International Journal of Research Studies in Biosciences (IJRSB)
Volume 2, Issue 8, Spetember2014, PP 6-16
ISSN 2349-0357 (Print) & ISSN 2349-0365 (Online)
www.arcjournals.org

Implementation of *Saccharomyces Spp.S-7* Isolate (Isolated From Manure of Bali Cattle) as A Probiotics Agent in Diets on Performance, Blood Serum Cholesterol, and Ammonia-N Concentration of Broiler Excreta

Desak Putu Mas Ari Candrawati, D. A. Warmadewi, Dan I.G.N.G. Bidura

Faculty of Animal Science,
Udayana University, Denpasar-Bali, Indonesia
Jl. PB. Soedirman, Denpasar-Bali
dsk_candrawati@yahoo.co.id

Abstract: *The study was carried out to study the effect of supplementation of Saccharomyces spp.S-7 isolate (isolated from manure of Bali cattle) in basal diets on performance, breast meta, abdominal-fat, blood serum cholesterol, and concentration N-NH_3 of broiler excreta. One hundried twenty of male broiler aged two of weeks was assigned to four treatments in a completely randomized design. Each treatment has six replications with five birds per replication. All of the birds were fed experimental diets for four weeks. The treatments were (i) diets without supplemented of Saccharomyces spp.S-7 isolate culture as control; (ii) supplemented of 0.20% Saccharomyces spp.S-7 isolate in diets; (iii) supplemented of 0.40% Saccharomyces spp.S-7 isolate in diets; and (iv) supplemented of 0.60% Saccharomyces spp.S-7 isolate in diets, respectively. The study showed that supplementation of Saccharomyces spp.S-7 isolate culture in diets (treatment B, C, and D) could improve significant differences (P<0.05) on performance of broiler. Carcass percentage and breast meat of birds treatment B, C, and D were increased significantly different (P<0,05) than control (treatment A). Supplementation of Saccharomyces spp.S-7 isolate culture in diets were increased significantly different (P<0,05) on dry matter (DM), organic matter (OM), crude protein (CP), and crude fibre (CF) digestability than control (unsupplemented). On the other hand were decreased significantly different (P<0,05) on abdominal fat, blood serum cholesterol contents, and concentration of N-NH_3 on excreta of broiler. It was concluded that supplementation of Saccharomyces spp.S-7 culture (isolated from manure of Bali cattle samples), were increased live weight gains, carcass percentages, breast meat, and feed efficiencies of of broiler up to six weeks old. On the other hand were decreased abdominal fat, blood serum cholesterol contents, and concentration N-NH_3 of broiler excreta.*

Keywords: *Saccharomyces spp., probiotics, crude fiber, digestibility, ammonia, broiler*

1. INTRODUCTION

Meat demand in Indonesia continues to increase along with the increasing number of population. Currently, the consumption of animal protein in Indonesia reached 5.45 g/capita/day. This figure is below the standard recommended by the Food and Agriculture Organization (FAO), which is about 6 g/capita/day (Sutawi, 2011). This of course is a challenge in the livestock sub-sector provision of animal protein for the Indonesian people.

In livestock farming, should consider the aspect of efficiency. Efficiency will be achieved to the maximum when feeding carefully in accordance with the rules of the science of nutrition. The feed must meet the standards of adequate and balanced nutrition. Generally poultry feed derived from agro-industrial waste products of agriculture and most fundamental is used in the preparation of poultry rations is rice bran. Factors limiting their use in poultry rations is the high content of phytic acid, tannin, and fiber roughness, so that poultry can not digest the compounds (Bidura et al., 2010).

Cellulose fraction is the largest component as a constituent of plant cell walls, which is about 40-50%, is one of the crude fiber fraction of plants that are very difficult/can not be digested by the digestive enzymes of animals. In order to be used, the cellulose must first be broken down into simpler compounds. This degradation involves complex cellulase enzymes produced by microbes

(Wainwright, 2002). Cellulose can only be degraded by two main enzymes released by yeast, namely endo-beta-glucanase and beta-glucosidase. According Orpin and Joblin (1988), most of the polysakarida is fermented by yeast in the rumen and nearly 50% cellulose and hemicellulose components of plant digested by yeast, while bacteria *Ruminococcus albus* only 8%.

Efforts to increase of rice bran value can be done by utilizing of microbes, which utilize the ability of the yeast *S. cereviseae* contained in manure of cattle. *Saccharomyces cereviseae* as a probiotic agent can improve fibrous digestibility in poultry (Ahmad, 2005; Bidura, 2012). Supplementation of *Saccharomyces cerevisieae* (yeast) in the diet significantly increased the growth and feed efficiency (Park et al., 1994; Kompiang, 2002; Bidura et al., 2012).

Fermentation feed products can improve growth and carcass quality, but decreasing blood serum cholesterol of duck (Bidura et al., 2008). Other properties of the fermented product is able to suppress the activity of the enzyme 3-hydroxy-3-methylglutaryl Co-A reductase which serves for the synthesis of cholesterol in the liver (Tanaka et al., 1992). According Harmayani (2004), a bacterium that can grow and assimilate cholesterol in the small intestine has the potential as a controller of the host blood serum cholesterol levels. Probiotic bacteria, can assimilate cholesterol from the small intestine during growth. The ability of cholesterol assimilation by the probiotic bacteria varies between strains and requires anaerobic conditions and the presence of bile acids.

