

Fermented Rice Husk Utilization of Effective Microorganisms-4 Supplemented with *Piper Betle L.* Performance, Meat Quality, Antioxidant Capacity, and Meat Cholesterol Levels of Bali Duck



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Abstract

This experiment was conducted to study the effect of the offered effective microorganisms-4 fermented rice husk in diets and piper betle L. supplemented on performance, meat quality, antioxidant capacity, meat cholesterol levels of Bali duck. Research results showed that giving rations contain fermented rice husk and supplemented betle leaf (E treatment) on feed consumption was decreased significantly ($P < 0.05$) with the treatment. Moreover, the offering treatment C, D and E can increase of feed antioxidant consumption were significantly different ($P < 0.05$), but with treatment B was decrease of feed antioxidant consumption ($P < 0.04$) than the treatment A. Therefore, the offering treatment C, D, and E can increased of feed digestibility, final body weight, and gain body weight were significantly different ($P < 0.05$), but offering treatment B were not significantly of feed degestibility and final body weight ($P > 0.05$) and cotrasted with offering treatment B can decreased of gain body weight, and on FCR was increased, but with treatment C, D can decrease FCR were significantly ($P < 0.05$) than the treatment A. The giving treatment B, C, D, and E can increase of meat quality with organoleptic methods ($P > 0.05$), but on meat quality with obyrCyve was not significantly different ($P > 0.05$) than the treatment A. The offering treatment B, C, D, and E can be increased antioxidant capacity ($P < 0.05$), but on cholesterol concentration with treatment B, and C were not significantly different ($P > 0.05$), but treatment D and E can decrease of the cholesterol cooncentration ($P < 0.05$) than the treatment A., it could be concluded that giving treatment E gave the best response on performance, meat quality, antioxidant capacity, and meat cholesterol concentration of Bali ducks.

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1. Introduction

The Bali duck (*Anas Sp*) is one of the local ducks Indonesian that had developed and maintained the Balinese and Lombok, have very high survival, and rarely pose high mortality figures. To characteristic than Bali duck has a plumage "sumi" is a favorite duck and including a duck laying productive type, followed by the Bali duck feathers "sumbian" feathers and crested honey buzzard. In addition also the livestock that can be as a source of animal protein in the form of meat and eggs (Murtidjo, 1988). But weakness in ducks that have aged or failed have cholesterol content trend relatively high enough and had a positive correlation against the content of cholesterol in meat and eggs (Setyawardani *et al.*, 2001). To cope with the increased content of cholesterol can be done by making the ration formulation with the utilization of agricultural wastes or wastes of industrial agriculture, for example, the rice husk of required is quite high, due to the milling instead of rice grain retrieved 17% rice husk (Davendra, 1981).

Rice husk is a by-product of rice milling instead of the main results was the rice by-product (rice husk) produced quite abundant because rice is the staple food of Indonesian society. Rice husk as material feed alternatives has the content of nutrients is 12.5% water, 3.1% crude protein, 29.2% *Ingredient Extracts Non Nitrogen (BETN)*, crude fiber 35%, 2.7% crude fat and 17.5% ash with a low digestibility (Lubis, 1992), and will effect against the efficiency of the use of ration. It is necessary, in order for his nutritional value of fermented fixable (Widyanto, 1995). One of the inoculants who used a high ration materials digest fiber rough is a solution of *Effective Microorganisms-4* (EM-4) (Higa, 1993). Chandra *et al.*, (2013) reported rice husk fermentation with a solution of *effective microorganisms-4* (EM-4) can increase the nutritional content of rice husk that is crude protein from 1.92% to 2.67%, crude fiber, from 37.33% to 13.02%, *Gross Energy (GE)*, from 302.33 kcal/g to 376, 62 kcal/g.

