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THE EFFECT OF OFFERED FERMENTED RICE HULL IN RATION SUPPLEMENTED WITH PURPLE SWEET POTATO (*Ipomoea batatas* L.) LEAF ON LIPID PROFILE OF DUCK MEAT

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ABSTRACT

This experiment was carried out to study the effect of offered fermented rice hull in ration supplemented with purple sweet potato (*Ipomoea batatas* L.) leaf on lipid profile of duck meat. Seven treatment rations were used in a completely randomized design (CRD) consisted of control ration A (ration without containing rice hull and purple sweet potato leaf), ration B (ration containing 5% rice hull), ration C (ration containing 5% fermented rice hull and purple sweet potato leaf), ration D (ration containing 10% rice hull), ration E (ration containing 10% fermented rice hull and purple sweet potato leaf), ration F (ration containing 15% rice hull),and ration G (ration containing 15% fermented rice hull and purple sweet potato leaf). Each treatment consisted of three replicates and each replicate consisted of five ducks. Variable observed in this study were feed consumption, protein, crude fiber and antioxidant consumption and lipid profile consisted cholesterol total, HDL, LDL and TGA. The results showed that feed, protein, crude fiber and antioxidant consumption on treatment A were 6414.10., 1027.70., 520.82 and 59,51g/head. Giving treatment B, C, D, E, F and G decrease feed consumption (P, < 0.05), but protein consumption was increase significantly (P <0.05) except for treatment B was not significant compared with treatment A. Giving treatments C, E and G were decrease crude fiber consumption (P<0.05). Crude fiber consumption in treatment B increase significantly (P < 0.05), but crude fiber consumption in treatment D and F were not significantly different (P>0.05) with control (A). Antioxidant consumption for treatments B, C, D, E, F and G were increase significantly (P<0,05) compared with A. Lipid profile of duck meat consisted of cholesterol total, HDL, LDL and TGA in treatment A were 75,84., 26,81., 30,04 and 100,87 mg/100g. Offered treatment B, C, E, F and G significantly decrease cholesterol total (P<0.05), but treatment D was not significantly different (P>0.05) with treatment A . While on HDL and TGA for all treatment were not significantly different (P>0.05) except TGA for treatment C was increase significantly (P<0.05), compared treatment A. Offered treatment C, E and G were significantly decease LDL of duck meat, but treatment B, D and F were not significantly different (P<0.05) with treatment A. Its can be concluded that offered fermented rice hull in ration supplemented with purple sweet potato (*Ipomoea batatas* L.) leaf improve lipid profile of duck meat..

Key word: fermented rice hull, purple sweet potato leaf, antioxidant capacity, lipid profil, bali duck..

INTRODUCTION

Rice hull is by product of rice processing. Nutrient content in rice hull is 12,5% water, 3,1% protein, 29,2 nitrogen free extract, 35% crude fiber, 27% ether extract and 17,5% ash (Lubis, 1992) with low digestibility. Low digestibility feed stuff have negative affect on performance of duck. Improving the nutrient content of rice hull can be done by fermentation with *Aspergilus niger* which could produce enzyme *selulase, glukoamilase,* and *alpha amylase* (Muchtadi *at al.,* 1992), as it also contains *katalase, pectinase* and *anthosianse* enzyme (Wainwright, 1992).

The enzyme could digest the fiber into simple sugar then absorbed by animal Guntoro *at al.* (2004) reported that fermented cassava dregs with *Aspergilus niger* decrease crude fiber content from 14.5% to 10.53%. Bidura *at al.* 2007 reported that fermented coconut oil meal with *Aspergilus niger* increase protein content from 31.3% to 36.3%. and energi content from 1667 kkal /kg to 2479 kkal / kg. Increasing nutritional value of ration will increase the growth rate of duck, but the growth of duck will followed by increasing fat in the body. High fat content in the body especially saturated fatty acid followed by a high content of cholesterol. It's will be problem for consumer who want a good quality meat with low fat. Therefore should be efforts to lost fat including cholesterol in the ducks meat.

An alternative feed ingredient that can be used to suppress cholesterol in duck meat is purple sweet potato leaf. because antioxidant content at purple sweet potato leaf (Kumalaningsih 2007) can inhibit the forming of cholesterol with the working principle inhibitor of enzyme, which inhibit the enzyme 3 hidroxy 3- methyl gluteryl functioning CoA reductase HMG CoA to change mevalonic acid, so could reduce the number and frequency of cholesterol synthesis (Cuchel *et al.* 1997) Sumardika and Jawi (2011) reported that feeding of leaf extract purple sweet potato leaf in mice with high cholesterol content was found to improved blood lipid profile. Particularly a decrease in total cholesterol and LDL (Low density lipoprotein) and increase level of HDL (High density lipoprotein) in blood. Based on above description the experiment entitled the effect of fermented rice hull in ration supplemented with purple sweet potato (*Ipomoea batatas* L) leaf on lipid profile of duck meat.

