PROTEIN UTILIZATION OF SPIRULINA IN RESPONSE TO PROTEIN EFFICIENCY RATIO IN LAYING HENS

by Widya Paramita

Submission date: 27-Nov-2019 12:06PM (UTC+0800)
Submission ID: 1222610531
File name: Bukti_C_39_Protein_Utilization_of_Spirulina_in.pdf (1.31M)
Word count: 1210
Character count: 6397

PROTEIN UTILIZATION OF SPIRULINA IN RESPONSE TO PROTEIN EFFICIENCY RATIO IN LAYING HENS

Widya Paramita Lokapirnasari
Department of Animal Husbandry Faculty of Veterinary Medicine, Airlangga University
Email: wp_lokapirnasari@yahoo.com

ABSTRACT

High Quality Feed (HQF) is a formula feed comprising the feed material that has high quality. Purpose this research is to find a formula HQF that can be applied and can be widely used in laying chicken farms, primarily related to the case of Highly disease Pathogenic Avian Influenza (HPAI) that can reduce economic losses due to morbidity and high mortality. Because handling unfinished AI through vaccination, is expected by the HQF can help boost the immune system of poultry. In this stage developed feed formulations that contain ricebran fermentation with the best nutrient content, the building block of concentrates and Spirulina as immunomodulatory, this stage aims to determine the effect of HQF formula tested on chickens Isa Brown laying strain to determine the effect of the growth performance by calculating the feed conversion ratio. The aim of this research was to investigate effects of fermented ricebran to evaluate the protein efficiency ratio of layer chicken by in- vivo method. Material research were: chicken layer Isa Brown strain, feed stuff: maize, extracted soybean, fishmeal, methionin,premix vitamin, premix mineral, DCP, L-Lysin, oil, non fermented ricebran, fermented ricebran, feed additive. Eight different feed formulation are: control/P_0(crude protein(CP):18.14%, P_1 (CP: 18.34%), P_2(CP: 18.54%), P_3(CP: 18.74%), P_4(CP: 18.41%), P_5(CP: 18.61%), P_6(CP: 18.81%), P_7 (CP: 19.00%). The result of research showed that P_0 was different significantly ($p<0.05$) in protein efficiency ratio of layer chicken by in- vivo method. The highest protein efficiency ratio was P_7 (2.83).

Keywords: protein efficiency ratio, fermented ricebran, spirulina, layer chicken

INTRODUCTION

Spirulina is a cyanobacterium that can be consumed by humans and animals and is made primarily from two species of cyanobacteria: *Arthrospira platensis* and *Arthrospira maxima*. *Arthrospira* is cultivated worldwide; used as a dietary supplement as well as a whole food; and is available in tablet, flake and powder form. It is also used as a feed supplement in theaquaculture, aquarium and poultry industries (Vonshak, 1997).

Dried spirulina contains about 60% (51–71%) protein. It is a complete protein containing allessential amino acids, though with reduced amounts of methionine, cysteine and lysinewhen compared to the proteins of meat, eggs and milk. It is, however, superior to typical plant protein, such as that from legumes (Ciferri, 1983; Babadzhanov, 2004). The U.S. National Library of Medicine stated that spirulina was no better than milk or meat as a protein source, and was approximately 30 times more expensive per gram.

Spirulina's lipid content is about 7% by weight, and is rich in gamma-linolenic acid (GLA), and also provides alpha-linolenic acid (ALA),-linoleic acid (LA), stearidonic acid (SDA), eicosapentaenoic acid (EPA),-docosahexaenoic acid (DHA) and arachidonic acid (AA). Spirulina contains vitamins B_1 (thiamine), B_2 (riboflavin), B_3 (nicotinamide), B_6(pyridoxine), B_9 (folic acid), vitamin C, vitamin D, vitamin A and vitamin E. (Babadzhanov, 2004; Tokusoglu, 2003). It is also a source of potassium, calcium, chromium, copper, iron, magnesium, manganese, phosphorus, selenium, sodium and zinc. Spirulina contains many pigments which may be beneficial and bioavailable, including beta carotene, zeaxanthin, chloro-

phylla, xanthophyll, echinenone, myxox anthophyll, canthaxanthin, diatoxanthin , 3'hydroxyechinenone, beta-cryptoxanthin and oscillaxanthin, plus the phycobiliproteins c-phycocyanin and allophycocyanin (Vonshak, 1997).

MATERIALS AND METHODS

Chicken that has just arrived given water sugar, then kept for adaptation for a week. On the day to eight until the end of research, animals try given treatment. Feeding and drink given ad libitum. The act of vaccination use vaccine avian influenza inaktif type H5N1 performed on first week then will be booster on third week. The dose of vaccine was 0,5 ml / chickens by intramuscular. This research consists of 8 levels of treatment: control/P_0(crude protein (CP):18.14%, P_1 (CP: 18.34%), P_2(CP: 18.54%), P_3(CP: 18.74%), P_4(CP: 18.41%), P_5(CP: 18.61%), P_6(CP: 18.81%), P_7 (CP: 19.00%). The PER value was calculated as BW gain (grams) divided by CP intake (grams)

RESULTS AND DISCUSSION

Evaluation of protein quality of animal protein sources by integrative methods such as protein efficiency ratio (PER), present some information on probably heat damage in during processing and availability of amino acids in tissue level for birds (Sahraei, 2012). The results of the PER assays is shown in Table 1.

