

Zink Supplementation on Complete Tea Waste Ration (*Camelia sinensis*) to Evaluate Performance Reproduction of Young Rabbit Does

Lilis Khotijah*, T. Sari, & D.A. Astuti

Department of Nutrition and Feed Tecnology, Faculty of Animal Science
Bogor Agricultural University
*e-mail: lilis.khotijah@gmail.com

Abstract

Tea waste (*Camelia sinensis*) has high protein and crude fiber resources and it has been reported that 30% in the ration could give good performance in growing rabbit. Problem with the waste is lag of Zn absorpction due to lignin content so it will effect to the reproduction. The objective of this study was to evaluate the effect of level Zn supplementation on ration containing 30% tea waste on reproduction performance of young rabbit does. Twenty young rabbit does were assigned to four pellet complete rations and synchronization of estrus with such a dose of PGF2 α . The treatments were control with Comercial ration ; R1 was ration with 30% tea waste; R2 was R1 plus 50 ppm Zn and R3 was R1 plus 100 ppm Zn. Parameters observed were pregnant and lactation feed intake (g/head/d), frequency of first matting to pregnant, the pregnant presentation, length of pregnant (day), litter size, birth weight, weaning weight, milk production and mortality pre weaning. Completely Randomized Design was used with four treatments and five replications. Result showed that the treatments were not significant affected yet to the feed intake and all performance reproduction of young rabbit does. It was concluded that 30% of tea waste plus Zn could be used as source of protein and mineral for rabbit does reproduction ration where the result condition same with control ration.

Keywords: rabbit does, tea waste, Zn supplementation

Introduction

Tea waste as a byproduct of manufacture soft drinks industry has potential to use as source of feed, because of the availability and nutritional value. Some studies has been reported that tea waste can be used in rabbit ration up to more than 30% without a negative impact on performance (Khotijah *et al.*, 2004). However, the effect of the ration has not been evaluated for the reproductive performance of rabbit. A good reproduction performance by using cheap ration is one of the breeders goal.

Green tea waste has high protein and fiber content. As a roughage they has 29.01% lignin content (Istirahayu, 1993). According to James (1990), fibers with high lignin content could bind some minerals as a result of carboxyl, hydroxyl and methoxyl – lignin bound, so that interfering the mineral absorption which is very important for the reproduction pathway. One of the essential minerals for the reproduction metabolism is Zn. The functions of Zn are has affect to the growth, reproduction, bone and blood formation, metabolism of nucleic acids, proteins and carbohydrates. Zinc acts as essential components or enzymes activators and called metalloenzim (Scott *et al.*, 1982). Zinc plays a role in the process of cell development which needed by somatic cells during pregnancy and weaning. The mineral also involves in the process of protein synthesis for the milk production. It is reported that Zn deficiency during pregnant resulted in birth defects and fetal death (Lutwak-Mann and McIntosh, 1971). Zinc plays a critical role in the repair and maintenance of the uterine lining following calving, speeding the return to normal reproductive function and estrus. Zinc deficiency occurred during the standard dosing period of guideline rabbit developmental toxicity studies may be associated with a modest increase in resorption rate and a transient inhibition of embryonic growth (Pitt *et al.*, 1997). So that the presence of Zn in the ration is very important to note. Tea waste utilization in such a mount of reproductive ration requires additional essential mineral such Zn. This study was aimed to evaluate the effect of level Zn supplementation in ration containing 30% tea waste on reproduction performance of young rabbit does.

Materials and Methods

Animals and diets

A total of 20 young rabbits does of New Zealand White cross breed were used. The rabbits were housed in individual cages in the same room, receiving ration and water ad libitum. Treatments were made up of commercial ration and basal diets varying in supplemental zinc contents, provided as zinc sulfate (ZnSO₄) as described in Table 1.

Experimental design

The experimental design was Completely Randomized Design, with four treatments and five replications. The treatments were control with Comercial ration; R1 was ration with 30% tea waste; R2 was R1 plus 50 ppm Zn and R3 was R1 plus 100 ppm Zn. Parameters observed were pregnant and lactation feed intake (g/head/day), frequency of first matting to pregnant, the pregnant presentation, length of pregnant (day), litter size, birth weight, weaning weight, milk production and mortality pre weaning.

Table 1. Ration formulation and their chemical composition as DM basis

Feedstuff	Treatment Ration			
	K	R1	R2	R3
Tea waste (%)	C	30	30	30
Soybean meal (%)	O	20	20	20
Yellow corn (%)	M	26	26	26
Wheat bran (%)	E	17.5	17.5	17.5
Molases (%)	R	5	5	5
Palm Oil (%)	C	0.5	0.5	0.5
CaCO ₃ (%)	I	1	1	1
ZnSO ₄ (ppm)	A L	0	50	100
Dry matter (%)	86.45	88.31	88.31	88.31
Ash (%)	7.40	6.15	6.15	6.15
Crude protein (%)	16.59	21.92	21.92	21.92
Crude fiber (%)	9.75	10.58	10.58	10.58
NFE (%)	46.00	44.39	44.39	44.39
Ca (%)	0.82	1.33	1.33	1.33
P (%)	0.35	0.46	0.46	0.46
Zn (ppm)	70.00	50.00	100.00	150.00
NDF (%)	38.67	55.73	55.73	55.73
ADF (%)	16.77	22.2	22.2	22.20
Gross energy (kkal/kg)	4164	3879	3879	3879

Synchronization of estrus and Mating

The animal were treated by synchronization of estrus with PGF2 alpha hormone injections and then mated naturally. The checking of pregnancy were done in 12-14 days after injection. The parameter observed were collected during two months evaluation.

