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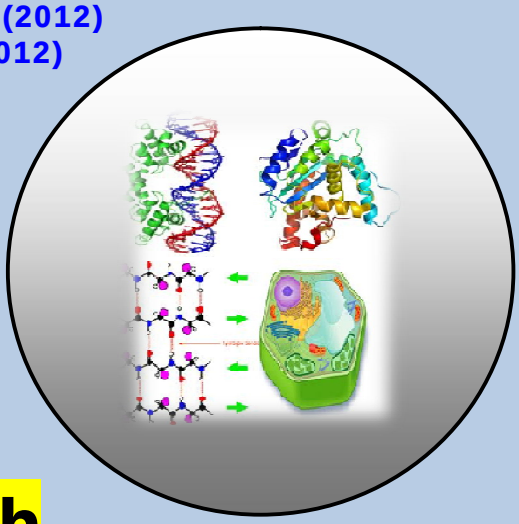

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Pollard in Diet Supplemented with Yeast on Broiler Performance and Ammonia-N Concentration of Excreta

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ABSTRACT

This research was carried out to study the effect of pollard in diet supplemented with yeast on broiler performance andammonia-Nconcentrationofexcreta. The birdsused in the experiment were 2 up to 6 weeks of age. Thetreatments were usingfour birds with six replications per replication in a completely Randomized Design (CRD).Thosediets treatmentwere evaluatedas follows: (A)diet without pollard as a control,(B) diet with 15 % pollard,(C) diet with 15% pollard and 0,20 % yeast supplemented, respectively. Diet and drinking water were provided ad libitum. The variablesobserved in this experiment consists of: feed consumptions, final body weight, live weight gains (LWG)s, feed conversion ratio(FCR), and ammonia-Nconcentration of excreta.

The studyshowed that feed efficiency and ammonia-Nconcentration in excreta of birds dietary 15% pollardsignificantly (P<0.05)lower than those of control birds. Moreover,supplementation of 15 % pollard combined with yeast significantly increased (P<0.05) live weight gains and feed consumption, but significantly decreasing (P<0.05) ammonia-Nconcentration in excreta of broiler. It can be concluded that inclusion of 15% pollard in diet supplemented with yeast increased performance but decreased ammonia-Nconcentration in excreta of broiler.

Key words :Pollard, Yeast, Performance, Ammonia-N and Broiler.

INTRODUCTION

Aspergillusoryseae (AO) and *yeast*, particularly *Saccharomyces cereviseae*, have been used as probiotics by workers (Piaoet *al*., 1999). *Aspergillus*sp.and *Saccharomyces*are derived from *Ascomycoyina* subdivision andmost industrial applied them in brewing, distilling, and baking (Han *et al*., 1999).

Yeast culture product has fermentation abilities, consist of: yeast (*S. cerevisae)* and media where yeast grew (Bidura *et al*., 2008). Piao *et al*. (1999) found that 0.10% yeast added in diet could reduce animal wastes which were similar to Park *et al*. (1994). Feeding live yeast to broiler breeder reduced colonization of salmonella in their coca and improved phosphorus utilization for chicken growth.

Pollard has a quite good content of nutrition, containing of 1300 kcal/kg metabolizable energy, 15% crude protein, 4,0% extract ether (Scott *et al*., 1982), and 26,04% crude fiber (Bidura,2008). High content of crude fiber in pollard becomes the constrictor factor of use in diet. Based on research, it indicates that pollard used up to 15% to broiler caused less growth and wet dirt so may not be used more than 15% in poultry diet (Bidura *et. al*., 2008). In this case, efforts to improve digestion of pollard crude fiber can be conducted by exploiting microbe services which has probiotical character.

The yeast can be used as probiotic source microbe which implied in yeast is *Saccharomyces cerevisiae* (Aryanta, 1980).This increased digestion of high fiber feed (Wallace and New bold, 1993) as fatty acids (acetate, propionate, and butyrate). The supplementation of *Saccharomyces cerevisiae* in diet could improve dry substance digesting, protein digesting, and phosphorus (Piao *et. al*., 1999). The increase of food digestion caused by decreased in mucus of its goblet cells. Bradley *et al*. (1994) has proved that in realistic supplementation of 0,20% *Saccharomyces cerevisiae* decreased goblet cells quantities. This caused decreasing yield of mucus, in contrast increased absorption process of food in intestine (Basyir ,1999).