The granting of a ration of rice husk contains deaminated urea and supplementation by *starbio* (Roni *et al.*, 2006); is the grant of 5.97% rice husk and urea producing slaught weight lower than controls, but after treatment supplementation with *starbio* effect on carcass weight and slaught weight, while the percentage of carcass to happen increased significantly ($P < 0.05$). Granting dust wood deaminated urea and solution EM-4 does not have an effect on the appearance of the Bali duck is currently in a phase of growth (Yadnya *et al.*, 2007). Yadnya *et al.*, (2006) reported that the replacement of 50% rice bran with rice husks or sawdust wood supplemented with *starpig* does not affect the efficiency of the use of ration but can improve the content of uric acid in the blood of a duck. To lower blood cholesterol levels can be done by supplemented with antioxidant compounds rations (Ishida *et al.*, 2000), one of them with betle leaf (*Piper betle L.*) Partama *et al.*, (2018), reported that the betle leaf (*Piper betle L.*) have total phenolics and antioxidant activity is high enough that is 1070mg/100 ml and 97.44%. Yadnya *et al.*, (2014), reported the giving 5% noni leaf, betle leaves, and purple sweet potato leaf can improve cholesterol levels, sugar levels and blood uric acid ducks. Susila *et al.*,

(2015) the granting of *Aspergillus niger* fermented rice husk supplemented leaves the purple sweet potato (*Ipomoea batatas l.*) can improve the efficiency of the use of ration, carcass, profile antioxidant, cholesterol levels of meat ducks.

Based on the explanation on the background then used of the research study entitled "The study utilization of rice husk bio-fermented and supplemented betle leaf (*Piper betle L*) on performance, meat quality, capacity antioxidant, meat cholesterol concentration of Bali duck".

2. Materials and Methods

The study entitled study of the utilization of rice husk bio-fermented by bacteria lactobacillus complex (BLC) in supplemented flour rations betle leaf (*Piper betle, L*) against the antioxidant capacity, performance, carcass characteristic, meat quality, and cholesterol levels the female duck liver on the growth phase. The research was carried out in the village of duck appearances Guwang, Sukawati, Gianyar. for 12 weeks. The antioxidant capacity of the test carried out in Analytical Lab., Udayana University, for 4 weeks and cholesterol meat and liver in Rama's Clinic Lab., Denpasar, carcass in Livestock product technology Lab., Faculty of animal husbandry, Udayana University, for 4 weeks and the texture of the meat in a large Veterinary Lab., Pegok, Denpasar for 2 weeks.

Ducks

Ducks used in the study was ducks Bali, 12 weeks is obtained from I Made Sukariawan that came from Guwang Village, Sukawati district, Gianyar Regency, as many as 125 of the Bali ducktail with homogenous body weights.

Cages and accessories

In this study using the enclosure system battery two-story colony as much as 20 compartments. Each cage has a swath length 70 cm, width 70 cm, height 70 cm. equipped with a Cage, food and a place to drink made of bamboo slats – that is located on the outside, and also comes with a container of dirt as well as holding the rest of the food, and are also equipped with lamps for lighting at night.

Ration ingredients, deamoniated urea, and biofermentation by bacteria lactobacillus complex (BLC) and flour betle leaf (Piper betle L.)

Ration ingredients used in this study was yellow corn, soybeans, copra meal, rice bran, rice husk, betel leaves, coconut oil, NaCl, Urea, rice husk, *lactobacillus bacteria complex*. For the activity of microbial ineffective microorganisms-4 to make mashed with Effective Microorganisms-4 (EM-4) solution 100 ml, urea 100 gram and Molasses solution 100ml in the 10 liter of water in clenched then incubation for one day, further, rice husk is ready for fermented by solution it who had previously mixed with rice husk, and if it is lumped with the hand not apart put in a gunny sack vacuum and fermentation for a week. After being fermented then dried and ready to be utilized as an ingredient mixer rations (Yadnya *et al.*, 2007). The betle leaf is obtained from the market of Desa Adat Peraman Guwang, Sukawati, Gianyar. Molasses and solution of EM-4 of shop Marketing Center products Oles Shop, Yangbatu, Denpasar.

The composition of the ration for research

Rations consisting of milled corn, soybeans, copra meal, rice bran, fish meal, B12, Minerals salts (NaCl), and rice husk. Rice husk is nothing without being processed and there are fermented with EM-4 solution, supplemented with leaves of Piper betle L. The composition the ration is found in Table 1 and containing nutrition of feed in Table 2.