Results and Discussion

The means of dry matter intake of different physiological status were shown in Table 2. Daily dry matter feed intake in all physiological status were not significant different in all treatments. The average of dry matter intake ranged from 84.14 to 121 g/head/d and result showed that tea waste supplemented Zn tended to increase

compared to the commercial ration. Does rabbits supplemented with 50- 100 ppm zinc, as well as non-supplemented animals.

Table 2. Dry matter Intake in Different Physiological Status

Physiological Phases	Treatments			
	K	R1	R2	R3
	-----g/head/day-----			
Pre pregnant	85.0±18.32	105,55±14.00	93.560±27.57	104.22±22.61
Pregnant	84.14±21.88	90.47±5.05	95.02±21.14	94.11±14.35
Lactation	94.07±34.41	110.70±25.29	103.60±39.86	121.01±36.84

Performance Reproduction

The frequency of first mating to be pregnant ranged from 1 – 1.33 time. Length of pregnancy ranged from 31.33 to 32.5 days. The data showed as the normal range according to Smith and Mangkoewidjojo (1988). The birth weight from does treated by 30% tea waste with 0-100 ppm Zn supplementation (R2) did not significantly different compared to control diet (commercial) (Table 3). The total number of kits born, weaned and total body weight of kits were similar among the treatments.

Table 3. Performance Reproduction of Young Rabbits Does

Parameters	Treatments			
	K	R0	R1	R2
Frequency of first matting to pregnant	1.00	1.00	1.33	1.00
P	100.00	100.00	66.67	100.00
Pregnant presentation				
Length of pregnant (day)	32.00	32.50	31.33	31.33
Litter size	5.70	6.75	7.00	7.00
B				
Birth weight (g/head)	51,58	33,80	41,97	39,43
Weaning weight (g/head)	220.04	205.38	149.28	136.95
Milk production (g/does/day)	62.23	61.72	70.60	67.60
Pre weaning Mortality (%)	5.00	62.50	42.5	34.39

Litter size were not significantly different in all treatments, but there was a tendency to increase litter size with increasing Zn in the ration. Presence of Zn

could maintain the cell division, so that pre natal disability and mortality can be reduced (Lutwak-Mann and McInToch, 1971).

The treatment did not give significantly different effects on the mother's milk production. There was an increasing of 13.45% in the waste tea ration and 8.63% milk production of commercial ration. Suplementasi Zn had affected to the milk production and growth (Bayu, 2004); the adequacy of Zn vary depending on physiological conditions, such as the amount of Zn that must be absorbed to replace the endogenous expenditure, network formation, growth and milk secretion (Reviana, 2004).

Pre-weaning mortality of kit affected by birth weight, environmental conditions, feed and does milk production and mothering ability (Junus, 1982). The highest kit mortality were in R0 and the lowest in the treatment of the commercial ration. There was a reduction in kit mortality on ration which treatment with Zn supplementation, where in Zn supplementation the mortality reduce from 42.9% to 37%. This value was higher than Lebas *et al.* (1984) reported, where pre-weaning mortality on Europe Rabbit farm was 20%.

Conclusions

Result showed that the treatments were not affected to the feed intake and all performance reproduction parameters of young rabbit does. It was concluded that 30% of tea waste plus Zn could be used as source of protein and essential mineral source for rabbit does reproduction ration without significant different compared to commercial ration.

Acknowledgement

The authors gratefully thanks to our colleagues who have contributed to this work and also to LPPM_IPB for financial support.

References

- Bayu, P.S. Suplemetasi ransum yang mengandung ikatan ampas bir, ampas tahu dan ampas kecap dengan Zn dan Cu terhadap produksi susu sapi perah. Skripsi. Fakultas Peternakan. Institut Pertanian Bogor.
- Istirahayu, D. 1993. The effect of tea waste in ration to giblet presentation, carcass, spleen and fat abdominal on broilet. Thesis. The Faculty of Animal Science. Bogor Agricultural University.
- Junus, M. 1982. Pertumbuhan kelinci dan pengamatan lain di sekitar Malang dan Junggo. NUFFIC. Universitas Brawijaya, Malan.
- Khotijah, L. Rochyan G.P. & L. Fiberty. 2004. Performance of male rabbit post weaning with different level tea waste on ration. Media Peternakan.

- Lebas, F.P. Coundert, R. Rouvier and H. De Rochambeue. 1984. The Rabbit Husbandary, Health and Production. Food and Agriculture Organization of The United Nation. Rome. Italy.
- Lutwak-Mann, C & McIntosh, J.E. 1971. Calcium content and uptake of ^{45}Ca in rabbit blastocysts and their environment. *J. Reprod. Fertil.* Dec:27(3):471-475.
- Pitt, J.A., M.J. Zoellner, E. W. Carney. 1997. Developmental toxicity of dietary zinc deficiency in New Zealand white rabbits. *Reproductive Toxicology Health and Environmental Research*. Volume 11, p. 781–789.
- Reviana, Ch. 2004. Peranan mineral Zn bagi kesehatan tubuh. *Cermin Dunia Kesehatan* No. 143. Pusat Penelitian dan Pengembangan Gizi. Departemen Kesehatan RI. Bogor.
- Smith, J.B. and S.Mangkoewidjojo. 1988. *Pemeliharaan, Pembiakan dan Penggunaan Hewan Percobaan di Daerah Tropis*. Universitas Indonesia. Jakarta.