Based on the results of the analysis of variance that the addition of Spirulina showed a significant difference ($p<0,05$) of average Protein Efficiency Ratio. The Duncan multiple range test showed that treatment which produces the lowest amount of Protein Efficiency Ratio obtained at the treatment P0 (Spirulina 0%) which is different from other treatments.

Table 1. Average of Protein Efficiency Ratio

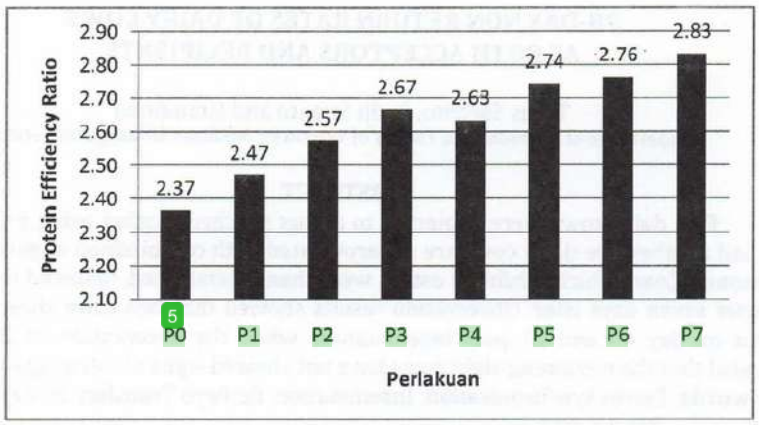
Treatment	Average of Protein Efficiency Ratio
P7	2.83 ^{a}
P6	2.76 ^{ab}
P5	2.74 ^{ab}
P3	2.63 ^{ab}
P4	2.67 ^{ab}
P2	2.57 ^{ab}
P1	2.47 ^{ab}
P0	2.37 ^{b}

Within column, numbers with ^{a,b} are significantly different between treatment ($p<0.05$).

The treatment feed formula contains Spirulina with 58% protein content and amino acids are quite balanced. The addition of Spirulina 0.5%, 1%, and 1.5% in the formula of rations the treatments provide value increase in protein content of the feed. In General, vegetable protein deficiency in plants due to this protein are usually bound with other compounds such as lignoselulosa that are difficult to digest or toxic compounds such as tannins, which will lower the value of the digestibility of the protein. On the cell walls of Spirulina, made from a compound of mucoprotein and lignoselulosa. On algae is also not found in other compounds that complicate digestion(Angka dan Suhartono 2000) , so that the feed formula treatment easier to digest by poultry.

CONCLUSIONS

In conclusion, the results of this study indicated that phytase supplementation improved the protein efficiency ratio of chicken fed diets containing Spirulina 1.5% in the formula of rations with crude protein content on diet 19.00% (P_7).



REFERENCES

Vonshak, A. (ed.). *Spirulina platensis (Arthrospira): Physiology, Cell-biology and Biotechnology*. London: Taylor & Francis, 1997.

Babadzhanov A.S. *et al.*. "Chemical Composition of Spirulina Platensis Cultivated in Uzbekistan". *Chemistry of Natural Compounds* **40** (3): 2004.

Ciferri O (December 1983). "Spirulina, the edible microorganism". *Microbiol. Rev.* **47** (4): 55178. PMC 283708. PMID 6420655.

Tokusoglu O., Unal M.K. "Biomass Nutrient Profiles of Three Microalgae: Spirulina platensis, Chlorella vulgaris, and Isochrisis galbana". *Journal of Food Science* **68** (4): 2003.

Sahraei. M, hossien janmohammadi, saman lashkari, mortaza deni , torkamani, akram gituee . 2012. Evaluation of protein quality in hydrolyzed protein meals by biological assay methods in broiler chickens. International Journal of Agriculture: Research and Review. Vol., 2 (4), 352-356,

PROTEIN UTILIZATION OF SPIRULINA IN RESPONSE TO PROTEIN EFFICIENCY RATIO IN LAYING HENS

ORIGINALITY REPORT

15%	14%	2%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	treatments4autism.blogspot.com Internet Source	4%
2	www.gnosis.us.com Internet Source	4%
3	www.seedhieximpal.com Internet Source	4%
4	powerpo.pw Internet Source	2%
5	Kelwyn D'Souza. "A Petri net approach for modelling controls of a computer-integrated assembly cell", International Journal of Computer Integrated Manufacturing, 9/1/1993 Publication	1%

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		