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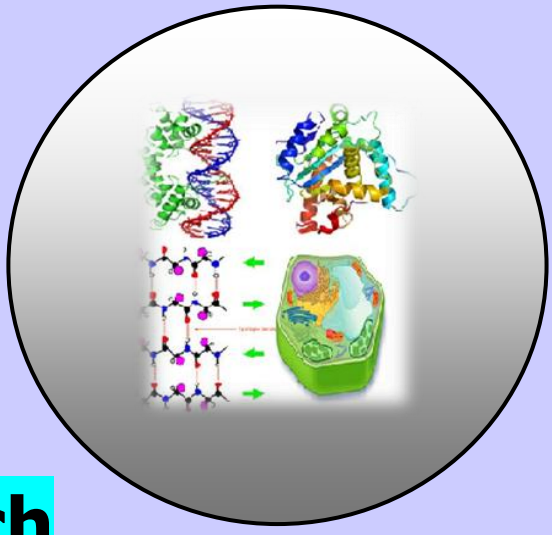
By

Ni Made Ristiani, I G.N.G. Bidura and Dewi Ayu Warmadewi

ISSN 2319-3077 Online/Electronic
ISSN 0970-4973 Print

Index Copernicus International Value
IC Value of Journal 46.52 Poland, Europe (2015)
Journal Impact Factor: 4.275
Global Impact factor of Journal: 0.876
Scientific Journals Impact Factor: 3.285
InfoBase Impact Factor: 3.66

J. Biol. Chem. Research
Volume 34 (1) 2017 Pages No. 80-88



Journal of Biological and Chemical Research

An International Peer Reviewed / Referred Journal of Life Sciences and Chemistry

Indexed, Abstracted and Cited in various International and National Scientific Databases

Published by Society for Advancement of Sciences®

J. Biol. Chem. Research. Vol. 34, No. 1: 80-88, 2017
(An International Peer Reviewed / Refereed Journal of Life Sciences and Chemistry)
Ms 34/1/34/2017

ISSN 0970-4973 (Print)
ISSN 2319-3077 (Online/Electronic)

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RESEARCH PAPER

Received: 13/02/2017 **Revised: 10/03/2017** **Accepted: 11/03/2017**

The Effect of *Saccharomyces spp.Gb-9 (*Isolated from Colon of Native Chicken) on the Growth Performance and Meat Cholesterol Level in Broilers

Ni Made Ristiani, I G.N.G. Bidura and Dewi Ayu Warmadewi
Master programs Animal Science Department, Faculty of Animal Science, Udayana University, Jalan PB Soedirman, Denpasar, Bali, Indonesia (80223)

ABSTRACT

The present study was conducted to determine the effects of Saccharomyces spp. Gb-9 supplemented in diets as a probiotics sources on the growth performance and meat cholesterol level of 2-week old broilers. One hundried eighty 2-wk-old broilers were colony caged in an environmentally controlled house to evaluate the effect of Saccharomyces spp.Gb-9 supplemented in diets as a probiotics sources administration on broilers. Broilers were randomly divided into three equal groups: one served as a control and was administered with diets only. Theother two groups were administered 0.20% Saccharomyces spp. Gb-9 or 0.40% Saccharomyces spp. Gb-9, respectively. The results howed that supplementation of 0.20-0.40% Saccharomyces spp.Gb-9 culture in basal diets were decreased seginificantly different (P<0.05) were improved feed intake, drinking water, final body weight, body weight gains, and feed efficiency compared with controls, and were decreased significantly (P<0.05) different both on meat cholesterol levels and abdominal fat compared to the control. It can be concluded that supplementation of 0.20-0.40% Saccharomyces spp.Gb-9 as a probiotics sources in diets were increase growth performance and decreased both meat cholesterol and abdominal fat of broiler
Key words: Probiotics, Saccharomyces spp., Performances, Cholesterol and Broiler.

INTRODUCTION

The consumers, nowdays mostly wish the low cholesterol and fat animal product becouse high cholesterol levels in such a product can couse the high rist of atherosclerosis. It is proved especially when consuming product having high in cholesterol such as meats. Meats are a delicate food product and lose quality rapidly during the period between collection and consumption. Thus, improving and extending meat shelf life is important to breeders

and other poultry researchers. Numerous efforts have been made to lower the cholesterol content of meats. Decreasing meat cholesterol would be beneficial to the poultry industry and public health (Mahmoud *et al*., 2010).

