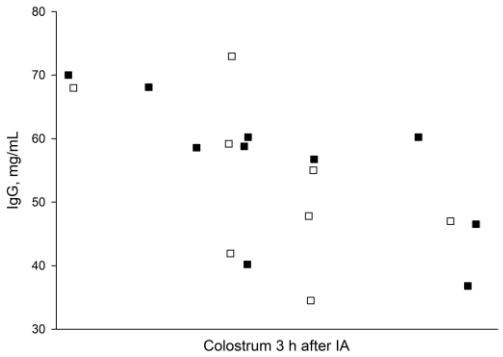
Repeated measure: Time
Subject: Animal
Bonferroni's test, p-value ≤ 0.05

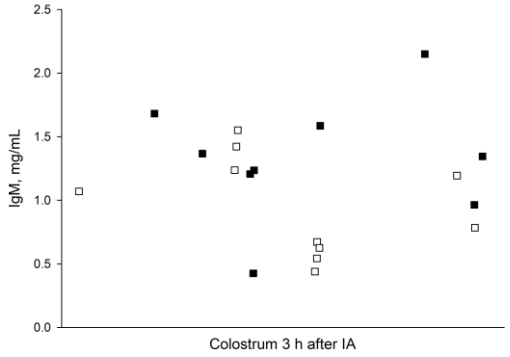
Results & Discussion

Variables	Groups		SEM	Fixed effects		
	LPS	CON		IA	Time	IA×T
IgG, mg/mL	8.2	7.3	0.46	0.098	<0.001	0.992
IgM, mg/mL	0.6	0.5	0.38	0.042	<0.001	0.036
BW, kg	4.5	4.3	0.21	0.445	<0.001	0.151
RT, °C	39.2	39.1	0.03	0.127	<0.001	0.315
MI, mL	1082.1	1083.9	52.38	0.984	<0.001	<0.001
Glucose, mg/dL	74.4	73.9	1.78	0.592	<0.001	0.679
Calcium, mg/dL	13.0	12.2	0.17	<0.001	0.177	0.192
LDH, U/L	561.0	626.0	20.52	0.016	<0.001	0.421
TP, g/dL	5.2	4.8	0.09	<0.001	<0.001	0.690

Results & Discussion

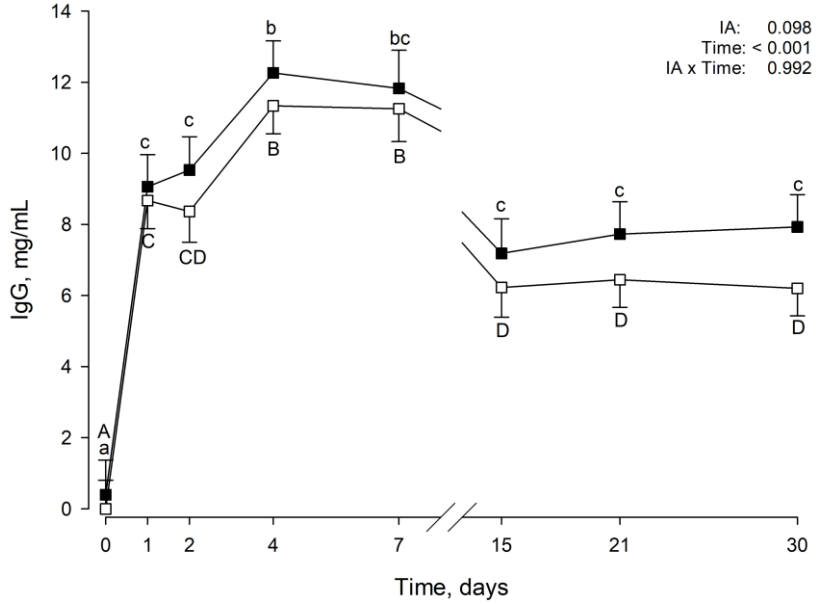
	LPS group	CON group
IgG mg/mL	57.4 ± 5.7	46.0 ± 5.53
IgM mg/mL	1.3 ± 0.11	0.95 ± 0.11

