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The Effect of Offered Diet Containing Rice Hull and Mono Sodium Glutamate (Msg) and *Effective Microorganism -4* (Em-4) Solution on the Performance of Campbell Duck

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Abstract

An experiment was carried out to study the effect of Effective Microorganisms-4 (EM-4), a diet containing rice hull and Mono Sodium Glutamate (MSG) on performance, body fat distribution, and quality of Campbell duck meat. The experimental design used in this research is completely randomized design (CRD) with four treatments, ie control treatment (A), diets containing rice hull 4.94%, 3.36% MSG and EM-4 (B); rations containing rice hull 5.97%, 5.94%MSG and the EM-4 (C), diets containing rice hull 6.94%, 6.34% MSG and EM-4 (D). Each treatment contained four ducks Campbell and each treatment was repeated four times. The observed variable is the performance, body fat distribution, and meat quality. The results showed that administration of rice husk supplemented with liquid EM-4 and MSG did not affect feed intake and protein consumption (P> 0.05), whereas the consumption of fat and crude fiber increased significantly (P <0.05), and the decrease was significantly (P <0.05) compared with the treatment control (A). Giving control treatments resulted in the fat pads of fat distribution, fat, gizzard, fat mesenterium and subcutaneous fat is 2.55%, 0.85%, 0.42%, and 23.5%, while the provision of rice husk and supplemented with MSG and EM-4 can be decrease the distribution of body fat was significantly (P <0.05). Granting EM-4 in the diet containing rice hull and MSG can improve both the quality of the meat will be objective, subjective, and overall value (P <0.05) compared with control treatment. Based on the results of this study concluded that offered of the EM-4 solution in the diet containing rice hull and monosodium glutamate can improve performance, body fat distribution and quality of Campbell duck meat.

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1. Introduction

The cost of feed for farm ranged 60-70% (Nitis, 1980). To reduce costs on the farm, it is necessary to use agricultural waste as optimal because it still contains many nutrients that are useful for livestock (Piliiang, 1997). However the problem of agricultural industry waste utilization are contained crude fiber and anti-nutritional substances are high, making it difficult to be digested by livestock (Lubis, 1992). To improve the digestibility of rations necessary supplemented with a probiotic substance such as condensation Effective Microorganisms -4(EM-4). According to Wididana and Higa (1993) states that in the solution of EM-4 contains several microbes that can remove some used enzymes to digest crude fiber and more than 90% containing Lactobacillus sps and the other is the proteolytic and lipolytic enzymes. Yadnya (2000) reported solution of EM-4 on the diet that contains sawdust can improve diet digestibility and crude fiber significantly. Biofermentasi sawdust can lower crude fiber content, from 89.3% to 48.9% and increase protein content from 0.90% to 8.65%. Yadnya *et al.*, (2007), and can improve performance in Bali ducks during the growth phase.

One of the potential agricultural waste used as feed material is rice hull, with nutrition substance is: 12.5% water, 3.1% protein, 29.2% No Nitrogen Extracting Material (BETN), 35% crude fiber, 2.7% fat, and 17.5% ash, protein level can be digested only 0.3% (Lubis, 1992). Roni and Yadnya (2006) reported the provision of rice hull in the diet supplemented with Star bio can improve the appearance of broilers. In order for the needs of protein or amino acid necessary in the diets supplemented with Monosodium Glutamate (MSG). Sukmaningsih *et al.*, (1998) reported that the addition of glutamic acid on a low-protein diet containing amino acids can reduce the critical matching of feed consumption, growth, body weight, the weight of abdominal fat and subcutaneous fat.

Meat quality is influenced by genetic factors, such as type, age, sex, and environmental factors, including the most decisive factor is the quality of food especially protein foods such as availability of rations (Soeparno, 2005). Further explained that the high protein content of the diets produced better quality meat. The weakness of the flesh is flesh fat duck, smells fishy. and tough (Setyawardani *et al.*, 2001), and therefore need to start giving fibers such as rice hull, probiotics, and amino acid substances to result in a good appearance at Campbell duck.

Under these conditions, the aim of this work with the title: The effect of a diet containing rice husks and monosodium glutamate and effective microorganism -4 (EM-4) on the performance of ducks Campbell.