The use of pro-biotic in diet significantly degraded activity of urease enzyme in small intestine so decrease the ammonia rate (Yeo and Kim, 1997). Besides, pro-biotic use in diet couldimprove" *lysine analogue S-2 aminoethyl - cysteine*" contents in poultry digestion (Sand and Hankins, 1976). According to Astuti (1996), increasing of sour amino lysine contents *(lysine analogue S-2 aminoethyl - cysteine*) could degrade fat. This study was evaluated on effect of pollard in diet supplemented with yeast to broiler performance and ammonia-N concentration in excreta of broiler aged 2 – 6 weeks.

MATERIAL AND METHODS

Place of Experiment

The research was conducted at Faculty of Animal Science, Udayana University Denpasar, Balifor two months.

Birds and Cages

Unsex broilers of CP 707 strainusedfrom a local hatchery in Kedewatan Village, Gianyar Regency. A total of 72 two-weeks-old broilers with an intial mean body weight of 500 ± 25 gwere housed in battery cages of 80 × 65 × 45 cm. The whole cages were equipped with drinker and feeder**.**

Diets Experiment and Drinking Water

Three experimental diets based on yellow corn-soybean meal (Table 1), as follows : control diet (A); diet with 15% pollard (B), and diet with 15% pollard supplement 0,02% yeast (C), respectively. The basal diets (Table 1) were formulated iso-protein (CP: 20%) and iso-calories (ME : 2900 Kcal/Kg) and calendared by Scot *et.al* (1982). Birds were provided in *ad libitum* to feed and water during experimental period. The composition of diet complied substance and nutrients used in diets can be seen in Table 1.

Yeast ("Ragi Tape")

Ragi tape is a brand name of *Saccharomyces cereviseae* culture produced locally by fermenting rice with *S. cereviseae*. *Saccharomyces cereviseae*is derived from *ragi tape*, common yeast used in "tape" called as "Na KokLiong", ensiled number 26895.

Experimental design and Treatments

This research was arranged in a Completely Randomized Design (CRD) with three treatments as of: diet without pollard and yeast as a control (A), diet with 15% pollard(B), diet with 15% pollard and supplemented with 0.2% yeast (C). Four birds (two weeks of age) with homogeneous body weight were used with six replications in each treatment.

The MeasurementVariables

The variables measured were feed consumption, live weight gains, Feed Conversion ratio (FCR), and final body weight. The concentration of ammonia-Nin excreta was analyzed based onConway method (Satter and Slyter, 1981) modified by Susanti (1990).

Table 1. Formula and Chemical Composition of Diets on 2-6 Weeks of age Growing Chicken (as-feed basis)[1)].

Ingredients	Diets			Standard[2)]
	A	B	C	
Yellow Corn	50.00	44.55	44.40	
Rice Bran	14.00	8.68	8.58	
Coconut Meal	12.00	5.20	5.00	
Soybeans	8.92	9.82	10.02	
Fish Meal	13.98	13.90	13.90	
Coconut Oil	0.86	2.61	2.66	
Yeast ("ragi tape")	-	-	0.20	
Pollard	-	15.00	15.00	
Mineral Mix	0.24	0.24	0.24	
Total	100.00	100.00	100.00	
Metabolizable Energy (kcal/kg)	2900.30	2899.90	2901.40	2900
Crude Protein (%)	19.99	20.01	20.02	20.00
Eter Extract (%)	7.71	9.19	9.25	5-10[3)]
Crude Fiber (%)	5.06	7.25	7.22	3-8[3)]
Calcium (%)	1.15	1.15	1.15	1.00
Phosphor (%)	0.67	0.69	0.69	0.45
Arginine (%)	1.58	1.44	1.43	1.14
Histidine (%)	0.51	0.48	0.48	0.45
Isoleucine (%)	1.02	1.03	1.03	0.91
Lysine (%)	1.41	1.40	1.41	1.14
Metionine (%)	0.46	0.45	0.45	0.45
Phenylalanine (%)	0.97	0.93	0.93	0.73
Threonine (%)	0.86	0.83	0.83	0.73
Tryptophan (%)	0.22	0.24	0.24	0.20
Valine (%)	1.07	1.05	1.05	0.73