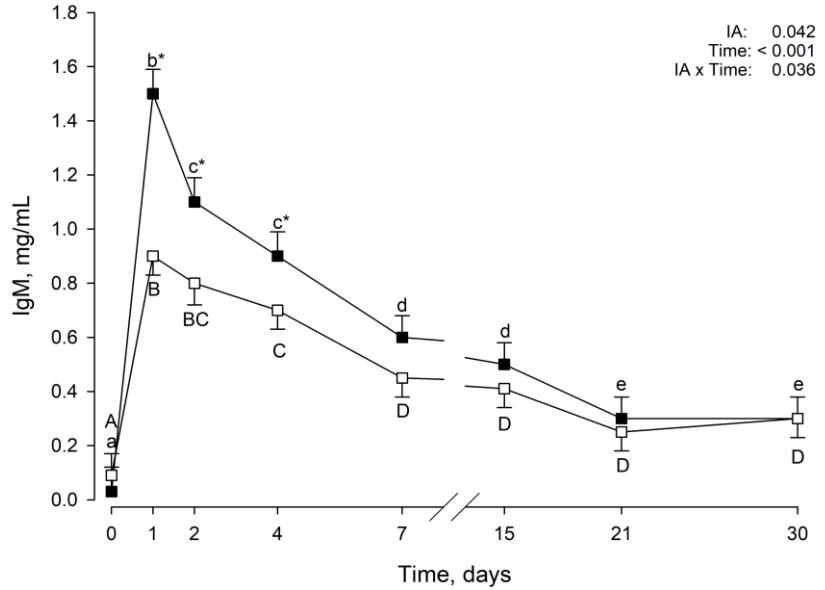




- Colostrum ↑ [Ig]

Castro et al. (2005)
Rodríguez et al. (2009)





LPS (■) and CON (□)
*Significant differences between groups
a-e /A-D Significant differences throughout time within the group

Results & Discussion

Mastitis vs. PIT

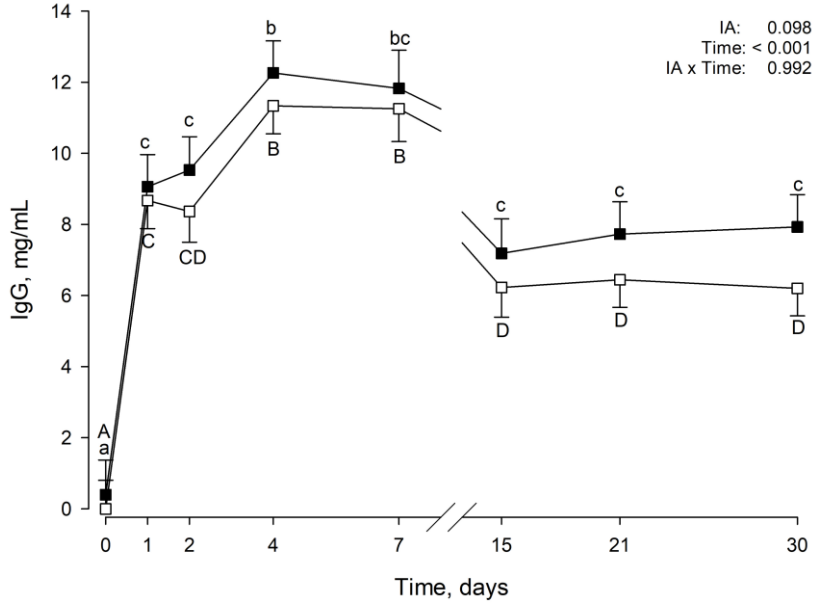
Intramammary infection induce changes in colostrum/transition milk immune components.