Table 1
Feed composition of ducks (12-24 weeks of age)

Ingredients (%)	Treatments				
	A	B	C	D	E
Yellow corn	55.36	49.98	49.98	49.98	49.98
Soybean	9.37	12.45	12.45	12.45	12.45
Copra meal	11.31	9.82	9.82	9.82	9.82
Fish meal	10.13	8.10	8.10	8.10	8.10
Rice bran	13.26	7.00	7.00	6.50	6.50
Rice husk	-	12.50	12.50*	12.50	12.50*-
<i>Piper betle leaves</i>	-	-	-	0.50	0.50
Coconut oil	-	2.00	2.00	2.00	2.00
Mineral B12	0.50	0.50	0.50	0.50	0,50
NaCl	0.15	0.15	0.15	0.15	0.15
Total	100	100	100	100	100

Table 2
The chemical composition of duck feed (12-24 weeks of age)

Chemical Composition	Unit	Treatments					Standard: <i>Scott et al., (1969).</i>
		A	B	C	D	E	
Metabolizable Energy	Kcal/kg	2884.16	2859.08	2900.00	2858.32	2858.32	2800-2900
Crude Protein	(%)	17.46	17.00	17.37	17.31	17.31	15 - 17
Ether Extract	(%)	5.75	6.11	6.23	5.92	5.94	3 - 6
Serat Kasar	(%)	4.63	8.23	7.34	8.84	7.24	6 - 9
Calcium (Ca)	(%)	0.90	0.87	0.99	0.87	0.89	0.80
Phosphorus (P)	(%)	0.69	0.67	0.66	0.67	0.67	0.45

Notes:

A : control diet (without rice hull and betle leaf meal); B : diet containing 12,5.0% rice husk; C : diet containing 12,50% fermented ricehusk; D : diet containing 12,50% rice husk and 0.50% betle leaf meal; E : diet containing 12,50% rice husk and 0.50% betle leaf meal

Research Design

Research design used was Complete Random Design (CRD) with five treatments, namely control ration, ration without rice husk (A); rations with 12.50% rice husk fermentation without (B); rations with 12.50% fermented rice husk and betle leaf (C); rations with 12.50% rice husk without fermented and betle leaf (D); rations with 12.50% fermented rice husk and betle leaf (E). Each of the treatments with four replicates each and Deuteronomy contains five Bali duck-tailed females the initial body with weights and age homogeneity.

The observed variable

The observed variables include the appearance (the consumption of rations, antioxidant consumption of rations, the final body weights, body weight and added the Feed Conversion Ratio), characteristic of the

carcass (carcass weight, cut Weight, carcass composition, carcass percentage), the meat quality consisted of organoleptic methods, objective methods, and meat texture, antioxidant profile consisted of antioxidant capacity, malondialdehyde, superoxide dismutase, lipid profile of meat consisted of cholesterol total, triglycerides, HDL and LDL

Data Analysis

The data obtained were analyzed with prints and when there is a noticeable difference between the treatment continued with test Duncan (Steel and Torrie, 1989).

3. Results and Discussions

Study of the influence of offering ration rice husk deaminated Urea and bio-fermented that supplemented betle leaf on the performance of the Bali Duck.

Consumption of Rations

Consumption of rations on the ducks get a ration of rice husk and without betle leaf or treatment (control) for 12 weeks is 5.786.25 grams/duck (Table 3). The ducks get 12.50% rice husk without fermentation (treatment B) an increase in the consumption of rations significantly ($P < 0.05$). The grant of a ration containing fermented rice husk 12.50% (treatment C), 12.50% rice husk without fermentation and betle leaves (treatment D), and 12.50% rice husk fermented and betle leaves (treatment E) different rations consumption decline markedly ($P > 0.05$) compared to treatment A. Increased consumption of rations caused by rice husk that cause low digestion, so the treatment B consumes more rations in order to fulfill their needs (Anggorodi, 1984). The results obtained in accordance with the digestion study by Yadnya *et al.*, (2015), rations, containing betle leaves as antioxidants can increase the metabolic processes are included in the process of digestion can be increased, so that the need for energy and substances other nutrients could be fulfilled.

