

THE EFFECTS OF SUPPLEMENTATION OF LEMURU FISH OIL (*Sardinella Longiceps*) AND CORN OIL (*Zea Mays L.*) IN THE DIET ON THE QUALITY OF KAMPUNG CHICKEN SPERMATOZOA

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ABSTRACT

This study was conducted to investigate the effect of Lemuru fish oil (LFO), corn oil (CO) and their combination in diets on the quality of kampung chicken spermatozoa. Sixteen (16) head of male kampung chickens were divided into 4 treatment groups with 4 replications. The feeding treatments were : R-0 (control), R-1 (10% LFO), R-2 (5% LFO and 5% CO) and R-3 (10% CO). Data were analyzed using analysis of variance in completely randomized design, and continued by Duncan's multiple range test. The result showed that there were differences ($P \leq 0,05$) of the sperm motility (R-0 = 80,00%, R-1 = 82,80%, R-2 = 88,34% and R-3 = 82,50%), and sperm concentration (R-0 = $2,38 \cdot 10^9$ /ml, R-1 = $3,06 \cdot 10^9$ /ml, R-2 = $3,07 \cdot 10^9$ /ml and R-3 = $2,99 \cdot 10^9$ /ml). It could be concluded that treatments did significantly differences on quality of spermatozoa.

Keywords : Kampung Chicken, Lemuru Fish Oil (*Sardinella Longiceps*), Corn Oil (*Zea Mays L.*), Spermatozoa

INTRODUCTION

The objective of the study was to determine the supplementation of lemuru fish oil (LFO) and corn oil (CO) and their combination in diets on spermatozoa's quality of kampung chickens.

Increasing productive and reproductive performance of kampung chicken were affected by feed availability and feed consumption (Tri Yuwanta, 1995). The essential fatty acid, especially fatty acid containing omega-3, omega-6 and omega-9 could be used to increase spermatozoa quality of chicken (Tranggono, 2001; Murray *et al.*, 1995). The sources of essential fatty acid were found from LFO (Leskanich and Noble, 1997) and CO (Cherian and Sim, 1992).

LFO is a by product from lemuru fish (*Sardinella longiceps*) canning and pulverizing industries which is unusable until now and potential for omega-3 fatty acid source and it could be used as chicken feed ingredients (Sulistawati, 1998 ; Leskanich and Noble, 1997). LFO contains 15.55% oleic acid, 8.91% omega-6 fatty acid, and 26.29% omega-3 fatty acid (Estiasih, 1996; Surai *et al.*, 2000).

The CO is dominant containing volatile fatty acid (86.2%) especially linoleic acid, linolenic acid and long chain fatty acid containing 2.6% omega-3, 53.4% omega-6 and 25.0% omega-9 (Clarke *et al.*, 1977 ; Scott *et al.*, 1982). The addition of fatty acid in the diets was one of the methods to increase feed quality especially in increasing essential fatty acid content. Thus, an experiment is needed to investigate the addition of

LFO and CO and their combination in the chicken feed. The results of this research may be useful in to describe how to increase kampung chicken's reproductive performance especially in spermatozoa's quality.

MATERIALS AND METHODS

Sixteen (16) head of male kampung chickens were divided into 4 treatment groups with 4 replications. Feed adaptation was carried out for two weeks.

The dietary treatments were :

1. R-0 = Control diet, 0% LFO and 0% CO.
2. R-1 = Diet containing 10% LFO and 0% CO.
3. R-2 = Diet containing 5% LFO and 5% CO.
4. R-3 = Diet containing 0% LFO and 10 % CO.

Nutrient requirements were based on NRC (1994), and diets R-1 to R-4 were made iso-nitrogen and iso-calori. The diets are presented in Table 1.

Table 1. Composition and calculation of the treatment diet.