Preliminary research conducted by Bidura et al. (2009) showed that the use of yeast culture as an inoculant fermentation of pollard may increase the digestibility of protein and crude fiber in ducks. If the fermented pollard given to ducks, can significantly improve body weight gains and feed efficiency. It was also reported by Bidura (2007) that the use of fermentation products in the ration can significantly improve the quantity and quality of the carcass, as well as lowering the amount of abdominal fat and the blood serum cholesterol of poultry. The same thing was reported by Suciani et al. (2011), that the addition of 0.20% yeast in the ration with cocoa pod based can significantly decrease the amount of abdominal fat and meat cholesterol content of broiler.

Piao *et al*. (l999) reported that used of 0,10% *yeast* (*Saccharomyces cereviseae*) in diets were increased body weight gains, feed efficiency, and absorption of nutrient in broiler, and were decreased N and P excretion in manure. Park *et al*. (l994) showed supplementation of yeast in diets could reduce animal wastes. Chen et al. (2005) reported that dietary supplementation of complex probiotic increased the live weight gains and decreased fecal NH3-N concentration, slightly improved digestibility of nutrients, however, blood characteristics and fecal VFA concentrations were not effected.

The objective of this study was to investigate the effects of implementation of *Saccharomyces spp.S-7* isolate (isolated from manure of beef cattle) in diets on performance, blood serum cholesterol contents, and fecal NH3-N concentration of broiler.

2. MATERIAL AND METHODS

2.1. Materials and Research Proposition

The material used is *Saccharomyces spp.S-7* isolates obtained from cattle feces. Selection and test the ability of probiotic agents and CMC-ase activity carried out in the Lab. Livestock Products Technology, Faculty of Animal Husbandry, and Lab. Biosciences, University of Udayana, Denpasar (Candrawati et al., 2014). Chemicals used in this study are: bacterio logical solution peptone 0.1%, OMEA (oxytetracycline extrax Malt Agar), distilled water, nutrient broth, NaOH, H2SO4, glucose, glycerol, NaDC, and alcohol.

2.2. Rations

Ration used in this study was calculated based on nutrient composition according to Scott et al. (l982), using materials, such as yellow corn, fish meal, coconut meal, rice bran, pollard, soybean meal, and NaCl (Table 1). All treatments arranged isocalory (ME: 2900 kcal/kg) and isoprotein (CP: 20%).

Table 1. *Formula and Chemical Composition of Treatment Diets of Growing broiler up to Six Weeks Old*

Ingredients (%)	Level of *Saccharomyces spp*.S-7 isolate in diets (%)			
	0.0	0.20	0.40	0.60
Yellow corn	53.20	53.40	53.20	53.20
Pollard	10.40	10.40	10.40	10.40
Rice bran	8.20	7.30	7.70	7.70
Coconut meal	3.00	3.50	2.80	2.80
Soybean meal	10.10	10.10	10.30	10.40
Fish meal	14.5	14.5	14.60	14.60
Palm oil	0.10	0.10	0.10	0.10
NaCl	0.50	0.50	0.50	0.50
***Saccharomyces spp*.S-7**	***0.00***	***0.2***	***0.4***	***0.6***
Total	100	100	100	100
Chemical composition [1]:				
Dry matter (%)[2]	92.67	92.68	92.47	92.53
Gross energy (kkal/kg) [2]	3859	3898	3889	3929
Metabolizable energy (kkal/kg)	2902	2901	2900	2900
Crude protein (%)[2]	19.07	19.98	20.18	20.25
Crude Fiber (%)[2]	5.07	5.11	5.24	5.18
Eter Extract (%)	6.83	6.73	6.81	6.82
Calsium (%)	1.18	1.18	1.19	1.19
P-available (%)	0.70	0.70	0.70	0.70
Lysine (%)	1.43	1.42	1.43	1.43
Methyonine (%)	0.46	0.46	0.46	0.46
Tryptophan (%)	0.24	0.24	0.24	0.24

Note:

1. Based on calculation according to Scott *et al.* (l982)
2. Based on the results of laboratory analysis

2.3. Experimental Design and Diets

One hundried twenty of male broiler aged two of weeks was assigned to four treatments in a completely randomized design. Each treatment has six replications with five birds per replicates (cage). All of the birds were fed experimental diets for four weeks. A corn-soybean meal based commercial diet (Table 1), was used for the control treatment (A). The four treatments were: basal diet without supplementation of cultures of *Saccharomyces spp*.S-7 as a control (A); The basal diet supplemented of 0.20% *Saccharomyces spp.S-7* isolate (B); The basal diet supplemented of 0.40% *Saccharomyces spp.S-7* isolate (C); and the basal diet supplemented of 0.60% *Saccharomyces spp.S-7* isolate (D), respectively.

2.4. The Yeast Saccharomyces Culture Isolates spp.S-7

Culturing yeast *Saccharomyces spp.S-7* on media onggok follow Muktiani (2002) method. Onggok (cassava powder waste) medium that will be used initially in the steam/steamed. Take isolates that have been cultured in a nutrient broth solution that had been stored for 24 hours, then centrifuged and the sediment grab, then add as much as 4 cc of distilled water and added to the media into Onggok. Fermentation is carried out for 2 days. After 2 days of *Saccharomyces spp* has been grown on the Onggok medium. Dry in the oven at a low temperature, after dry milled until mash form. Culture isolates *Saccharomyces spp* ready for use.