Table 3

Study of the influence of offered ration rice husk deaminated urea and bio-fermented supplemented betle leaf on the performance of the Bali duck

Variable	Treatments					SEM
	A	B	C	D	E	
Feed consumption (gr/duck) ^{NS}	5.786,25c	6.143,75a	5774,75cd	5845,25b	5745,25d	11,44
Feed Anttioxidant Capacity (%IC)	3,47c	3,26cb	4,96b	5,10a	5,25a	0,093
Final Body Weight (Kg/duck)	1.368b	1.335b	1.496a	1.505a	1.595a	0.041
Body weight gain (g/duck)	417.75c	384,00d	545,00b	553,00b	644,25a	8,536
Feed Conversion Ratio)	13.71b	16.00a	10,59c	10,55c	8,91d	0,186

Notes: A : control diet (without rice hull and betle leaf meal); B : diet containing 12,5.0% rice husk; C : diet containing 12,50% fermented rice-husk; D : diet containing 12,50% rice husk and 0.50% betle leaf meal; E : diet containing 12,50% rice husk and 0.50% betle leaf meal

NS: Non-Significant $P > 0,05$)

SEM: Standard error the treatment means

Feed Antioxidant Capacity

Feed antioxidant capacity in the ducks who get treatment A is 3,47% IC (Table 3). Administering treatment B can reduce the antioxidant capacity of 6.05% was not significantly different ($P > 0.05$) while with the treatments C, D and E may improve antioxidant capacity each ration 42.93%, 46.97% and 51.25% ($P < 0.05$) compared to treatment A. The presence of antioxidant capacity can improve fermentation. The results of this research as conducted by [Susila et al., \(2016\)](#) that get an increase in antioxidant capacity of the ration of fermented rice husk and supplemented purple sweet potato leaf. According to [Yadnya et al., \(2016\)](#), granting of fermented rice husk, with a solution of EM 4-supplemented MSG can increase the antioxidant capacity of rations

The final body weights

The final body weights on the duck were 1368.00 gram/duck (Table 3). The giving of treatment B generates the final body weight lower ($P > 0.05$), thus giving treatments C, D and E can increase final body weight the end respectively amounted to 9.35, 10.01., and 16.59% ($P < 0.05$) than granting < treatment A. Increased body weight the end very affected by the quality of the nutrition value of rations as well as the value of the digestion ration increases so that the nutrient substances can be absorbed more and more so living ducks can be fulfilled ([Yadnya and Trisnadewi, 2012](#)). The results of this study in accordance with obtained by [Susila et al., \(2016\)](#), that fermented supplemented ration granting leaves of sweet potato purple can body weights produces the end better than other treatments.

Body Weights Gain

Body weight gain on duck was 417, 75gram/tail (table 3) the giving of treatment B can lower the value of different body weights real ($P < 0.05$), whereas treatment with the administration of treatment C, D and E can increase body weight increase each of 30.46., 32.37., 54.21% were significantly different ($P < 0.05$) compared to treatment A. The presence of enzymes contained in solution EM-4 [Widiana and Higa \(1993\)](#) and antioxidant compounds in a betle leaf (*Piper betle L.*) so that the digestibility rations can be increased the body weight gain occurred. [Susila et al., \(2016\)](#), reported that giving ration fermented rice husk and supplemented of sweet potato purple (*Ipomoea batatas l.*) leaves can produce a body weight added better than ducks fed a control treatment.

Feed Conversion Ratio (FCR)

Feed conversion ratio (FCR) of Bali duck in treatment A was 13,71 (Table 3). Presented treatment B can increase FCR amount 16.70 percentage was not significantly than those in the control diet Moreover, FCR of ducks in treatment C, D and E can decrease were significantly different ($P < 0.05$) than that treatment A. FCR very depend on feed consumption and body weight gain ([Yadnya et al., 2013](#)). Feed consumption the affected containing nutrition value, because on treatment B content 12.50% rice husk as source crude fibre very difficult for digest by bird that have not digestion for crude fibre and have low digest that low small material can that for absorption nutrition very low, so that decrease for body weight gain ([Anggrogodi, 2005](#)). According to [Susila et al., \(2015\)](#), Offered ration containing fermented rice husk with *Aspergillus niger* and supplemented *Ipomoea batatas L* leaf can improve the performance of Bali duck included body weight and FCR.