(A) Diet without pollard was and yeast as control; (B) diet with 15% pollard; (C) diet with 15%pollard + 0.20% yeast supplementation.

1) The calculation was based on Scott *et al.* (1982)
2) Scott *et al*. (1982),
3) Morrison (1961).

Statistical Analysis

The whole data were analyzed by one-way analysis of Variance Test (Steel and Torrie, 1989). Statistical significances among treatments means were determined by method of New Multiple Range Test of Duncan when F value was significant at 5% level.

RESULTS AND DISCUSSION

Table 2 provides the effect of dietary pollard and yeast supplemented on feed consumption, live weight gains (LWG)s, final body weight, feed conversion ratio, and ammonia-N concentrations on broiler (2-6 weeks of age). The average of feed consumption of birds during four weeks in control group (A) was 2364.53 g/head/day. Inclusion of 15% pollard in diet (B diet) increased ($P<0.05$) feed consumption compared to A diet. There was a similar result of feed consumption applied to broilers offered B and C diet ($P>0.05$).

The average of final body weight and LWG during four weeks of experiment to birds within control diet(A) was 1754.63 g/head and 1256.75 g / head, respectively (Table 2).Final body weight and LWG of birds fed diet C were significantly higher ($P<0.05$) compared to control and B diets.

Feed conversion ratio during four weeks experiment in birds control diet (A) was 1.88/head (Table 2). The average of feed conversion ratio in the birds fed B diet was significantly higher ($P<0.05$) than in control and C diets.

Ammonia concentration in excreta during four weeks experiment to broiler fed control diet(A) was 86.87 mg% (Table 2).The average Excreta ammonia concentration of the birds having diet A were increased significantly ($P<0.05$), both than B and C diet.

Table 2. The Influence of Pollard in Diet with Yeast Supplementationon Performance and Ammonia-N concentration in Broilers Excreta (2-6 weeks of age).

Variables	Diets[1)]			SEM[2)]
	A	B	C	
Feedconsumption(g/head/day)	2364.53[b]	2580.12[a]	2513.46[a]	42.962
Liveweight gains (g/head)	1256.75[b]	1201.88[b]	1349.29[a]	22.963
Final body weight (g/head)	1754.63[b]	1697.79[b]	1844.50[a]	22.309
Feed Conversion Ratio (FCR)	1.88[b]	2.15[a]	1.86[b]	0.024
Ammoniaconcentration (mg%)	86.87[a]	60.42[b]	58.93[b]	0.812

1. A: Diet without pollard and yeast as a control; (B) diet with 15% pollard; (C) diet with 15%pollard + 0.20% yeast supplementation, respectively.
2. SEM: Standard Error of the treatment Means.
3. Means with different superscript different significantly ($P<0.05$).

Bidura (2007) conveyed that 15% pollard in diet significantly increased feed consumption of birds (P<0.05) caused high crude fiber content in pollard (26.04%). Diet with high dietary fiber could cause decrease of metabolizable energy. The increase of crude fiber in diet were increase rate of passage diet in gastro intestinal tract (Bidura *et al*., 1996). Cao (2001) reported that 1.5-3.5% dietary cellulose increase growth and energy retention of 7-15 day old chicks, but more than 5% suppressed growth and energy retention. On the other hand, high consumed of crude fiber caused some loss of net energy for gizzard activities to move out crude fiber from gastro intestinal.

The addition of yeast as source of pro-biotic in diet containing pollards (C diet) can improve feed consumption and other nutrition. This is due to existence of yeast as pro-biotic source in diet which able to improve enzyme activities and broiler digestion (Bidura, 2007). Besides, yeast has an important role as a source of vitamin B complex (Sukaryani, 1997).Vitamin B complex can improve feed consumption (Tillman *et al*., 1998).