MATERIAL AND METHODS

Place and Period

The experiment was conducted at Guwang Village, Gianyar regency, in Bali for 12 weeks, while the determination of lipid profile of duck meat conducted in laboratory of Animal Nutrition Faculty of Animal Husbandry Udayana University and determination of antioxidants capacity was conducted in laboratory of food analysis Faculty of Agriculture Technology Udayana university.

Material and Equipment

Rice hull obtained from local farmer, *Aspergilus niger* used in this study obtained from the institute for Agriculture Technology Denpasar. The duck used in this experiment were the duck form a farmer at Ketewel Village Gianyar regency.

The ration was composed based on Scott *at al.* (1982) recommendation and using; yellow corn, rice brand, coconut oil meal, fish meal, soybean, rice hull, purple sweet potato leaf, mineral B12 and salt (NaCl). Ingredient and nutrient composition are presented in table 1 and table 2. Ration and drinking water provide *ad libitum*. Source of drinking water is from local drinking water firm.

Experimental Design

The experiment used a completely randomized design (CRD) with seven treatments, and each treatment consist of three replicate and each replicate consist of five Bali duck with same age and weight.

Variable Measured

Variable measure were feed consumption protein, crude fiber and antioxidant consumption, lipid profile of duck meat consist of cholesterol total, high density lipoprotein

(HDL), low density lipoprotein (LDL) and trigliserid (TGL) of meat. The data were analyzed with analysis of variance, and further analysis was continued using Duncan test (Steel and Torrie, 1989).

Table 1.Ingridient composition of female duck age 3 – 15 weeks

Ingredient (%)	Treatment						
	A	B	C	D	E	F	G
Corn yellow	55,36	54,98	54,98	49,98	49,98	47,32	47,32
Soybean	9,37	12,45	12,45	12,45	12,45	13,88	13,88
Coconut oil meal	11,31	9,82	9,82	9,82	9,82	7,28	7,28
Fish meal	10,13	8,10	8,10	Duck	8,10	10,29	10,29
Rice brand	13,26	9,00	9,00	9,00	9,00	5,56	5,56
Rice hull	-	5,00	-	10,00	-	15,00	-
Fermented rice hull and purple sweet potato leaf	-	-	5,00	-	10,00	-	15,00
Mineral B12	0,50	0,50	0,50	0,50	0,50	0,50	0,50
Salt (NaCl)	0,15	0,15	0,15	0,15	0,15	0,15	0,15
Total	100	100	100	100	100	100	100

Table 2. Nutrient Composition of female Duck Age3-15 weeks

Energy and Nutrient	A	B	C	D	E	F	G	Standard
Energy (kkal Me/kg)	2885,6	2808,3	2859,3	2860,8	2867,6	2840,8	2897,5	2800
Protein kasar (%)	17,22	17,68	17,68	19,54	20,78	20,8	21,85	15-17
Lemak (%)	5,34	5,96	5,96	6,08	6,08	6,02	6,03	4-7
Serat kasar (%)	6,9	6,11	6,11	7,76	7,77	8,02	8,03	3-6
Ca	0,94	0,77	0,77	0,77	0,77	0,84	0,84	0,80
P	0,51	0,52	0,53	0,52	0,51	0,55	0,55	0,50

Note : A; Ration without rice hull and purple sweet potato leaf, B ; Ration contain 5% rice hull, C; Ration contain 5% fermented rice hull and purple sweet potato leaf, D; Ration contain 10% rice hull, E; Ration contain 10% fermented rice hull and purple sweet potato leaf, F; Ration contain15% rice hull, G; Ration contain 15% fermented rice hull and purple sweet potato leaf

RESULT AND DISCUSSION

Feed and nutrients consumption

Feed consumption of ducks which got treatment A (control) was 6414.1 g /head (table 3). Ducks received rations containing 5, 10, and 15% of rice hull (treatments B, D, F) and ducks were given rations containing fermented rice hull at level 5, 10, and 15% supplemented with purple sweet potato leaf (treatment C, E, G) decrease feed consumption ($P < 0.05$) compared with control.(A). The lower feed consumption in ducks who got treatment B, D and F because they contain no fermented rice hull so that ducks need a longer time to digest the ration finally feed consumption of duck decrease.. The lower feed consumption of ducks at treatments C, E and G. caused by *Aspergillus niger* fermentation increases energy ration (Bidura, 2007). thus, to meet its needs, ducks consume less feed.