Study of the influence of offering ration rice husk deaminated Urea and bio-fermented that supplemented betle leaf on meat quality of the Bali duck meat quality with organoleptic methods variable organoleptic meat quality was color, smell, texture, taste, and to receive of the whole. Score color meat duck A was 3.20. (Table 4). Offered treatment B, C, D, and E can increase score color were significantly different ($P < 0.05$) than to treatment A. The increasing of the color of meat very the affect by protein consumption and antioxidant consumption. This result of the research was suitable with the experiment of [Yadnya et al., \(2015\)](#), reported

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that offered ratio containing fermented *Aspergillus niger* and supplemented purple sweet potato (*Ipomoea batatas L*) leaf can increase color score with organoleptic methods.

Table 4
Study of the influence of offering fermented rice husk with effective microorganisms-4 (EM-4 in diets supplemented betle leaf on meat quality of the Bali duck with organoleptic methods

Variable	Treatment					SEM
	A	B	C	D	E	
Color	3.20d	3.40c	3.46b	3.80b	3.89a	0.049
Smell	3.20d	3.60c	3.93b	3.88b	4.23a	0.046
Texture	3.20d	3.63	3.82b	3.85b	3.95	0.048
Taste	3.40c	3.60c	3.80b	4.23a	4.40a	0.083
To recive of whole	3.4d	3.60d	3.80c	4.10b	4.40a	0.073

Notes: A : control diet (without rice hull and betle leaf meal); B : diet containing 12,5.0% rice husk; C : diet containing 12,50% fermented rice-husk; D : diet containing 12,50% rice husk and 0.50% betle leaf meal; E : diet containing 12,50% fermented rice husk and 0.50% betle leaf meal

NS: Non-Significant ($P > 0,05$)

SEM: *Standard Error The Treatment Means*

Score smell meat to duck offering ration containing without rice husk in diet was 3.20 (Table 4), thus giving treatment B, C, D, and E could increase of score smell of meat respectively were 12.50., 22.81., 21.25, and 32.18% were significantly different ($P < 0.05$) than treatment A. Decreased smell and rancid meat ducks get *piper betle L* as in the beetle leaf in diets contains compound which is antioxidant that can prevent oxidation by free radicals (Hustani, 2001). Rumiasih *et al.*, (2011) reported that the supply of rations containing antioxidants can reduce odor off on the meat duck. Scoring value with the organoleptic taste of duck meat, show that offered treatment E is the most preferred treatments. This is due to shrinkage of meat cooking on the lowest among ducks treatment, so the nonprotein substance that dissolves in water and fat as the precursors of meat flavor that is greater than the other treatment (Soeparno, 2005).

Winarno (1986) reported that the flavor determined by smell, taste, and savor with the presence of antioxidants in the diet that contained in the unfermented or fermented rice husk could reduce oxidation by radicals. In the case, less saturated fatty acids oxidized could reduce off-odor intensity.

The score of duck meat texture in treatment A was 3.20 (see in table 4). Offered treatment B, C, D, and E can increased meat texture score respectively were 12.50., 22.81., 20.31., and 23.43% significantly different ($P < 0.05$) compared than treatment A. Susila *et al.*, (2016) reported that offered fermented or without fermented on rice husk can improve texture meat with organoleptic method. Tenderness of meat is determined by 3 components, such as myofibrils and its status of contraction, the connective tissue content of cross linking, water holding capacity (WHC) of protein in meat juice (Soeparno, 2005). Susila *et al.*, (2016) reported that offered fermented rice husk that supplemented purple sweet potato could improve meat texture, included colour, smell, taste, and texture compare duck offered diet without fermented rice husk.

Score taste meat to duck offering ration containing without rice husk in diet was 3.20 (Table 4), thus giving treatment B, C, D, and E could increase of score smell of meat respectively were 5.88., 17.64., 24.41, and 29.41% were significantly different ($P < 0.05$) than treatment A. Score taste meat very determine by smell, feeling, to taste, with there is antioxidant in beetle leaf can reduce oxidation unsaturated by free radical and intensity off-odor can reduce (Borovička & Řanda (2007).

The Study showed that total acceptance with treatment A for meat A was 3.40 (Table 4). In the treatment B, C, D, and E can increased score total acceptance respectively 5.88., 11.76., 20.58., and 29.41% were significantly different ($P < 0.05$) compared with treatment A. Susila *et al.*, (2016) reported that offered fermented rice husk as diet antioxidant could improve color, smell, taste, texture, and total acceptance. The total acceptance is a combination from some variables organoleptic test on meat product, so existence of abetter meat variable.