2. Materials and Methods

The experiment was conducted in Guwang Village, Gianyar Regency in Bali for 12 weeks, while the determination of the body fat distribution and the quality of Campbell duck meat was conducted in the Laboratory of Animal Products Technology, Faculty of Animal Husbandry, Udayana University for 4 weeks.

Ducks

The Ducks used in the experiment were types of unsexing Campbell ducks from UD Mertasari, Guwang Village which was originally obtained from ducks breeder in Tabanan Regency.

Ration and Drinking Water

The rations were formulated based on Scott content (1982). The composition and nutrient of the ration are indicated in Tabel 1.

Table 1
The composition and nutrition content of the ration ducks at the age 2 -8 weeks

Ingredient (%)	Treatments			
	A	B	C	D
Yellow corn	55,36	55,36	55,36	56,36
Fish meal	8,12	8,12	8,12	8,12
Rice bran	14,14	7,04	6,04	4.04
Coconut meal	9,31	6,31	3,31	3,31
Soybean	11,97	11,97	11,97	11,97
Rice hull	-	4,94	5,97	6,94
Na-Sodium Glutamate(MSG)	-	3,36	5,94	6,34
Premix	0,50	0,40	5,36	0,40
NaCl	0,52	0,42	0,40	0,42
Total	100,00	100,00	100,00	100,00

Notes:
[1)]Treatments: A : Control treatment ; B : Ration content of 4,94% rice hull, 3,36% MSG and EM-4 ; C: Ration content 5,97% rice hull, 5,94%MSG and EM-4 ; D : Ration conten 6,94% rice hull, 6,34% MSG and EM-4.

Table 2
Nutrient Composition of Duck Feed, Age 2-8 Weeks

Nutrient	Unit	Treatments [1)]				Standard
		A	B	C	D	Scott *et.al.*(1982)
Metabolis Energy	Kkal/kg	2879,6	2856,9	2807,5	2820,5	2800,00
Crude Protein	%	18,3	17,8	17,2	16,9	18,0
Crude Fat	%	4,62	5,07	5,77	5,72	<5
Crude Fiber	%	7,5	7,9	8,12	8,6	4-9
Calsium(Ca)	%	0,57	0,56	0,56	0,55	0,60
Phosphor(P)	%	0,55	0,52	0,52	0,50	0,60

Notes:
[1)] Treatments: A : Control treatment ; B : Ration content of 4,94% rice hull, 3,36% MSG and EM-4 ; C: Ration content 5,97% rice hull, 5,94%MSG and EM-4 ; D : Ration conten 6,94% rice hull, 6,34% MSG and EM-4.

Experimental Design

The experimental design in this research is completely randomized design (CRD) With four treatments, namely giving the control diet (A), diet containing 3.36% MSG + EM-4 (B), diets containing 5.94% MSG + EM-4 (C), diet containing 6.34% MSG + EM-4 (D). Each treatment contained four Campbell ducks, and each treatment was repeated four times

Variable

The observed variable is the performance include feed intake, protein consumption, the consumption of fat, crude fiber intake, body weight gain, and feed Conversion ratio (FCR). Distribution of body fat includes fat pads, menstruum fat, gizzard fat, and subcutaneous fat. The quality of the meat will be objective, include water content, water holding capacity, pH, and subjective assessment includes flavor, texture, flavor and overall acceptance (Larmond, 1977).

Statistical Analysis

The data obtained were analyzed by variance and Duncan test was continued (Stell and Torrie, 1989).

3. Results and Discussions

3.1 Performance

Consumption of rations for ducks given control diet for 6 weeks is 4575gram (Table 3). The diet containing rice husk 4.94%, 3.36% Mono Sodium Glutamate (MSG) and EM-4 (B), diets containing rice husk 5.97%, 5.94% MSG and EM-4 (C) , and the diet containing rice husk 6.94%, 6.36% MSG and EM-4 (D) can increase feed consumption 15.02%, 15.25% and 21.48% higher (P <0.05) rather than treatment A. Provision of rice husk can be lowered ration digestibility, and to meet the energy, then more and more consume ducks. According to Wahju (1992) states to fulfill their basic needs ducks must meet energy needs, and then followed by need substances obtained by other. In accordance with Sukmaningsih *et al.*, (1998) who obtained Glutamate can increase feed intake.

