



Doses of chromium propionate in lamb diets and their effects on metabolic parameters

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1. Introduction

Chromium is an essential micronutrient in lipid and glucose metabolism, and its trivalent form, CrIII, enhances insulin signaling. Organic sources of chromium, such as chromium propionate, can be up to ten times more bioavailable than inorganic sources and have an effect on metabolism.

This study was designed to evaluate the metabolic effects of two additional doses of chromium propionate.

2. Methods

Treatments:

- 1. CTL: no added chromium
- 2. Cr0.5: CTL + 0.5 mg/kg DM
- 3. Cr1.5: CTL + 1.5 mg/kg DM

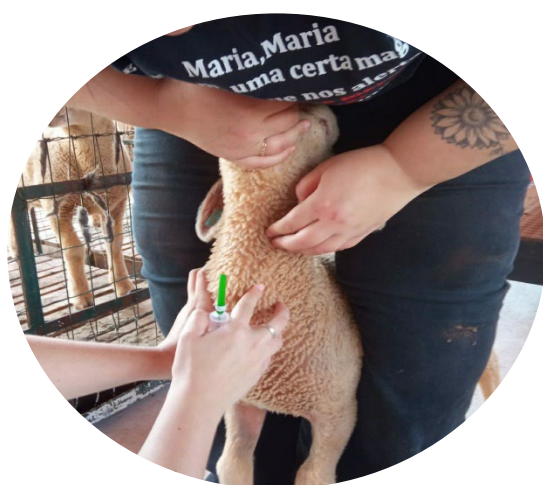


Table 1
Chemical composition of the diet of lamb with different supplementation chromium.

Ingredients, % DM	CTL	Cr0.5	Cr1.5
Grass hay <i>Tifton 85</i>	15	15	15
Corn	61	61	61
Soybean meal	20	20	20
Limestone	2	2	2
Mineral Supplement ^a	2	2	2
Chromium propionate ²	0.0000	0.0005	0.0015
Nutrients, % DM			
Dry matter	90.21	90.01	90.28
Organic matter	6.16	5.88	6.13
Crude protein	15.09	15.60	15.15
Neutral detergent fibre (NDF)	24.14	26.40	27.12
Acid detergent fiber (ADF)	13.56	16.02	15.01
Ether extract	4.62	4.38	4.54
Calcium	12.12	11.10	12.11
Phosphorus	3.20	3.08	3.16
Chromium (ppm of DM)	2.89	3.98	4.50

CTL - no supplementation; Cr0.5 - 0.5 mg/kg DM and Cr1.5 - 1.5 mg/kg DM of chromium propionate.

- 29 uncastrated male lambs, 90 days old and weighing an average of 21.16 kg.
- Blood analysys: 59 days
- The experimental period: 64 days.
- The experimental design was completely randomized, and means were compared using the Tukey test at 5% probability.



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3. Results

Table 2 . Complete blood count of lambs supplemented with different levels of chromium propionate.

		Treatment					
		CTL	Cr0.5	Cr1.5			
Metabolism							
Cholesterol, mg/dL		53.17 ^{ab}	44.97 ^b	58.71 ^a	52.28	1.97	0.0023
Triglycerides, mg/dL		15.83	15.42	15.10	15.45	1.20	0.3674
Alkaline phosphatase,	U/L	577.74 ^a	383.20 ^{ab}	360.50 ^b	440.48	36.15	0.0274
Fructosamine, μmol/L		530.33	478.76	496.13	501.74	9.73	0.1418
Glucose, mg/dL		87.63	83.58	83.04	84.75	1.27	0.2187
Insulin, ng/mL		1.94	1.58	1.21	1.57	0.85	0.2092
Blood count and leukogram							
Hemoglobin, g/dL		12.03	11.80	11.58	11.80	0.15	0.4228
Hematocrit, %		36.64	34.21	35.79	35.54	0.93	0.6081
Total leukocytes, /μL		6747 ^a	3520 ^b	5100 ^{ab}	5122	22.68	0.0126
Neutrophils, /μL		2298	1936	1489	1907	161.03	0.2290
Lymphocytes, /μL		5009 ^a	3252 ^b	3983 ^{ab}	4081	343.84	0.0476
Monocytes, /μL		424.55 ^a	184.70 ^b	177.40 ^b	262.21	35.13	0.0058
Eosinophils, /μL		51.97	20.80	35.60	36.12	7.32	0.3915
Basophils, /μL		64.17	34.80	34.10	37.59	7.78	0.0902
Platelets, x10 ³ /μL		507	517	554	526	30.31	0.8430

4. Discussion

Cr has the capacity to modulate lipid metabolism and reduce cholesterol levels (Sharma et al., 2011). Alkaline phosphatase is an enzyme whose high concentration is associated with liver disorders, osteopathies, and the presence of lymphomas (Giannini, 2005). In contrast, animals that were fed chromium exhibited lower levels of this enzyme. The concentration of lymphocytes and monocytes, which are indicative of the immune system process, was statistically influenced by Cr, indicating healthier animals (Seifalinasab et al., 2022).

Conclusion

Chromium propionate supplementation at 0.5 mg/kg DM for lambs was beneficial for metabolism and the immune system.

References

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