Generally, probiotics are derived from bacteria, fungus, and yeast. *Saccharomyces cerevisiae* is one of the well-known yeasts that has widely put in trade and, thus, given to livestock. Supplementation of yeasts on diet may improve the quality of diet and consequently livestock performances; feed efficiency is also improved (Bidura *et al*., 2012; Alimyameen, 2011). Furthermore, the beneficial effect of supplementation of probiotics has also been reported by Ghasemi *et al*. (2006), Mohiti *et al*. (2007), Yousefi and Karkoodi (2007), and Roni *et al*. (2014). On the other hand, some authors (such as Ayanwale *et al*., 2006) reported that yeasts supplementation on diet has no effect on the growth performances.

Probiotic can be considered as food ingredient consisting of live microbes that have beneficiary effect on health status. They may live and adhere to specific areas of the gastrointestinal tract and compete with the existing pathogens or harmful antigens (Mountzouris *et al.,* 2010; Dinkci *et al*., 2006). Putra *et al*. (2015) reported that addition of probiotic in diet are expected to increase the role of normal flora in the digestive tract of chicken which, in turn, may increase production of exogenous enzymes such as amylase, protease, and lipase, following which it may lead to an increase in activities of endogenous enzymes in hydrolyzing feed nutrients. Concerning feed conversion ratio, the present results found that there was no significant different among the experimental treatments on feed efficiency. Wibawa *et al*. (2014) who found that addition of 0.20% of *Saccharomyces spp*. in diets had no effect on feed intake and feed efficiency of layers and broilers. Other previous workers also reported such a non-significant effect of inclusion on the diet of probiotic on feed efficiency (Mutus *et al*., 2006; Wahyuni *et al*., 2008; Yousefi and Karkoodi, 2007; Chumpawadee *et al*., 2009). On the other hand, some studies showed that probiotic supplementation on feed led to improvement in feed conversion ratio of broilers as reported by Puspani *et al*. (2014) and Umiarti *et al*. (2014). The preliminary study on the use of probiotics in the ration was able improve the growth performance, digestibility, efficiency ration, and lowering the amount of abdominal fat and cholesterol body poultry (Bidura *et al*., 2012; Bidura *et al*.,2014; Bidura *et al*., 2016; Candrawati *et al*., 2014). The reasons for such varies effect of probiotic supplementation may be related to variations in gut flora and in environmental conditions (Mahdevi *et al*., 2005).

The present study was conducted to evaluate effect of *Saccharomyces spp. Gb-9* supplemented in diets as a probiotics sources on the growth performance, meat cholesterol and abdominal fat of broiler up to two weeks of age.

METERIAL AND METHODS

Animals and experimental design: A total number of 180 broiler *strain CP 707* at two weeks of age and with homogenous body weight of 348.42 ± 10.05 gram were randomly divided and caged in 18 separate pens with 10 birds in each pen were assigned to three treatments in a completely randomized design. Each treatment has six replications with ten birds per replication. All of the birds were fed experimental diets for four weeks. The treatments were (i) unsupplemented *Saccharomyces spp.Gb-9* in diets as a control (A); supplemented of 0.20% *Saccharomyces spp.Gb-9* in diets (B), and supplemented of 0.40% *Saccharomyces spp.Gb-9* in diets (C), respectively. Food and drinking liquid were given *ad libitum*.

The individual bird that has been treated was weighted weekly, while food consumption and drinking water was recorded daily.

Materials and Research Proposition: The material used is *Saccharomyces spp.Gb-9* selected from the colon of native chickens. The isolate has passed the test and has been considered as potential probiotic according to our previous study (Bidura *et al*., 2015).

Body Composition: At the end of the experiment (42 days of age) 30 birds 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 are: pad-fat (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).

Statistical analysis: All data were analyzed with analysis of variance (ANOVA) to determine the differences among treatments. If differences were found, then further analysis was performed withDuncan's multiple range test.

RESULTS

The results study shows that 0.20% and 0.40% *Saccharomyces spp.Gb-9* in diets significantly increased (P<0.05) the feed consumption and the body weight gains as well as the average feed conversion ratio. However, no significant differences (P>0.05) in the efficiency of feed consumption, water consumption, and egg weight per head (g/head) were noted among the treatments (Table 1). The average value of FCR (feed consumption : body weight gains) during the four weeks of observation in control group was 1.85/head (Table 1), and significantly different (P<0.05) from group of birds in treatments B and C, with the average of 13,09 % dan 11,57% lower than control, respectively. In addition, the results shows that additional of 0.20% and 0.40% *Saccharomyces spp.Gb-9* in diets resulted in a significant (P<0.05) decrease in abdominal fat and levels of cholesterol in the meat of birds.