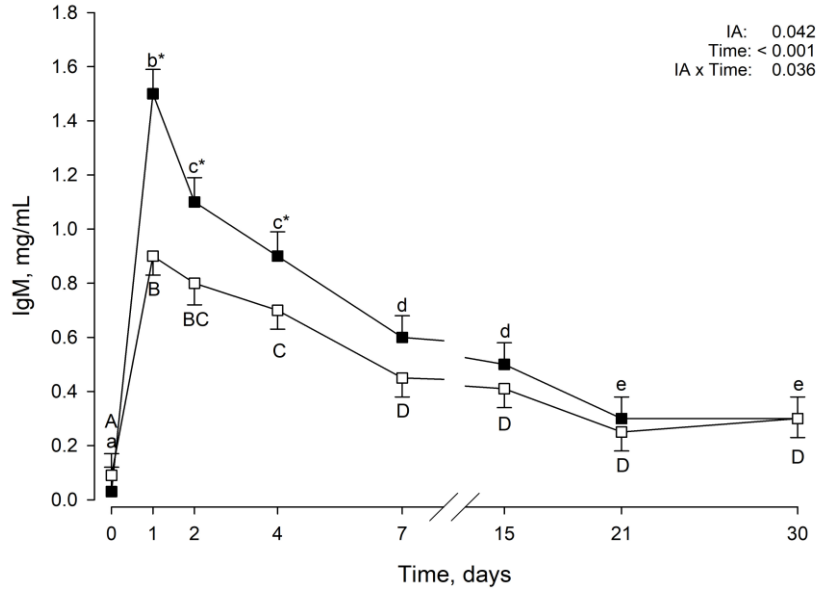
BUT → Does not affect passive immunity transfer — Alcindo et al. (2016)

- Oral administration of LPS

✓ 12 µg/kg of BW

Samarasinghe et al. (2020)