2.5. Body Composition

At the end of the experiment (42 days of age) 12 broiler from each treatment were selected and slaughtered for determination of body composition. The leg and breast meats were separated from the carcass. The parts of the body fat is: fat pad (separated from the organs of the abdominal viscera to the skin), mecenteric fat (linkage separated from the intestine), vernticulus fat, and abdominal fat (a combination of fat pad, ventriculus fat and mecenteric fat).

2.6. Retention and Excretion of Nutrients

In order to determine the nutrient digestibility and metabolizable energy (ME) value of the ration, six weeks old of broiler were used in this study. All the birds were deprived of feed for 24 h to ensure that their alimentary canals were empty from feed residues. Stainless steel funnel with 40 cm stem was used in *force feeding technique* (Mustafa *et al*., 2004). The amount of feed used was 50 g based on preliminary assays. The birds were kept over excreta collection trays and their housing time was recorded. Excreta voided from 0 to 24 h and from 24 to 48 h (which represent metabolic plus endogenus excretion) after housing were collected quantitatively. Water was available *ad libitum* during the experimental period. Excreta were collected for two hours. Other substances (such as feathers, scurf, etc.) in the collected excreta were removed before drying at 60^0C for 48 hours and subsequent grinding. Feed and feces were analyzed by AOAC (l994) procedures for proximate components. The retention of nutrients was calculated by dividing the amount of retained nutrient (ingested nutrient minus excreted nutrient) by the amount of ingested. Gross Energy (GE) was measured with an adiabatic oxygen bomb calorimeter (Parr, USA), Crude Fibre (CF) was analysed according to Van Soest (1991).

The total excreta were collected in plastic trays. The excreta samples were frozen, allowed to equilibrium with the atmospheric moisture, weighed, and ground through one mm sieve. Samples of excreta and feed were subjected to appropriate analysis to determine DM, OM, CP, CF, and gross energy.

2.7. Measurements

Feed intake was determined by measuring feed residues on weekly basis since the beginning of the experiment. Feed conversion was calculated by dividing feed intake by body weight gains. Apparent metabolizable energy (AME) was calculated using the formula of Mustafa *et al*. (2004): AME = IE – FE, where IE = ingested energy and FE = fecal energy of the fed birds;

For analysis of total serum cholesterol, two ml of blood was taken from the *jugular vein* of each duckling and centrifuge at 3000 rpm for 20 minutes. Blood serum cholesterol analysis using the method of Lieberman-Burchad (Plummer, 1977), using 2 cc of blood taken at the chicken wings at the end of the study in each replicate (experimental units). Analysis using cholesterol sterols in chloroform solution was reacted with acetic anhydride concentrated sulfuric acid. In this test produced a color from bluish green to green, depending on the sample of cholesterol levels. The resulting solution contained in a spectrophotometer to obtain the optical density (DO). The results are then compared with the DO of the standard solution.

2.8. Concentration of N-NH3

The method used is the method of Phenolhypoclorite in Saransi et al. (2004). Gastrointestinal fluid sampling is done at the end of the study. Gastrointestinal fluid that is in the digestive tract in the cecum and colon removed, then filtered with satin triplicate into a test tube which had previously been spilled one drop of concentrated sulfuric acid. Samples were then taken to the laboratory for analysis of N-Ammonia content.

2.9. Statistical Analysis

All data were subjected to a one-way analysis of variance test (Steel and Torrie, 1989). Statistical significances among treatment means were determined by method of New Multiple Range Test of Duncan when the F value was significant at 5 % level.

3. RESULT

Table 2 showed that body weight gain, feed efficiency, breast meat, abdominal fat, blood serum cholesterol, and ammonia-N concentration of broiler excreta. Feed consumption was not affected by levels of *Saccharomyces spp.S-7* isolate supplementation in diets. Supplementation of 0.20-0.60% *Saccharomyces spp.S-7* isolate in diets were increased significantly different ($P<0.05$) than control (unsuplemented). Live weight gains of birds during the four weeks observation in treatment B, C, and D respectively were: 16.89%; 19.33%; and 17.87%, higher significantly different ($P<0.05$) than control.

Table 2. *Effect of supplementation of Saccharomyces spp.S-7 isolates (isolated from manure of Bali cattle) in diets on body weight gain, feed efficiency, Breast meat Abdominal Fat Blood serum cholesterol and ammonia-N concentration of broiler excreta*

Variables	Treatments [1)]				SEM[2)]
	A	B	C	D	
Feed konsumption (g/ekor)	2756.16[b]	2897.16[a]	2846.66[a]	2874.50[a]	21.21
Final body weight (g/ekor)	1905.00[c]	2170.16[b]	2208.00[a]	2184.66[ab]	9.58
Body weight gains (g/ekor)	1574.00[c]	1839.83[b]	1878.16[a]	1855.16[ab]	9.19
Feed conversion ratio (gains/feed)	1.75[a]	1.58[b]	1.52[d]	1.55[c]	0.001
Persentase berat Karkas (%)	75.19[c]	76.01[b]	76.62[a]	76.19[ab]	0.17
Breast meat (carcass wt%)	24.10[b]	27.53[a]	27.79[a]	27.61[a]	0.20
Abdominal Fat (% body weight)	1.88[a]	1.61[bc]	1.53[c]	1.63[b]	0.03
Blood serum cholesterol (mg/dl)	170.67[a]	144.17[b]	143.83[b]	147.00[b]	6.62
Ammonia (N-NH_3) (m.Mol/l)	60.48[a]	54.961[b]	53.71[c]	54.14[c]	0.21