Table 1. The effect of *Saccharomyces spp.*Gb-9 levels in basal diets and administered to 2-6 weeks aged of broilers to the growth performance and meat cholesterol level.

Variables	Treatments[1)]			SEM[2)]
	A	B	C	
Feed Consumption (g/head/4 weeks)	2.573,00[b]	2.630,00[a]	2.651,33[a]	18,46
Water consumption (ml/head/4 weeks)	6.432,51[b]	6.577,09[a]	6.628,34[a]	37,16
Final body weight (g/head/4 weeks)	1.895,75[b]	2.127,78[a]	2.141,62[a]	11,08
Body weight gains (g/ekor/4 weeks)	1.377,00[b]	1.614,56[a]	1.629,56[a]	11,99
Feed conversion ratio (feed consumption: body weight gains)	1,85[a]	1,61[b]	1,64[b]	0,01
Meat cholesterol (mg/dl)	74,88[a]	62,99[b]	63,26[b]	0,32
Abdominal fat (% body weight)	2,30[a]	2,15[b]	2,13[b]	0,03

Notes:

1. A: rations without *Saccharomyces spp.Gb-9* as control; (B): rations with 0.20% *Saccharomyces spp.Gb-9*; and (C): rations with 0.40% *Saccharomyces spp.Gb-9*, respectively.
2. SEM: Standard Error of Treatment Means
3. Means with different superscripts within raw values are significantly different (P<0.05).

The results showed that supplementation of 0.20 to 0.40% of *Saccharomyces spp.Gb-9* culture into diets significantly increased (P<0.05) the performance of birds (final body weight, live weight gains, and feed efficiency). The culture of *Saccharomyces spp.Gb-9* that have passed the test as well as the probiotic agent and has cellulolytic activity or having the activity of CMC-ase (Bidura *et al*., 2015) in the digestive tract of ducks. Probiotic supplementation in the diet can significantly improve weight gain, utilization of nutrients, as well as nitrogen and phosphorus digestibility (Piao *et al*., l999). The same thing was reported by Bidura *et al.* (2016) and Puspani *et al.* (2014) that the broilers were given probiotics can significantly improve weight gain and feed efficiency. Feeding containing probiotics can improve the metabolism of nutrients in the digestive process (Nurhayati, 2008; Bidura *et al.,* 2014 and 2015). Chen *et al*. (2005) reported that the addition of 0.20% probiotic complex (*L. acidophilus* and *S. cerivisae*) in the basal diet can markedly increase the digestibility of dry matter (Bidura *et al.,* 2012; Candrawati *et al*., 2014; Utama, 2011). Many studies indicate that the addition of the culture of probiotic or enzyme in high feed content NSP can significantly reduce the viscosity of the digestive tract (intestinal viscosity), increase energy and protein retention (Wang *et al*., 2004; Bidura *et al*., 2012; Chen *et al*., 2005).

Bidura *et al.* (2014) and Siti *et al*. (2014) suggest that supplementation of *S.cerevisiae* in the pollard at the level of 0.20% and 0.40% could increase the activity of amylolytic and proteolytic enzymes in the digestive tract of chicken, so as to improve metabolizabel energy and protein digestibility of the ration. Increased digestibility of protein and energy can have an impact on improving the feed conversion ratio and increasing the growth of broilers (Bidura *et al.,* 2016). The response of probiotics in poultry was different effect, and it is highly influenced by the strain of bacteria used as probiotics, dosage or level of administration, the composition of the ration, feeding system, the form of rations, and interactions with other feed additive (Mahfudz, 2006). Wu *et al.* (2005) and Huang *et al.* (2004) reported that *Aspergillus xylanase* supplementation in wheat bran-based diet can improve the performance of broiler chickens. Mulyono *et al.* (2009) that the addition of 1.0% *S.cerevisiae* (9 x 109 cfu) derived from baker's yeast in a basal ration of broiler chickens significantly increase the digestibility of dry matter, protein digestibility, and protein efficiency ratio.