Study of the influence of offering fermented rice husk with effective microorganisms-4 (EM-4 in diets supplemented betle leaf on meat quality of the Bali Duck with organoleptic methods

Water meat concentration to duck provision treatment A was 74.75% (Tabel 4). Provision treatment B, C, D, and E production water meat concentration were not significantly ($p > 0,05$) compared than treatment A. Water meat concentration the affected by water consumption and water metabolism through metabolism of protein, lipid, and carbohydrate water until formation balance condition (Murray *et al.*, 2009). The resulting research is nearly same with pound Yadnya *et al.*, (2016), reported that offered ration containing fermented rice husk with effective microorganisms-4 (EM-4) supplemented Mono Sodium Glutamate (MSG) get water meat concentration not significantly different ($P > 0.05$) with control treatment. Yadnya *et al.*, (2015) reported that offered ration containing fermented purple sweet potato skin product water meat concentration nearly same with offered treatment control.

It showed that in Table 5. Offered treatment B, C, D, and E were not significantly ($P > 0.05$) of pH, water holding capacity (WHC), and cooking loss (CL). compared than.

Table 5

Study of the influence of offering fermented rice husk with betle leaf supplemented of meat duck quality with objective methods

Variable	Perlakuan					SEM
	A	B	C	D	E	
Water Concentration (%) ^{NS}	74,75	74,53	73,24	75,19	75,42	4,744
pH ^{NS}	5,57	5,54	5,69	5,66	5,71	0,11
Holding Capacity (WHC) ^{NS} (%)	38,36	44,24	35,32	37,44	35,72	35,52
Cooking Loss (CL) ^{NS} (%)	32,85	31,81	31,65	31,14	30,70	3,004

Notes: A : control diet (without rice hull and betle leaf meal); B : diet containing 12,5.0% rice husk; C : diet containing 12,50% fermented rice-husk; D : diet containing 12,50% rice husk and 0.50% betle leaf meal; E : diet containing 12,50% fermented rice husk and 0.50% betle leaf meal

NS: Non-Significant ($P > 0,05$)

SEM: *Standard Error The Treatment Means.*

Treatment A. From result research to get water concentration, pH, and protein concentration of the meat were not significantly different ($P > 0.05$) can the affected of another compound. WHC effected meat containing protein and pH (Soeparno, 2005). The increase of WHC could apply water to meat which causes an increase in protein, so it could also of WHC value. Lawrie (1995) reported that high cooking loss could produce more nutrients lost during the process WHC. Meat has its capability to bring water molecule, depend on the amount of protein when there was a decreased activity (Purnomo *et al.*, 1989). A cooking loss could be measured when there was a decrease in WHC value. Lawrie (1995) reported that high cooking loss could produce more nutrients lost during the process of boiling.

Study of the influence of offering fermented rice husk with betle leaf supplemented of meat antioxidant capacity, meat and liver cholesterol levels of Bali duck
Meat Antioxidant Capacity

Meat antioxidant capacity on duck offering treatment A was 9.561% (Table 7). Offering treatment B, C, D, and E can increased meat antioxidant capacity respectively 52.61., 85.98., 89.12, and 121.23% were significantly different ($P < 0.05$) compared to treatment A. If antioxidant consumption higher shall to effected contain antioxidant in higher meat. Yadnya *et al.*, (2015) reported that to getting ration fermented rice husk

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and betle leaf supplemented can increase antioxidant capacity in the blood and meat of Bali duck. Prangdimurti *et al.*, (2006) reported that offering suji leaf on a rat, and can be increased of blood antioxidant capacity compared to rat fed without leaf.