Note:

1. *A (diets without supplemented of Saccharomyces spp.S-7 isolates); B(diets containing 0.20% Saccharomyces spp.S-7 isolates); C (diets containing 0.40% Saccharomyces spp.S-7 isolates); and D (diets containing 0.20% Saccharomyces spp.S-7 isolates); resvectively*
2. *Standart error of the treatment means*
3. *Means with different superscripts within raws are significantly different (P<0.05)*

The mean value of FCR (gains/feed) chickens for 4 weeks observation in treatment B, C, and D are, respectively: 9.72%; 13.15%; and 11.43% significantly (P<0.05) lower than the value of its FCR chickens who receive treatment A. Feed conversion ratio in 0.40% *Saccharomyces spp.S-7* isolate group are lower than other groups.

Chicken carcass weight percentage that received treatment B, C, and D are, respectively: 1.09%; 1.91%; and 1.33% significantly different (P<0.05) higher than the chickens who got treatment A. Abdominal fat of chicken in treatment B, C, and D, respectively were decreased significantly different (P<0.05) than in treatment A. The blood serum cholesterol content of birds received treatment B, C, and D were 15.53%; 15.73%; and 13.87% significantly different (P<0.05), resvectively than birds treatment A.

Excreta ammonia content in chickens treated A was 60.48 mMol / liter, while the ammonia content of chicken excreta gets treatment B, C, and D, respectively: 9:13%; 11:19%; and 10:49% significantly (P <0.05) lower than in chickens treated chickens treated A. C and D, respectively: 2:27% and 1:50% significantly (P <0.05) lower than that of chicken treated B.

Table 3 shows the nutrient digestibility and metabolizable energy of diets in *Saccharomyces spp.S-7* isolates supplemented were increased significantly (P<0,05) different rather than unsupplemented (control diets). Dry matter digestibility in chickens treatments B, C, and D were: 1.94%; 2.94%; and 2.29%, respectively significantly (P<0.05) higher than treatment A. Organic matter digestibility in chickens that received treatment B, C, and D, respectively: 1.75%; 2.28%; and 1.05% significantly (P<0.05) higher than of chicken treated A. The digestibility of crude protein in chickens control was 76.17%, while in chickens treated B, C, and D, respectively: 2.58%; 3.59%; and 2.77% were higher significantly different (P<0.05) than the chickens treatment A. Metabolizable energy content of the ration in in chickens treated B, C, and D, respectively 5.17%; 5.81%; 5.28% were higher significantly different (P <0.05) than that of chicken treated A.

Nutrient digestibility and metabolizable energy of diets (uneupplemented compared then supplemented) were shown in Table 3 as below:

Table 3. *The effect of Saccharomyces spp.S-7 isolate supplemented in diets on nutrient digestibility and metabolizable energy of Broiler*

Variables	Treatments[1)]				SEM[2)]
	A	B	C	D	
Dry matter digestibility (%)	75.55[c3)]	77.02[b]	77.77[a]	77.28[ab]	0.21
Organic matter digestibility (%)	77.39[c]	78.74[a]	79.15[a]	78.20[b]	0.17
Crude protein digestibility (%)	76.17[a]	78.14[b]	78.91[b]	78.28[b]	0.27
Crude fibre digestibility (%)	53.90[b]	57.97[a]	58.09[a]	57.83[a]	0.15
Metabolizable energy (kcal/kg)	3024.61[b]	3180.93[a]	3200.44[a]	3184.22[a]	7.47

Note:

1. *A (diets without supplemented of Saccharomyces spp.S-7 isolates); B(diets containing 0.20% Saccharomyces spp.S-7 isolates); C (diets containing 0.40% Saccharomyces spp.S-7 isolates); and D (diets containing 0.20% Saccharomyces spp.S-7 isolates); resvectively*
2. *Standart error of the treatment means*
3. *Means with different superscripts within raws are significantly different (P<0.05)*

4. DISCUSSION

The results showed that supplementation both of 0.20 to 0.60% isolates culture of *Saccharomyces spp.S-7* were isolated from the manure of cattle in the diet can significantly improve performance of chicken (final weight, weight gain, and feed efficiencies). The yeast of *Saccharomyces spp*.S-7 which have been tested as probiotic agents and degrading crude fiber (Candrawati et al., 2014) in the digestive tract can improve feed digestibility. As reported by Piao et al. (l999), that probiotic supplementation in the diet can significantly improve live weight gain, nutrient utilization, and digestibility of nitrogen and phosphorus. Also reported by Stanley et al. (l993), broilers fed 0.10% *Saccharomyces cerevisiae* can significantly improve live weight gain and feed efficiencies. In addition, yeast in the diet can increase the secretion of mucin. Mucin is a substance which is very important for habitat and a source of food for beneficial microbes in the digestive tract of chicken (Savage, 1991). Feeding containing probiotics can improve metabolism on the digestive tract (Nurhayati, 2008). According to Chesson (1994), response of probiotic effect will be different on the birds, and it is strongly influenced by the strain of bacteria used as probiotics, dose or level of administration, the composition of the ration, feeding system, the form of rations, and interactions with the other feed additives.