Consumption of protein and crude fiber in ducks A is 1027,74 and 520,82g / head (table 3) giving treatment C, D, E, F and G increase protein consumption ($P < 0.05$), but the consumption of protein of treatment B was not significant different ($P > 0.05$) with the

control. Crude fiber consumption in treatment C, E, and G significant (P< 0.05) lower than that of treatment A. But in treatment B increased significantly (P <0.05).compared with control Crude fiber consumption in F treatment was not significant different (P> 0.05) compared with controls. Increased protein consumption and decreased crude fiber consumption in ducks were given rations containing fermented rice hull because fermentation could increase the protein content and decreased crude fiber content (Yadnya and Trisnadewi, 2011).

Consumption of antioxidant ration

Antioxidant consumption in treatment A was 59.51 g / head (table 3). Antioxidant consumptions in treatments B, C, D, E, F and G significant higher than that of treatment A (P<0,05). Fermentation in rice hull can improve the nutritional value of the ration as well as purple sweet potato leaf anthocyanin-containing substances that act as antioxidants thus increasing consumption of antioxidant ration (Yadnya *et al.*, 2014).

Table 3. feed, nutrient and antioxidant consumption

Variable	Treatment							
	A	B	C	D	E	F	G	SEM[2)]
Feed consumption (g/head)	6414.1a.[1)]	6342.5b	5335.5bc	6307.5c	6235.6d	6199.9e	6171.6e	10.46
Protein consumption (g/head)	1027.7e	1019.23e	1108.71d	1123.48d	1222.14b	1149.07c	1320.07a	6.84
Crude fibre consumption (g/head)	520.82b	556.65a	403.56d	518.5bc	366.65e	515.92b	293.14f	0.87
Antioxidant consumption (g/head)	59.51f	65.51d	77.52b	65.76d	70.22c	61.32e	77.68a	9.6

Notes: [1)] Values with different aphabets in the same column means significantly different (P<0,05), [2)] SEM: Standart Error of the Treatment Means

Meat lipid profile

Meat lipid profile consists of total cholesterol, HDL, LDL, and VLDL (Siswono, 2000). Total cholesterol meat ducks gain control treatment (A) was 75.84 mg / 100 g meat (table 4). Treatment B, C, D, E, F, and G decrease meat cholesterol levels significantly (P <0.05) compared to control (A). Levels of HDL and LDL in the A treatment were 26.81 mg / 100 g and 30.04 mg / 100 g meat. Provision of treatments B, C, D, E, F, and G has no effect on HDL (P> 0.05), while the LDL levels decreased (P <0.05), except for the provision of treatments B, D and F were not significantly different (P > 0.05) in comparison with giving treatment A . Triglyceride levels only in treatment C that affect significant (P<0,05) where other treatments were not significantly different (P> 0.05) with control

Cholesterol level in the body is influenced by internal factors: the ability of the body to form cholesterol. According Siswono (2000) the body itself is able to synthesize 85% of the cholesterol needed by the body, while external factors significantly affected by the intake from food sources. The presence of antioxidants in the diet will greatly influence the formation of cholesterol in the body. Kumalaningsih (2008) reported that the presence of antioxidants in body can inhibit the formation of cholesterol by inhibiting the activity of the enzyme 3-hydroxy, 3 methyl, gluteryl coenzyme A reductase so that the formation of 3-hydroxy 3 methyl gluteryl be hampered formed in the liver (Argawa and Rao , 2000), so that cholesterol circulate in the blood is reduced so that the cholesterol that accumulates in meat will be reduced. The same thing was also obtained by Yadnya (2012),

giving of fermented purple sweet potato to the extent of 15% has no effect on HDL, while the LDL decreased significantly. Cholesterol levels in the body can also be reduced by the formation of cholesterol is disturbed and also the absorption is reduced. Their rice hull as a source of fiber that can inhibit the absorption of food including cholesterol, in addition to the coarse fiber can be fermented in the gut will be formed propionate acid which can disrupt the formation of cholesterol in the liver, so absorbed in the body will be reduced. Yadnya et al, (2014) reported that giving skin purple sweet potato (*Ipomoea batatas L*) fermented in the diet can lower serum total cholesterol and LDL cholesterol in the blood while HLD no affect.

Table 4. lipid profile of duck meat offered ration containing fermented rice hull supplemented with purple sweet potato leaf (*Ipomia batatas L*)

Variable	Treatment							
	A	B	C	D	E	F	G	SEM
Cholesterol total (mg/100g)	75.84a	66.07b	62.45b	69.46ab	63.81b	64.79b	64.07b	2.38
HDL (mg/100g)	26.81a	26.13a	27.26a	26.53a	26.75a	26.23a	26.52a	0.62
LDL (mg/100g)	30.04a	28.34a	14.19b	22.86ab	16.85b	23.70ab	16.16b	2.46
Trigliserida (mg/100g)	100.87b	75.11b	150.0a	88.36b	73.98b	80.50b	106.77 ab	9.6

CONCLUSION

Giving ration containing fermented rice hull supplemented with purple sweet potato leaf (*Ipomia batatas* L) improve lipid profile of duck meat.

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