Raper *et al*. (1965) in Han *et al*. (1999) reported that *Aspergillus oryzae* and *S. cereviseae* can improve *amilolytic* activity and *proteolitic* enzymes in digestive tracts of broiler, protein digestible and metabolizable energy. As a logical consequence, it will improve growth of broilers. This research was supported by Francis *et al*. (1978) found that use of pro-biotic in diet could improve broilers growth. The final body weight of broilers during experiment, decreased in B treatment (diets containing 15% pollard) because the increase of diet crude fiber caused an amount decrease of nutrient (Siri *et al*., 1992) which affecting degradation of broiler's weight. The yeast has a role as pro-biotic in broiler's digesting channel. Pro-biotic in diet can improve the digesting of food nutrition (Jin *et al*., 1997), availability of " *lysine monologue - S-2-aminoetyl Cystein"* in digestion channel (Sand and Hankin, 1976), used as a single protein (Sukaryani, 1997) and could improve the protein retention, mineral Ca, Co, P and Mn (Nahashon *et al*., 1994).

Feed Conversion Ratio (FCR) is the indicator of diet efficiency. The low value of FCR indicates the higher of diet efficiency level (Anggorodi, 1985). The supplementation of yeast as a source of pro-biotic significantly improved efficiency of diet because of pro-biotic existence in diet can improve enzyme and digestion activities (Jin *et al*., 1977). Pro-biotic also can improve both the diet and protein digestion (Piao*et al*., 1999), sincepro-biotic in gastro intestinal tract were decreased the gastro of goblet cell (Bradly *et al*., 1994). The decrease of goblet cells caused limited quantities of mucus production, however, increased nutrient absorption. According to Basyir (1999), the production of mucus by goblet cells in broilers digestive tract can pursue the process of nutrition absorb. Result of this research is supported by Madrigal *et al*. (1993) that efficiency of diet used on broilers increased by yeast addition (50-200 g/ton diet).

Chen *et al*. (2005) reported that dietary supplementation of complex pro-biotic can increase body weight gain and decreased fecal NH_3-N concentration, and slightly improved digestibility of nutrients. Fermented feed product to diets caused numerical increases in body weight gain. Consistency result within previous study indicated that supplementation of yeast in diets has positive effect on animal performance (Bidura *et al*., 2008). This case could be attributed to positive effects of fermented feed product on phytates and protein.

Diet high fiber resulted in a lowered rate of lipogenesis and tended to increase utilization capacity of acetyl-CoA in pigs (Zhu *et al*., 2003). Non starch polysaccharide (NSP) is the carbohydrate components of dietary fiber and predominant substrates for anaerobic fermentation. Non starch polysaccharide can be broken down by microflora permanently colonizing gastrointestinal tract and their breakdown in all non ruminants, mainly occurs in the hindgut by microbial fermentation (Wang *et al*., 2003). Ragi which contains *Saccharomyces cereviseae* can improve crude fiber digestibility on the ceca of birds to be volatile fatty acid (acetate, propionate, and butyrate) (Wallace and New bold, 1993). Piao *et al*. (1999) reported that 0.10% yeast (*Saccharomyces cereviseae)* in diets increased body weight gains, feed efficiency, and absorption of nutrient in broiler, and decreased N and P excretion in manure. Park *et al*. (1994) suggested that body weight gain and feed efficiency significantly improved by the addition of 0.10% yeast culture in diets of broiler. The use of 15%pollard in broiler's diet (2-6 weeks of age) increased feed consumption and decreased feed efficiency. 0.20% yeast supplementation as pro-biotic source in diet containing 15% pollard could improve performance of broilers and decreased concentration of ammonia-N in excreta of broiler.

CONCLUSION

It can be concluded that performance of broiler (2-6 weeks of age) increased by supplementation of 0, 20% yeast and 15% pollard but decrease concentration of ammonia-N in excreta.

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