Table 3
The response offered of effective microorganisms-4(EM-4) in a diet containing rice hull and Mono Sodium Glutamate(MSG) of the performance in the Campbell d buck

Treatments	Variables					
	Feed Consumtion (g/duck)	Protein Consumption (g/duck)	Fat Consumption (g/duck)	CF Consumption (g/duck)	Body weight gains(g/duck)	FCR
A	4575.0 b	883.45 a	343.43 c	211.48 d	727.0 c	6.28 c
B	5262.5 a	936.72 a	416.56 b	266.80 c	897.0 a	4.74 d
C	5273.0 a	906.95 a	427.39 b	298.48 b	812.5 b	6.48b
D	5558.0a	1030.13 a	477.98 a	317.91 a	728.5 c	7.63 a
SEM	109.41	1.13	7.45	4.77	2.01	0.009

1) Treatment: A = control diet; B = diet containing 4.94% rice husk; 3.36% MSG and EM-4: C = diet containing rice hull 5.97%, 5.94% MSG and EM-4, D = diet containing rice husk 6.94%, 6.36% and EM -4.
2) Values with different letters in the same column means significantly different (P <0.05).
3) SEM : *Standard Error of the treatment means*

Consumption of food substances such as fat, protein and crude fiber for ducks A is 343.43 g /duck; 883.45 g / duck; and 211.48 g /duck (Table 3). Providing treatment B, C and D can increase the consumption of fat, protein, and crude fiber was significantly (P <0.05) compared with treatment A. Increased consumption of food substances is closely related to feeding intake, the higher the ration consumed, the more nutrients that can be consumed.

Added weight to duck A is 727.5 g / duck (Table 3). Providing treatment B and C can increase body weight respectively for 23.36% and 11.68% (P <0.05), while D has no effect on body weight gain (P> 0.05) compared with treatment A. Providing treatment B and C containing Lactobacillus Complex microbes that can digest crude fiber, the presence of enzymes and lipase proteolytic can digest proteins and fats, thus increasing the ration digestibility and crude fiber was significantly (Belawa, 2000). Roni and Belawa (2006) reported the provision of rice hull supplemented with Star bio can improve the performance of broilers. FCR of ducks A is 6.28 (Table 3). Providing treatment B can reduce the FCR of 24.52% (P <0.05), whereas with treatments C and D can increase the FCR of 3.18% and 21.49% compared with treatment A. In treatment B fiber in diet and fiber consumption can still be tolerated by the enzymes present in the solution of EM-4, whereas in treatment C and D with a higher fiber intake than treatment A, so that nutrients are absorbed is not perfect, so the numbers FCR will be higher than treatment A.

3.2 Body Fat Distribution

A fatty body in the duck which is distributed in the fat pads (wt% cut), gizzard fat (% weight pieces), mesenterium fat (% weight pieces), and carcass fat (% weight to slaughter) are 2.55%, 0.85% ; 0.42% and 23.53% (Table 4). Provision of treatment B, C and D can reduce body fat pedestrian significantly (P <0.05) compared with treatment A.

Table 4
The Response offered of Effective Micro to Pemberian Effective Microorganisms-4(EM-4) in Diet Containing Rice Hull and Mono Sodium Glutamate (MSG) on Body Fat Distribution in The Campbell Duck

Variable	Treatment [1)]			
	A	B	C	D
Fat pad (% of Slaught Weight)	2.55 a	1.48 b	1.38 b	0.85c [2)]
Gizzard fat(%of Slaught weight)	0.85 a	0.74 c	0.79 b	0.74 c
Mesentrium fat(% of Slaught weight)	0.42 a	0.37 b	0.39 b	0.34 c
Carcass fat(% of Slaught weight)	23.53 a	21.18 b	21.45 b	21.36 b

Notes :
1) Treatment: A = control diet; B = diet containing 4.94% rice husk; 3.36% MSG and EM-4: C = diet containing rice hull 5.97%, 5.94% MSG and EM-4, D = diet containing rice husk 6.94%, 6.36% and EM -4.
2) Values with different letters in the same column means were significantly different (P <0.05).

