TAP TO RETURN TO KIOSK MENU

Effects of tannin supplementation on zootechnical performance and blood parameters of weaned piglets

Monika Hejna[a]*, Matteo Dell'Anno[a], Valentina Caprarulo[a], Stefania Sotira[a], Luciana Rossi[a]

Department of Health, Animal Science and Food Safety, Università degli Studi di Milano, Milan, Italy.

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ABSTRACT

*Contact: monika.hejna@unimi.it

Weaned piglets often suffer from the enteric disorders and post-weaning diarrhoea. Natural extracts, due to its functional properties, such as tannins from chestnut and quebracho are often considered as feed additives against diarrhoea after the antibiotics ban (Reg. UE 1831/2003). The aim of this study was to evaluate the dietary effects of tannins on growth performance and blood parameters of weaned piglets. A total of 120 piglets (Large White x Landrace) weaned at d 28±2 were randomly allotted to one of two treatments (control vs. tannin) with 6 pens per treatment and 10 pigs per pen. The tannin diet was supplemented with 1.25% of chestnut and quebracho tannins (Silvateam, Italy). The experiment lasted 40 days. Individual body weight (BW) was recorded at d 0, 14, 28 and 40. Feed intake was measured weekly to calculate feed efficiency from d 0 to 14, d 14 to 28, and d 28 to 40. Blood samples were collected on d 40 from a subset of animals (4 pigs/pen). Data were analyzed using PROC GLIMMIX of SAS 9.4 (SAS Inst. Inc., Cary, NC). Supplementation of tannins did not affect BW and feed intake throughout the experiment. However, addition of tannins showed tendency to increase the feed efficiency on d 14 to d 28, compared with control (P = 0.54; 60.4 vs. 52.3, respectively). Dietary addition of tannins significantly increase the serum concentration of albumin, and decrease of globulin, urea and creatinine compared with control (P < 0.05; 23.05 vs. 19.31 g/L, 30.13 vs. 33.58 g/L; 0.98 vs. 2.18 mmol/L; 53.92 vs. 78.92 µmol/L, respectively). In conclusion, tannin supplementation impacted the blood parameters that were related to protein utilization, although this benefit was not reflected in growth performance of weaned pigs.

Key words: **pig nutrition, tannin supplementation, blood parameters**.

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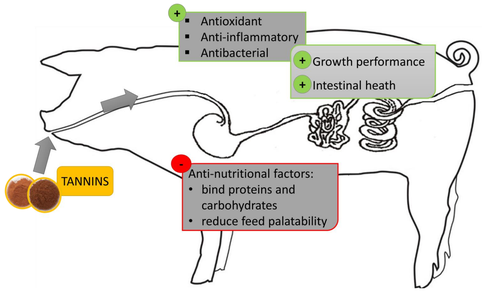
INTRODUCTION

Weaned piglets often suffer from the enteric disorders and post-weaning diarrhoea. Natural extracts, due to its functional properties, such as tannins are often considered as feed additives against diarrhoea after the restricted antibiotics use as growth promoter (Reg. UE 1831/2003). However, the bioactive characteristics of tannins can affect the palatability and digestibility of pig feed.



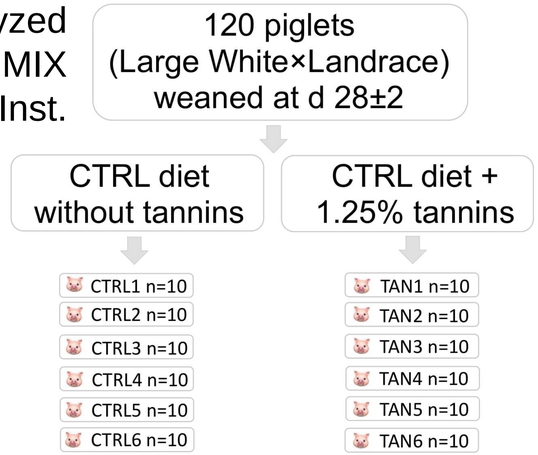
OBJECTIVE

To evaluate the dietary effects of tannins on growth performance and blood parameters of weaned piglets.

MATERIALS & METHODS

*Contact: monika.hejna@unimi.it

- The tannin diet was supplemented with **1.25%** of hydrolysable chestnut and quebracho **tannins** (Silvateam, Italy).
- The experiment lasted 40 days.
- Blood samples were collected on d 40 from 4 pigs/pen.
- Individual body weight (BW) was recorded at d 0, 14, 28 and 40.
- Feed intake was measured weekly to calculate feed efficiency from d 0 to 14, d 14 to 28, and d 28 to 40.
- Total phenolic compounds were assayed according to the Folin-Ciocalteu method.
- Data were analyzed using PROC GLIMMIX of SAS 9.4 (SAS Inst. Cary, NC).