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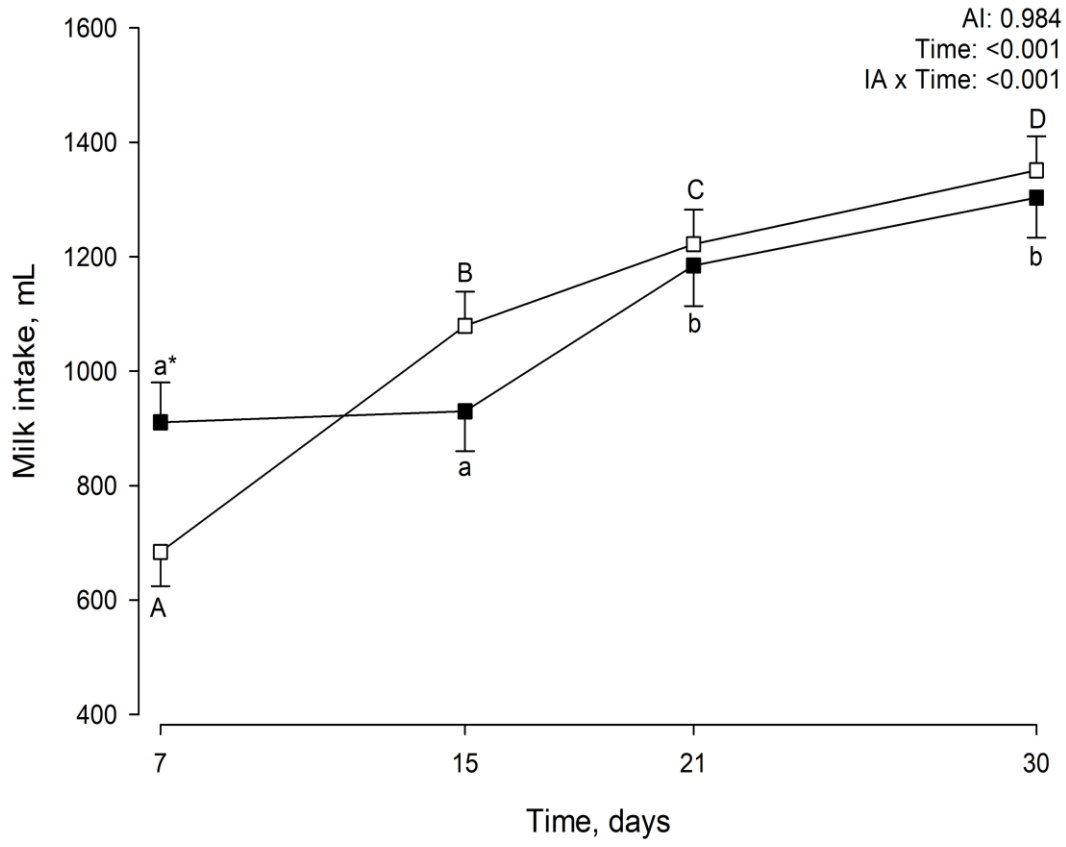
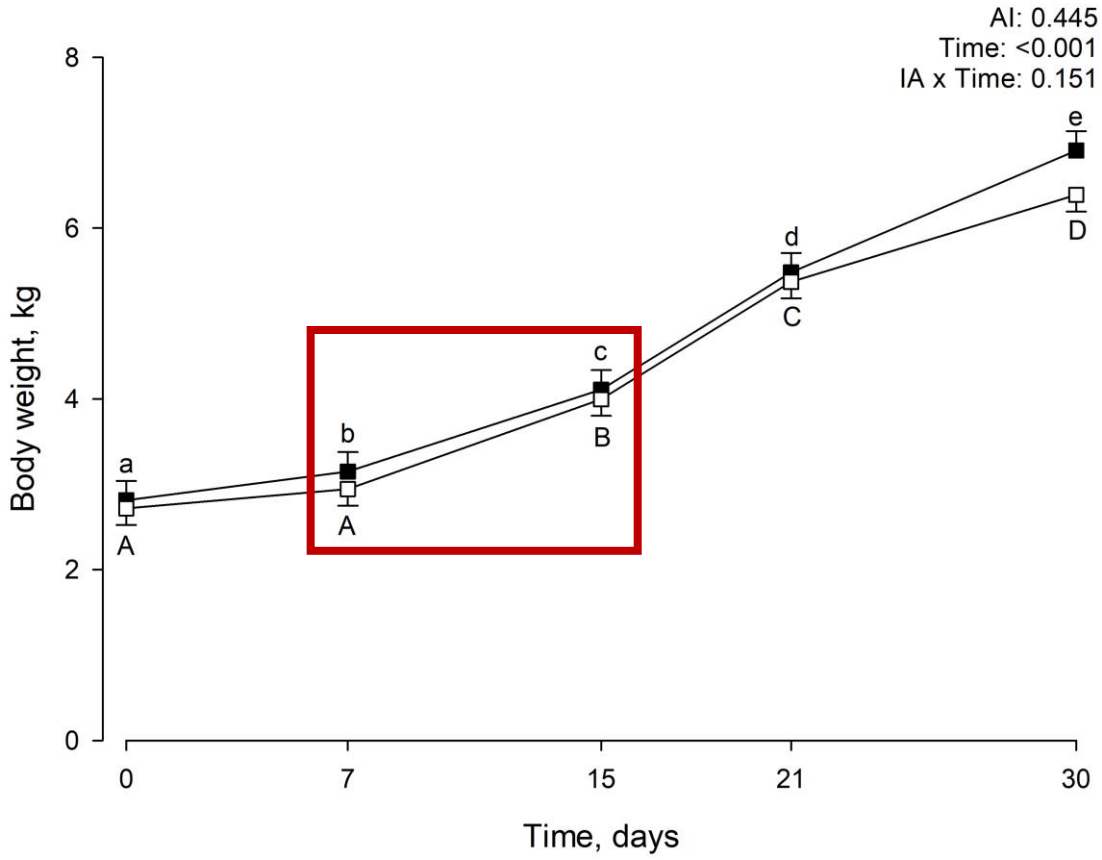
Results & Discussion