Ingredients (%)	R-0	R-1	R-2	R-3
Corn	59,59	41,00	41,00	41,00
Rice bran	24,00	30,00	30,00	30,00
Lemuru fish oil (<i>Sardinella longiceps</i>)	0,00	10,00	5,00	0,00
Corn oil (<i>Zea mays L.</i>)	0,00	0,00	5,00	10,00
Soybean meal	5,00	5,00	5,00	5,00
Meat meal	5,00	5,00	5,00	5,00
Synthetic DL-Methionine	1,00	1,00	1,00	1,00
HCl L-lysine	1,00	1,00	1,00	1,00
Calcite	2,41	5,00	5,00	5,00
Salt (NaCl)	0,50	0,50	0,50	0,50
Topmix	0,50	0,50	0,50	0,50
Biopos	0,50	0,50	0,50	0,50
CaCO ₃	0,50	0,50	0,50	0,50
Total	100,00	100,00	100,00	100,00
Nutrient contents	R-0	R-1	R-2	R-3
EM (kcal/kg)	2779,67	3305,08	3304,08	3303,08
CP (%)	14,53	13,31	13,31	13,31
Fat (%)	5,54	5,52	5,52	5,52
Crude fiber (%)	2,57	2,49	2,49	2,49
Calcium (%)	1,03	2,02	2,02	2,02
Phosphorus (%)	1,00	1,02	1,02	1,02

The collected data were motility and sperm concentration. Semen collection was carried out with abdominal massage method once in three days for four times and then were analyzed using one way classification of variance analysis in completely randomized design (CRD) followed by testing the significant means by Duncan's multiple range test (Steel and Torrie, 1993).

RESULTS AND DISCUSSION

The result of diet treatments had significantly differences on kampung chicken's spermatozoa quality.

Motility and spermatozoa quality

The spermatozoa motility of kampung chicken has average values of 80% - 88.34% and the spermatozoa concentration was 2.38 - 3.07 billions/ml (Table 2.)

Table 2. Motility and spermatozoa concentration of kampung chicken

Variable	Treatment			
	R-0	R-1	R-2	R-3
Spermatozoa motility (%)	80,00	82,80*	88,34*	82,50
Spermatozoa concentration (10 ⁹ /ml)	2,38	3,06*	3,07*	* 2,99*

*P<0.05

The use of LFO and CO and their combination in the diet treatments resulted in different (P<0.050) motility and concentration of spermatozoa (Table 2). The spermatozoa motility and concentration of R-1, R-2 and R-3 were higher (P<0.05) than those of R-0. Diet with 5% LFO and 5% CO (R-2) resulted in the highest motility and concentration of spermatozoa. This fact was supported by nutrients balance in the diet treatments especially for their fatty acid. Diet with 5% LFO and 5% CO (R-2) combination has more complete fatty acid (omega-3 in LFO and omega-6 and omega-9 in CO). The requirement of nutrients would be more fulfilled by the fatty acid as energy source and one of the nutrients containing lipoprotein and cholesterol. Lipoprotein and cholesterol were components for steroid hormone and adrenal gland forming (Pamela *et al.*, 1993). Nettleton J.A (1995) reported that cholesterol was carried to the layer in mitochondria to be changed into pregnenolone (hormone steroid compound) functioning on spermatogenesis (formation of spermatozoa).

Diet with (R-1) LFO or CO (R-3) addition only had part of fatty acid which contained only in LFO or CO. Thus, nutrient requirement will be more fulfilled by more complete fatty acid as in diet R-2. This fact supported that the activity of spermatozoa increased gradually so the need for energy sources will be higher to increase the viability of those spermatozoa. Thus, it needs diet with complete essential fatty acid (long chain fatty acid and omega-3, omega-6 and omega-9) as in R-2 treatment diet.

CONCLUSION

It can be concluded that the addition of 10% LFO and 10% CO, and their combination (5% LFO and 5% CO) in the diet significantly affected quality of spermatozoa (spermatozoa motility and spermatozoa concentration) of kampung chicken. The addition of 5% LFO and 5% CO combination showed the highest increase of spermatozoa motility and concentration.

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