DIET COMPOSITION

Ingredients	CTRL	TAN
Barley meal	25.15	25.00
Wheat meal	19.41	19.07
Corn meal	14.03	13.50
Corn flakes	4.85	4.80
Soybean meal	4.65	4.60
Soybean protein	4.11	4.10
Bakery meal	4.00	4.00
Dextrose monohydrate	3.50	3.50
Wheat middlings	4.32	4.30
Fermented milk product	3.00	3.00
Fish meal	2.50	2.50
Milk whey powder	2.50	2.50
Coconut oil	1.00	1.00
Dicalcium phosphate	0.85	0.80
Animal fats, lard	0.70	0.70
Acidity regulators (1)	0.50	0.50
L-Lysine	0.50	0.50
Benzoic acid	0.40	0.40
L-threonine	0.34	0.34
DL-methionine	0.35	0.35
Sodium chloride	0.26	0.24
Vitamins	0.24	0.24
L-valine (96.5%)	0.14	0.14
L- Tryptophan	0.08	0.05
Copper sulfate	0.04	0.04
Tannins	-	**1.25**

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RESULTS

Table 1. Growth performance of weaned piglets fed diets with tannin supplementation from day 0 to day 40.

Growth parameters	Treatments[1] CTRL	TAN	SEM	P-value
BW, kg				
d 0	8.71	8.64	0.68	1.00
d 14	11.11	10.79	0.68	1.00
d 28	15.44	15.34	0.69	1.00
d 40	20.17	19.78	0.69	1.00
ADG, kg/d				
d 0-14	0.171	0.159	0.02	1.00
d 14-28	0.310	0.324	0.02	1.00
d 28-40	0.396	0.371	0.02	0.97
FCR				
d 0-14	1.97	2.22	0.12	0.70
d 14-28	1.93	1.72	0.12	0.80
d 28-40	2.03	2.19	0.12	0.93
ADFI, kg/d				
d 0-14	0.327	0.347	0.03	1.00
d 14-28	0.596	0.543	0.03	0.81
d 28-40	0.797	0.781	0.03	1.00
Feed efficiency				
d 0-14	52.44	45.62	3.35	0.70
d 14-28	52.26	60.35	3.35	0.54
d 28-40	49.54	46.59	3.35	0.99

[1] CTRT: basal diet; TAN: basal diet with tannin (1.25 %). Data are shown as LSMEANS and SEM.

- Supplementation of tannins extract (1.25%) did not affect the feed intake and the overall feed efficiency (P=0.84; Table 1).
- TAN group showed tendency to increase the feed efficiency on d 14 to d 28, compared with control (P=0.54; Table 1).
- Calculated phenolic compound intake was significantly higher in TAN group compare to CTRL group (Table 2).

Table 2. Phenolic compound intake (g/d).

Compound	Treatments[1] CTRL	TAN	SEM	P-value
Phenolic compound intake				
d 0-14	0.258[a]	1.009[b]	0.08	<0.01
d 14-21	0.471[a]	1.581[b]	0.08	<0.01
d 21-28	0.630[a]	2.273[b]	0.08	<0.01

[1] CTRT: basal diet; TAN: basal diet with tannin (1.25 %).

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RESULTS

Table 3. Blood parameters of weaned piglets at d 40 fed diets with tannin supplementation from day 0 to day 40.

Blood	Treatments[1]		SEM	P-value
	CTRL	TAN		
Total protein content, g/L	52.88	53.18	1.94	0.914
Albumin, g/L	19.31	23.05	0.84	0.005
Globulin, g/L	33.58	30.13	1.66	0.154
A/G ratio	0.58	0.80	0.04	0.002
ALT-GPT, IU/L	38.33	35.08	2.56	0.380
AST-GOT, IU/L	54.17	47.50	3.28	0.165
ALP, UI/L	165.67	180.75	12.58	0.406
Glucose, mmol/L	5.00	5.13	0.24	0.718
Urea, mmol/L	2.18	0.98	0.18	< 0.001
Creatinine, µmol/L	78.92	53.92	4.05	< 0.001
Total bilirubin, umol/l	1.98	1.71	0.13	0.140

[1] CTRT: basal diet; TAN: basal diet with tannin (1.25 %).
Data are shown as LSMEANS and SEM.
A/G ratio: albumin/globulin ratio; ALT-GPT: alanine aminotransferase; AST-GOT: aspartate aminotransferase; ALP: phosphatase alkaline.

CONCLUSION

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In conclusion, tannin supplementation impacted the blood parameters that were related to protein utilization, although this benefit was not reflected in growth performance of weaned pigs. The lacking of tannin impact on growth performance could be related with dose of tannins inclusion.

However, tannins during the post-weaning phase could be an interesting alternative to reduce the antibiotics use.

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