Han et al. (1999) suggest that the supplementation of *Aspergillus oryzae* and *S.cerevisiae* in the basal ration at the level of 0.15% and 0.30% can increase the activity of amylolytic and proteolytic enzymes in the digestive tract of chicken, so as to increase protein digestibility and metabolizable energy. The increase of protein digestibility and metabolizable energy will result in increased feed efficiencies and improve the growth of chicken. Wu et al. (2005) and Huang et al. (2004) reported that supplementation of *Aspergillus xlanase* in wheat bran-based diet can improve the performance of broiler chickens. It was also reported by Mulyono et al. (2009) that the addition of 1.0% *S.cerevisiae* (9×10^9 cfu) were isolation from baker's yeast in basal ration of broiler significantly increased the digestibility of dry matter, protein digestibility and protein efficiency ratio. Monogastric animals can not make use of phytin phosphorus due to lacking of phytase enzyme in their digestive systems and consequently phytin-posphorus is mostly excreted in the faeces. Therefore, it is susgested that phytase enzyme can be used in order to alleviate the negative effect of phytic acid (Chesson, 1994). Phytase addition has been shown to increase Ca availability.

Saccharomyces spp.S-7 isolates supllementation to the rations coused numerical increases in the live weight gains, carcass percentage, and percentage of breast meat of the chicken carcass. This coused the presence of probiotic microbes in the digestive tract of chicken will be able to increase the activity of enzymes, absorption of nutrients, and improve retention of protein and energy in the body of the chicken. As reported by Yi et al. (l996), that supplementation of probiotic microbes in the ration can significantly increase nitrogen retention in broiler chickens, the fermentation process will break down proteins into amino acids and carbohydrates, nitrogen, and carbon dissolved required for body protein synthesis (Rahayu et al., 1989). Tang et al. (2007) suggested that the increased of protein and lysine consumption in broiler chickens caused an

increase in the amount of breast meat compared with protein and lysine consumption were lower. High protein can increase meat carcass component. The same thing was reported by Al-Batshan and Hussein (1999) that increased of protein consumption will increase carcass weight, carcass percentage, and percentage of breast meat.

Supplementation of 0.20 to 0.60% *Saccharomyces spp*.S-7 isolates culture were decreased abdominal fat and blood serum cholesterol. According Piliang et al. (l990), the yeast *Saccharomyces sp* as the source of probiotics in the diet can increase the amount of lactic acid bacteria (LAB) which will affect the amount of fat digestion and absorption in the gastrointestinal tract of poultry. Lactic acid bacteria in the digestive tract of poultry can able to utilize the energy derived from carbohydrate sources to lower the pH of the digestive tract to 4.5 to become acidic. Environment (acidic) caused lipase activity is limited, so the reduced fat digestion and subsequent formation of body fat deposition. This result is supported by Nurhayati (2008) that the use of a mixed fermented feed by *A.niger* at the level of 10-30% significantly reduced abdominal fat. Min (2006) reported that feeding fermented significantly reduced abdominal fat in pigs. Supplementation of *Saccharomyces spp* in the diet significantly reduced blood serum cholesterol of duck (Bidura, 2012).

Ammonia gas concentration of 0.003% in the air, can lead to blood pH rises, reabsorption by the lungs, decreased oxidation ability, suppress both respiration and blood circulation, and breathing apparatus (Arifien, l998). One way to reduce levels of fecal ammonia gas is by pressing the degradation of urea, which is the separating the urine and feces, or can be done by using a urease inhibitor. Suplementation of 0.20 to 0.60% yeast *Saccharomyces spp.S-7*isolates (isolated from the manure of Bali cattle) in the ration can significantly reduced of $N\text{-}NH_3$ concentration in excreta. Yeo and Kim (l997), reported probiotics (*Lactobacillus cassei*) can suppress the activity of the urease enzyme in the small intestine, so that the levels of organic gases in the excreta decreased. According to Chiang and Hsieh (l995), probiotics can improve the digestibility of feed protein and can lower the amount of uric acid. Uric acid is introduced into anorganic protein so that its presence in the excreta decreased. Piao et al. (l999) reporetd that used of 0.10% *Saccharomyces serevisiae* in the diet can significantly decrease the amount of nitrogen and excreted in the feces of chicken. Probiotics microbial in poultry was reported capable of suppressing the activity of the urease enzyme and may reduce the amount of uric acid in the digestive tract of chicken, because uric acid has been utilized as microbial proteins (Chiang and Hsieh, l995). Chen et al. (2005) and Bidura (2012), reported that probiotic supplementation in the ration significantly improve body weight gains and decreased of $N\text{-}NH_3$ concentration in feces. Santoso et al. (2001) reported that the use of fermented food products (*Bacillus subtili*) in chicken rations, can significantly decrease the release of ammonia gas, while the secretion of total N, N-uric, and the N-ammonia in the feces did not show any significant difference.

Results of experiments to determine the digestibility of the ration showed that the digestibility of DM, OM, CP, and CF, using a ration supplemented with yeast culture *Saccharomyces spp.S-7* isolate were increased compared with the control diet (Table 3). The increase of nutrient digestibilities was due to yeast can produce amylase and protease enzymes, so its presence in the digestive tract of chicken will increase the activity of this enzyme, and also increase the breakdown of food substances into simpler form and is easily absorbed by the digestive tract (Mulyono et al., 2009).