The decrease in body fat content of ducks given diets containing rice hull and supplemented of MSG solution caused the number of EM-4 fiber contained in rice husk, so the fat contained in the ration-bound by fiber, so that the fat is absorbed can be reduced and the effect on the content body fat can be reduced. Budaarsa (1997) reported that administration of fibers derived from the rice hull and seaweed can lower the fat in meat and carcass fat. Yadnya *et al.*, (2007) state that the diet supplemented fiber contain EM-4 solution can reduce the carcass fat.

Meat Quality

The quality of meat with an objective assessment of pH, water binding capacity, and moisture content of ducks A is 5.89%, 57.03% and 73.24% (Table 5). Granting treatment B, C and D did not affect pH and water content of meat (P> 0.05), while in the water binding capacity increased significantly (P <0.0%) compared with treatment A. Provision of rice husk as a source of fiber, so that fat bound by fiber and excreted through feces. So that feces are expelled rather wet Bidura *et al.*, (1996), so that the water content in meat is approximately equal. The situation is the same water content suggests that the number of positive and negative charges balanced so that H^+ ions approximately equal, so the pH of the meat produced is approximately equal. In treatment B, C and D result in the water holding a capacity of meat (DIA higher than the control treatment (A).

Table 5
Response Offered of Effective Microorganisms-4(EM-4) in Diet containing Rice hull and Mono Sodium Glutamate (MSG) On Meat Quality in The Campbell Duck

Variable	Treatments				SME
	A	B	C	D	
To receive of Objective method					
pH	5.89	5.91	5.89	5.85	0.01
Water Holding Capacity(%)	57.03 d	62.86 a	58.61 b	57.66 c	0.12
Water Concentration(%)	73.24	73.58	73.76	73.88	0.56
T0 receive of the Subjective method :					
Flavor	6.2 c	6.9 a	6.4 b	6.5 b	0.06
Taste	6.9 b	7.6 a	6.8 b	6.2 b	0.05
Texture	6.5 b	7.65 a	6.,8 a	6.8 a	0.07

To receive of whole	7.2 c	7.8 a	7.5 b	7.5 b	0.07

1) Treatment: A = control diet; B = diet containing 4.94% rice husk; 3.36% MSG and EM-4: C = diet containing rice hull 5.97%, 5.94% MSG and EM-4, D = diet containing rice husk 6.94%, 6.36% and EM -4.
2) Values with different letters in the same column means were significantly different (P <0.05).

It is strongly associated with the consumption of proteins and protein content in the blood is higher, will provide a strong hydrophilic group of proteins that bind the water molecules through hydrogen bonds that bind each other with negative ions from the carboxylic groups contained in the amino acids proteins contained in meat or skin (Purnomo and Palaga, 1989).

Research on the organoleptic quality of meat on the control treatment (A) includes aroma, taste, and texture are 6.2; 6.9, and 6.5 (Table 5). In the provision of treatment B, C and D can enhance the flavor and texture (P <0.05), the taste can be improved with treatment B (P <0.05), but on treatment C and D did not affect the flavor (P > 0.05). In treatment, B produces a more desirable rating. This is because the water binding capacity (DIA) on duck meat B is higher so that the volatile substance (volatile) caused the meat more. According to Soeparno (2005) states that the aroma of cooked meat is determined by the release of volatile contained in meat. Power greater water bonding will affect the shrinkage of cooked meat is lower so that non-protein substances that dissolve in water and more fat than flavor is precursor meat (Hornstein, 1960 cited by Soeparno, 2005). Because of the higher water binding cause the fat in the body tissues of cattle capable of dissolving the collagen network, so that the texture of the meat more tender and soft (Soeparno, 2005).

4. Conclusion

From the results of this study can conclude that the solution of EM-4 in the diet containing 4.94% and 3.36% rice husk Mono Sodium Glutamate (MSG) can improve performance, reduce body fat distribution, and improve the meat quality of ducks Campbell.

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Statement of authorship
The author(s) have a responsibility for the conception and design of the study. The author(s) have approved the final article.

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