Milk intake



Body weight



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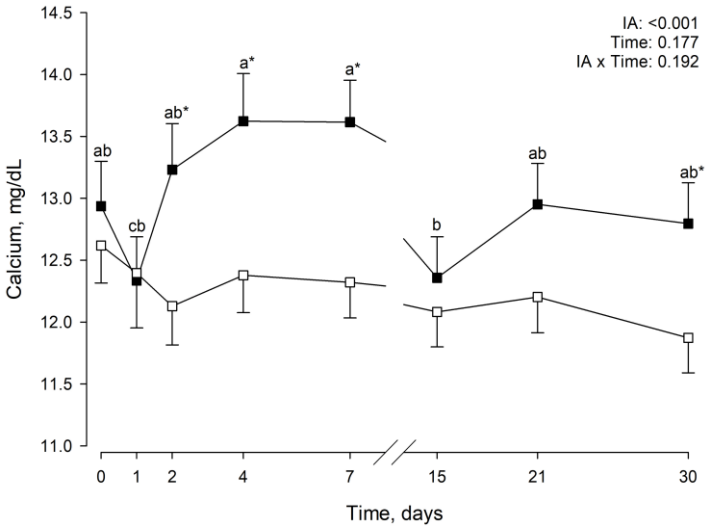
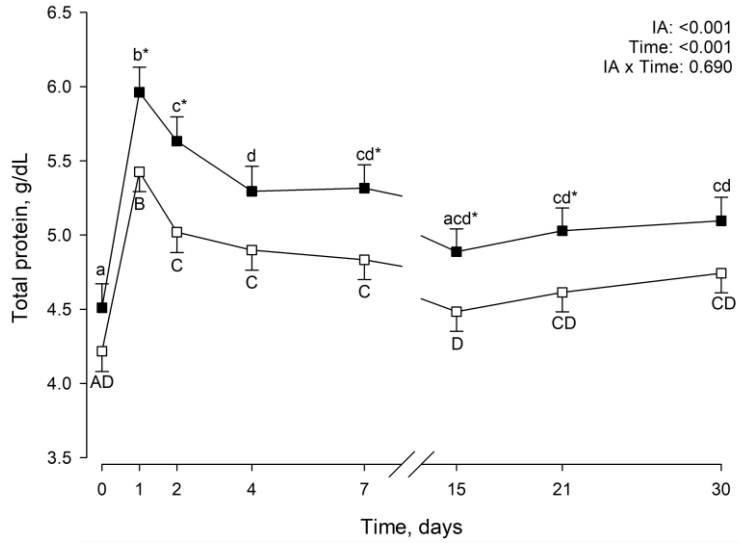
Results & Discussion

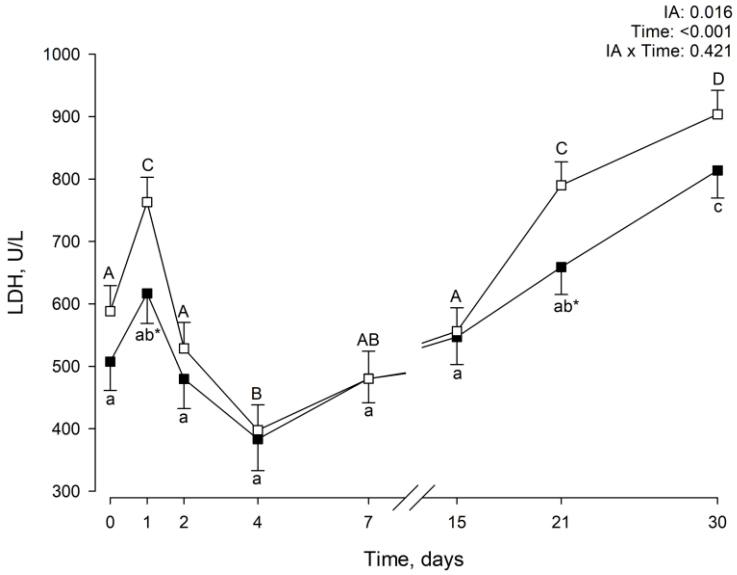
Calcium



Total protein



Lactate dehydrogenase



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LPS

↑ Calcium, Total protein

↓ LDH

Age related biochemical changes in newborns

Samimi et al. (2019)

Conclusions

Intramammary administration of LPS

Immune and biochemical effects

- Enhanced plasma immunoglobulins concentrations
- Serum biochemical changes

Animal Production and Biotechnology Group

Thank you for your attention

Funding

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