Jaelani et al. (2008) reported that the fermentation of feed ingredients (palm kernel meal) with *Trichoderma reesei* can increase metabolizable energy and crude protein feed ingredients. Extracellular peroxidase enzymes work actively on lignolisis activity, thus breaking the bond lignocellulose and lignin fraction decomposes into CO_2. Biofermented process used of microbes can increase the nutrient content of feed (Arsyad et al., 2001; Bidura and Suastina, 2002). Hong et al. (2004) reported that fermentation of feed by *Aspergillus oryzae* significantly increased digestibility of dry matter and crude protein.

Crude protein and crude fiber digestibility and metabolizable energy of feed significantly increased by yeast culture *Saccharomyces spp.S-7* supplemented. This indicates that the carbohydrate and crude fiber components used by yeast for growth (microbial protein) in the

digestive tract of chicken. Yi et al. (l996) reported that microbial supplementation in the diet can improve N-retention in broilers and improve digestibility of proteins. It was also reported by Chen et al. (2005), that the addition of 0.20% probiotic complex (*L.acidophilus and S.cerivisae*) in the basal diet can improve dry matter digestibility of feed. The same thing was reported by Bidura et al. (2012) and Candrawati et al. (2014) that the fermentation of feed by using inoculant yeast (*Saccharomyces spp*) can improve the digestibility of dry matter, organic matter, crude protein, and crude fiber feed compared with unfermented feed.

Utama (2011), reported that the administration of the yeast *S. cerevisiae* in the diet can increase the digestibility of crude protein and fiber components, such as cellulose and hemicellulose. Bedford and Classen (1992), fungus is very effective in degrading complex compounds, such as β-glucans and arabinoxylans. Many studies indicate that the addition of probiotic cultures or enzymes in high feed NSP content can significantly reduce the viscosity of the digestive tract (intestinal viscosity), and increase energy and protein retention (Wang et al., 2004; Bidura et al., 2012; Yi et al ., l996; Chen et al., 2005).

5. CONCLUSION

It was concluded that supplementation of *Saccharomyces spp*.S-7 culture (isolated from manure of Bali cattle samples), were increased live weight gains, carcass percentages, breast meat, and feed efficiencies of of broiler up to six weeks old. On the other hand were decreased abdominal fat, blood serum cholesterol contents, and concentration $N\text{-}NH_3$ of broiler excreta.

ACKNOWLEDGEMENTS

The authors would like to thank the staffs of Biosience Laboratory of Udayana University for their help in chemical analyses of the samples. We gratefully acknowledged the Rector of Udayana University, Denpasar Bali and General Director of Education, Jakarta for funding this research.

REFERENCES

Ahmad, R. Z 2005. Pemanfaatan Khamir Saccharomyces cerevisiae untuk Ternak (Yeast Saccharomyces cerevisiae Utilization for Livestock). Wartazoa Vol. 15 (1): 49-55

Al-Batshan, H. A. and E. O. S. Hussein. 1999. Performance and Carcass Composition of Broiler Under Heat Stress: 1. The Effects of Dietary Energy and Protein. Asian-Aust. J. of Anim. Sci. 12 (6): 914-922

Arifien, M. 1998. Mengurangi Gas yang Merugikan di Kandang. Poultry Indonesia Edisi Desember l998, No: 224, Hal: 32-33

Arsyad, M., H. Syam, dan R. Islamiyati. 2001. Kandungan Kalsium dan Fosfor Buah Kakao yang Difermentasi dengan EM-4 pada Berbagai Lama Penyimpanan. Buletin Nutrisi dan Makanan Ternak, Fapet Unhas 2 (1): 1-10.

Assocciation of Official Analytical Chemists (l994). Official Methods of Analysis. 15th Edition. Associoation of Analytical Chemists, Arlington, Virginia pp. 1230

Barrow, P. A. 1992. Probiotics of Chickens, in : Probiotic The Scientific Basis. Ed., R. Fuller. 1st Ed., Champmann and Hall, London: 225-250

Bedford, M. R. and H. L. Classen. 1992. Reduction Intestinal Viscosity Through Manipulation of Dietary Rye and Pentosanase Concentration is Effected Through Changes in The Carbohydrate Composition of The Intestinal Equous Phase and Result in Improved Wheats and Food Conversion Efficiency of Broiler Chicks. J. Nutr. 122: 560-569

Bidura, I.G.N.G. 2007. Aplikasi Produk Bioteknologi Pakan Ternak (Applications of Biotechnology Products Feed). Udayana University Press, Unud., Denpasar

Bidura, I.G.N.G. 2012. Pemanfaatan Khamir Saccharomyces cerevisiae yang Diisolasi dari Ragi Tape untuk Tingkatkan Nilai Nutrisi Dedak Padi dan Penampilan Itik Bali Jantan. Disertasi, Program Doktor Program Pascasarjana, Universitas Udayana, Denpasar

Bidura, I.G.N.G. dan I.G.P.B. Suastina. 2002. Pengaruh Suplementasi ragi tape dalam Ransum terhadap Efisiensi Penggunaan Ransum (Effect of yeast supplementation in Rations on feed Efficiency). Majalah Ilmiah Peternakan 5 (1): 06 – 11.