Many studies indicate that the addition of the culture of probiotic or enzyme in high feed content NSP can significantly reduce the viscosity of the digestive tract (intestinal viscosity), increase energy and protein retention (Wang *et al*., 2004; Bidura *et al*., 2012; Chen *et al*., 2005).

That matter, which can cause improve weight gain and feed efficiency. Giving feed containing probiotics can stimulate the metabolism of poultry feed in the digestive process (Nurhayati, 2008). Probiotic microbes such as *Aspergillus oryzae* and *Saccharomyces cerevisiae* in the digestive tract of poultry at the level of 0.15% and 0.30% can increase the activity of amylolytic and proteolytic enzymes, thus increasing energy and digestibility of dietary protein termetabolis (Han *et al*., 1999). Fermentation of feed material (palm kernel meal) with *Trichoderma reesei* can improve metabolizabel energy and crude protein of feed. Extracellular peroxidase enzymes actively working on lygnolysis activity, thus breaking the bond lignocellulose and lignin fraction breaks down into CO2 (Jaelani *et al.,* 2008).

Supplementation *Saccharomyces spp.Gb-9* isolated from the colon of native chickens can produce the enzymes amylase and protease, that its presence in the digestive tract of chicken will increase the activity of this enzyme and the breakdown of nutrients into a form that is simple and easily absorbed by the digestive tract (Mulyono *et al.,* 2009). Supplementation *Saccharomyces spp.Gb-9* isolated from the colon of native chickens in the ration significantly reduced abdominal fat and meat cholesterol levels. This is caused by probiotics may contribute to the regulation of serum cholesterol concentrations were carried out by deconjugated bile acids (Ezema and Yeh, 2015). Cholesterol is a precursor to the formation of bile acids and bile acid excretion when deconjugated enhanced by probiotic supplementation, the precursor molecule then be required to restore the formation of bile acids. The results of this study are supported by Bidura *et al*. (2016); Park *et al*. (2008) and Sutarpa *et al.* (2011) reported that the use of probiotics in the diet can lower cholesterol levels in serum and chicken meat. Probiotic supplementation at a rate of 1.0 g/kg ration can be recommended for optimum egg production and to reduce the concentration of cholesterol in serum and egg (Ezema and Eze, 2015). Probiotic may contribute in the regulation of serum cholesterol concentrations conducted by deconjugated bile acids. As cholesterol is a precursor for bile acid formation and when deconjugated bile acids excretion is enhanced by probiotics supplementation, then more precursor molecules are needed for the recovery of bile acid formation (Ezema and Eze, 2015). Consequently, it may be expected that level of serum cholesterol decreases (Bidura *et al*., 2016; Park *et al*., 2008; Sutarpa *et al*., 2011). Ulker *et al*. (2010) reported that fungi have been recognized as microbe that may produces high concentration of lipase. It may hydrolyze the lipid content of diet. Sutarpa *et al*. (2011) reported that supplementation of probiotic in diet may significantly lowered levels of cholesterol in serum and in meat of native local chickens. Probiotic may contribute in the regulation of serum cholesterol concentrations conducted by deconjugated bile acids. As cholesterol is a precursor for bile acid formation and when deconjugated bile acids excretion is enhanced by probiotics supplementation, then more precursor molecules are needed for the recovery of bile acid formation (Ezema and Eze, 2015). Consequently, it may be expected that level of serum cholesterol decreases (Puspani *et al*., 2016; Park *et al*., 2008; Sutarpa *et al*., 2011). That co-precipitation with bile acids may be of importance in decreasing serum cholesterol concentrations (Klaver and Van Der Meer, 1993). Bidura *et al*. (2016) suggested, probiotic (*S.cerevisiae*) suplemented in diets of layers mash is rekomanded for optimum hen-day egg performance and minimum serum and egg cholesterol content.

CONCLUSION

We conclude that that 0.20-0.40% *Saccharomyces spp.Gb-9* on rations improved growth performance and may decrease abdominal fat and meat cholesterol contents of broiler up to two weeks of age.

ACKNOWLEDGEMENTS

The authors would like to thank to staff of laboratory attendants at the Nutrition Laboratory, Udayana University for their assistance in chemical analysis of the samples. We also would like to thank the Head of Magister Science Department and Rector of Udayana University for their support during this study including research funding.

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Corresponding author: I G.N.G. Bidura, Master programs Animal Science Department, Faculty of Animal Science, Udayana University, Jalan PB Soedirman, Denpasar, Bali, Indonesia (80223)
Email: bidura_unud@yahoo.com