Table 7

Study of the influence of offering fermented rice husk with betle leaf supplemented of meat antioxidant, meat and liver cholesterol levels of Bali duck

Variabel	Treatments					SEM
	A	B	C	D	E	
Antioxidant capacity(IC%)	9,56c	14,59b	17,78b	18,08b	21,15a	1,393
Meat Cholesterol (mg/dg)	219.59a	185.29a	173.58a	156.71b	144.23b	16.48

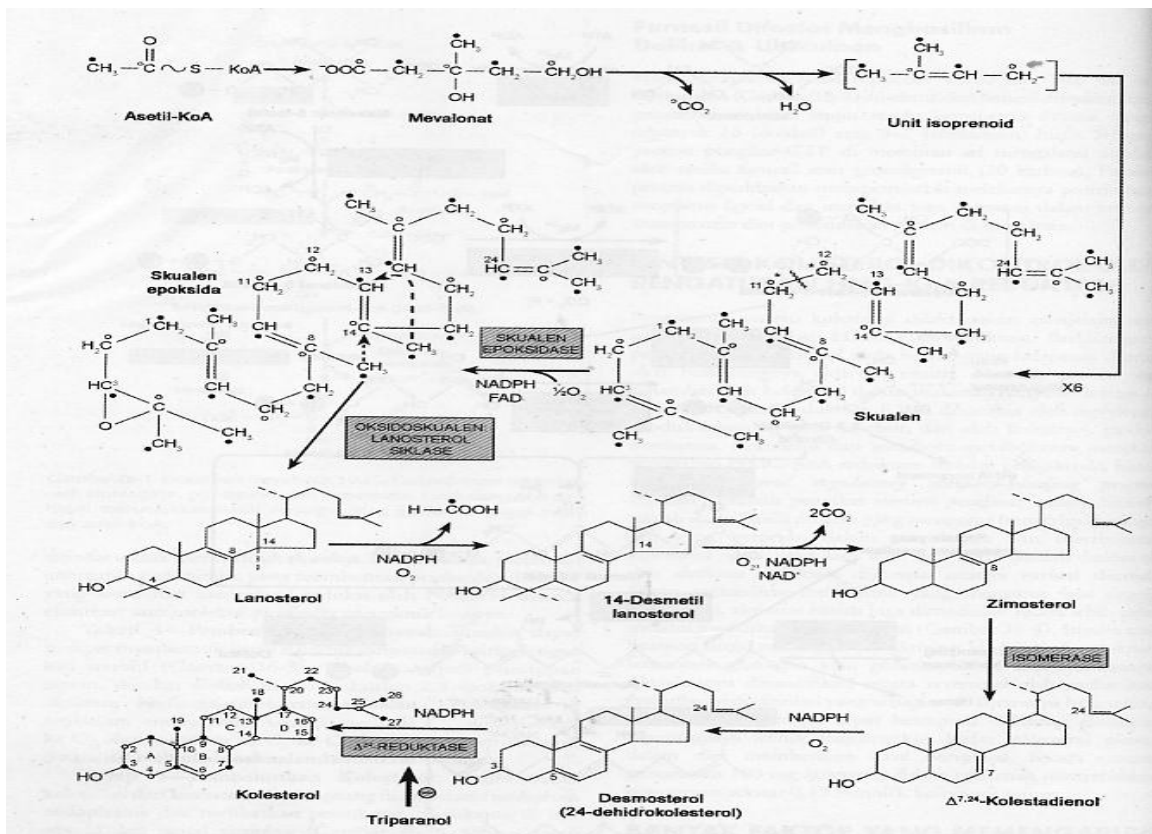
Notes: A : control diet (without rice hull and betle leaf meal); B : diet containing 12,5.0% rice husk; C : diet containing 12,50% fermented rice-husk; D : diet containing 12,50% rice husk and 0.50% betle leaf meal; E : diet containing 12,50% fermented rice husk and 0.50% betle leaf meal.

NS: Non-Significant ($P>0,05$).

SEM: *Standard Error The Treatment Means*

Meat Cholesterol Concentration

Meat cholesterol on duck offering treatment A was 219,59mg/dg (Table 7). Provision treatment B and C produce meat cholesterol were not significantly different ($P>0.05$), but with offering treatment D and E can decreased of meat cholesterol, respectively 28.63% and 34.31% were significantly different ($P<0.05$) compared to treatment A, Moreover, on liver also in case, to giving treatment B was not significant of cholesterol ($P>0.05$) but offering treatment C, D, and E can decrease liver cholesterol were significantly ($P<0.05$) compared to treatment A.



4. Conclusion

It was concluded that offering ration containing fermented rice husk and betle leaf supplemented can improve performance, meat quality, antioxidant capacity, and meat cholesterol of Bali duck.

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