Bidura, I.G.N.G., D. P. M. A. Candrawati, dan D. A. Warmadewi. 2010. Pakan Unggas, Konvensional dan Inkonvensional (Poultry Feed, Conventional and Unconventional). Udayana University Press, Unud., Denpasar

Bidura I.G.N.G., N. L. G. Sumardani, T. I. Putri, and I. B. Gaga Partama. 2008. The effect of fermented diets on body weight gains, carcass and abdominal fat in bali ducks. J. Indon. Trop. Agric. Vol 33 (4): 274 – 281

Bidura, I.G.N.G., D. A. Warmadewi, D.P.M.A. Candrawati, I.G.A. Istri Aryani, I.A. Putri Utami, I.B. Gaga Partama, and D.A. Astuti. 2009. The Effect of Ragi tape fermentation products in diets on nutrients digestibility and growth performance of Bali drake. Proceeding. The 1st International Seminar on Animal Industry 2009. Sustainable Animal Production for Food Security and Safety. 23-24 November 2009. Faculty of Animal Science, Bogor Agricultural University. Pp:180-187

Bidura, I.G.N.G., IG. Mahardika, IP. Suyadnya, IBG. Partama, IGL. Oka, and I.A.S. Aryani. 2012. The implementation of Saccharomyces spp.n-2 isolate culture (isolation from traditional yeast culture) for improving feed quality and performance of male Bali ducking. Agricultural Science Research Journal. ISSN-L: 2026-6073 September: Vol. 2 (9): 486-492

Candrawati, D.P.M.A., D.A. Warmadewi, and I.G.N.G. Bidura. 2014. Isolation of Saccharomyces Spp from Manure of Beef Bali Cattle as a Probiotics Properties and has CMC-ase Activity to Improve Nurient Quality of Rice Bran. Journal of Biological and Chemical Research Vol. 31 (1): 39-52

Chen, Y. H., H. K. Hsu, and J. C. Hsu. 2002. Studies on the fine structure of caeca in domestic geese. AJAS 15 (7): 1018-1021

Chesson, A. 1994. Feed Enzymes. Anim. Feed Sci. Technol. 45: 65-79

Chiang, S. H., and W. M. Hsieh. 1995. Effect of Direct-Fed Microorganisms on Broiler Growth Performance and Litter Ammonia Level. Asian-Aust. J. Anim. Sci. Vol 8 (2): 159-162

Han, I. K., J. H. Lee, X. S. Piao, and D. Li. 1999. Feeding and management system to reduce environmental pollution in swine production. Asian-Aust. J. Anim. Sci. 14 : 432-444

Harmayani, E. 2004 The role of probiotics to reduce cholesterol. Papers of the National Seminar on "Probiotics and Prebiotics as Functional Foods", dated August 30, 2004, Cooperation Center for Food Safety study, Lemlit Unud the Indonesian Society for Lactic Acid Bacteria (ISLAB), Bukit Jimbaran Campus, Univ. Udayana, Denpasar.

Hong, K. J., C. H. Lee, and S. W.Kim. 2004. Aspergillus oryzae GB-107 fermentation improves nutritional quality of food soybeans and feed soybean meal. J. Med. Food. 7: 430

Huang, M. K., Y. J. Choi, R. Houde, J. W. Lee, B. Lee, and X. Zhao. 2004. Effect of Lactobacilli and Acidophilic Fungus On The Production Performance and Immune Responses In Broiler Chickens. Poult. Sci. 88: 788-795

Jaelani, A., W.G. Piliang, Suryahadi, and I. Rahayu. 2008. Hydrolysis of palm kernel cake (Elaeis guineensis Jacq) by fungus Trichoderma reesei mannan degrading polysaccharides. Animal Production Vol. 10 (1): 42-49

Kompiang, I. P. 2002. Pengaruh ragi Saccaromyces cerevisiae dan ragi laut sebagai pakan imbuhan probiotik terhadap kinerja unggas. JITV. 7 (1): 18-21

Min, B. J. 2006. Nutritional Value of Fermented Soy Protein (FSP) and Effect of FSP on Performance and Mea Quality of Pigs. (Ph.D. Thesis). Seoul, Korea: Department Of Animal Resourches and Science.

Muktiani, A. 2002. Penggunaan Hidrosilat Bulu Ayam dan Shorgum serta Suplemen Kromium Organik untuk Meningkatkan produksi Susu pada sapi perah (The use of chicken feathers and Shorgum Hidrosilat and Chromium Supplements to Improve Organic milk production in dairy cows). Disertasi, Program Pascasarjana IPB, Bogor.

Mulyono, R. Murwani, dan F. Wahyono. 2009. Kajian Penggunaan Probiotik Saccharomyces Cereviseae sebagai Alternatif Aditif Antibiotik terhadap Kegunaan Protein dan Energi pada Ayam Broiler. Journal of the Indonesian Tropical Animal Agriculture Vol.34 (2): 145-151

Mustafa, M.F., A. R. Alimon, M. W. Zahari, I. Idris, and M. hair Bejo. 2004. Nutrient Digestibility of Palm Kernel Cake for Muscovy Ducks. Asian-Aust. J. Anim. Sci. Vo. 17 (4):514-517

Nurhayati. 2008. Pengaruh Tingkat Penggunaan Campuran Bungkil Inti Sawit Dan Onggok yang Difermentasi dengan Aspergillus Niger dalam Pakan terhadap Bobot dan Bagian-Bagian Karkas Broiler. Animal Production Vol 10 (1): 55-59

Orpin, C. G. And K. N. Joblin. 1988. The Rumen Anaerobic fungi. In. The Rumen Micribial Ecosystem. Ed. P. N. Hobson. Elsevier Applied Science, London and New York. Pp. 129-149

Park, H. Y., I. K. Han and K. N. Heo. 1994. Effects of Supplementation of Single Cell Protein and Yeast Culture on Growth Performance in Broiler Chicks. Kor. J. Anim. Nutr. Feed 18 (5): 346-351

Piao, X. S., I. K. Han, J. H. Kim, W. T. Cho, Y. H. Kim, and C. Liang. 1999. Effects of Kemzyme, Phytase, and Yeast Supplementation on The Growth Performance and Pullution Reduction of Broiler Chicks. Asian-Aust. J. Anim. Sci. 12 (1): 36-41

Piliang, W. G. dan S. A. H. Djojosoebagio. 1990. Fisiologi Nutrisi. Volume I. Depdikbud, Dikti, PAU Ilmu Hayati. Bogor: Institut Pertanian Bogor, Hal. 213-234

Plummer, D. T. l977. An Introduction to Practical Biochemestry. McGraw-Hill Book Co., Ltd. New Delhi.

Rahayu, K., Kuswanto, dan S. Sudarmadji. 1989. Mikrobiologi Pangan. Pusat Antar Universitas Pangan Dan Gizi,. Yogyakarta: Universitas Gadjah Mada.

Santoso, U., K. Tanaka, S. Ohtani, and M. Sakaida. 2001. Effect Of Fermented Product From Bacillus Subtilis On Feed Conversion Efficiency, Lipid Accomulation And Ammonia Production In Broiler Chicks. Asian-Aust. J. Anim. Sci. 14 (3): 333-337

Saransi, AU, IM Mudita, T.I. Putri, DPMA Candrawati and I.G.N.G. Bidura. 2010. Practical Guidance Handbook. Lab. Nutrition, Faculty of Animal Husbandry, Udayana University, Denpasar

Savage, D. C. 1991. Modes of Action. Pages 11-81 In: Direct-Fed Microbials In Animal Production. A Review of Literature. West Des Moines, IA.: National Feed Ingradients Association

Scott, M.L., M.C. Neisheim and R.J. Young. l982. Nutrition of The Chickens. 2nd Ed. Publishing by : M.L. Scott and Assoc. Ithaca, New York.

Stanley, V. G., R. Ojo, S. Woldesenbet, D. Hutchinson and L.F. Kubena. 1993. The Use of Saccharomyces sereviseae to Supress the Effects of Aflatoxicosis in Broiler Chicks. Poult. Sci. 72 : 1867 - 1872

Steel, R.G.D. and J.H. Torrie. l989. Principles and Procedures of Statistics. 2nd Ed. McGraw-Hill International Book Co., London.

Suciani, K. W. Parimartha, N.L.G. Sumardani, I.G.N.G. Bidura, I.G.N. Elysian, and S. A. Lindawati. 2011. addition of multi-enzyme and yeast in the diet of high-fiber (cocoa pod) ration to lower meat cholesterol of broiler. Veterinary Journal, Journal of Veterinary Indonesia Vol. 12 (1): 69-76

Sudirman, I., 2004, Peranan bakteri asam laktat dalam kesehatan hewan dan peternakan, Pelatihan Mikrobiologi Dasar, Fakultas Kedokteran Hewan IPB, Tanggal 26 April – 7 Mei 2004.

Sutawi. 2011. Protein Hewani, Rokok dan Karakter Bangsa. Poultry Indonesia Vol. VI: 72-73

Tanaka, K., B. S. Youn, U. Santoso, S. Ohtani, and M. Sakaida. 1992. Effects of Fermented Feed Products From Chub Mackerel Extract on Growth and Carcass Composition, Hepatic Lipogenesis and on Contents of Various Lipid Fraction In The Liver And The Thigh Muscle of Broiler. Anim. Sci. Technol. 63: 32 – 37

Tang, M. Y., Q. G. Ma, X. D. Chen and C. Ji. 2007. Effects of Dietary Metabolizable Energy and Lysine on Carcass Characteristics and Meat Quality in Arbor Acres Broiler. AJAS Vol. 20 (12): 1865-1873

Utama, C. S. N. 2011. Potensi Probiotik Bekatul. Poultry Indonesia. Vol VI, September: 78-80

Van Soest, P. J. l991. Difinition of Fibre Animal, In. W. Haresign and D.J.A. Cole Ed. Recent Advences in Animal Nutrition. Butterworths. pp. 55-70.

Wainwright, M. 2002. An Introduction to Fungal Biotechnology. John Wiley & Sons Ltd. Baffins Lane, Chichester, West Sussex PO19 IUD, England.

Wu, Y., C. Lai, S. Qiao, L. Gong, W. Lu and D. Li. 2005. Properties of Aspergillus xylanase and the effects of xylanase supplementation in wheat-based diets on growth performance and the blood biochemical values in broiler. Asian-Aust. J. Anim. Sci. Vol 18 (1): 66-74

Yeo, J. and K. Kim. 1997. Effect of Feeding Diets Containing Antibiotics, A Probiotic or Yucca Extract on Growth and Intestinal Urease Activity In Broiler Chicks. Poult. Sci. 76: 381-385

Yi, Z., E. T. Kornegay and D. M. Denbow. 1996. Effect of microbial phytase on nitrogen and amino acid digestibility and nitrogen retention of turkey poults fed corn-soybean meal diets. Poultry Sci. 75: 979-990