Potential of ashitaba leaf (*Angelica keiskei*) as a phytobiotic source in feed on cholesterol and blood triglyceride levels of broiler chicken

D Oktaviana’, G A E Windhary, Mashur, Supriadi and Kholik

Faculty of Veterinary Medicine, Universitas Pendidikan Mandalika, Mataram 83125,
*Corresponding author: dinaoktaviana_2013@yahoo.com

Abstract. Ashitaba leaf is a multi-functional plant because it is rich in vitamins, minerals, amino acids, mineral elements, and many active substances, this herbal plant also contains antioxidants, and has the potential to be a food supplement so that it can increase blood production which is closely related to chicken growth. One source or material that has the potential as a source of probiotics is Ashitaba leaf flour. The purpose of this study was to determine the potential of Ashitaba Leaf flour as a psychobiotic source in feed against blood cholesterol and triglyceride levels in broiler chickens. 25 day old unsex broiler chickens produced by PT. MalindoTbk maintained for 35 days in individual cages measuring 40 x 40 cm. The treatment begins by adding Ashitaba leaf flour in basal feed with different levels, namely; P0 (0% Ashitaba leaf flour + 98% Basal feed + 2% filler); P1 (0.5% Ashitaba leaf flour + 98% Basal feed + 1.5% filler); P2 (1% Ashitaba leaf flour + 98% Basal feed + 1% filler); P3 (1.5% Ashitaba leaf flour + 98% Basal feed + 0.5% filler) and P4 (2% Ashitaba leaf flour + 98% Basal feed + 0% filler). The design used was a complete randomized block design with 5 treatments and 5 replications. The data obtained were analyzed by analysis of variance and if there were significant differences it would be further tested by the Duncan Distance Test. The results showed that the administration of Ashitaba Leaf Flour up to 2% level had no significant effect (P > 0.05) on cholesterol and blood triglyceride levels of broiler chickens aged 5 weeks. There tends to be a decrease in the value of cholesterol numbers from P0 to P2.

Keywords: Broilers, Ashitaba Leaf Flour, probiotics, cholesterol, and triglycerides.

1. Introduction
The need for chicken meat as a source of animal protein has increased along with increased income and public awareness of the importance of nutritious food. The broiler chicken farming business can quickly meet the community’s need for animal protein because the growth of broiler chickens is relatively shorter than other meat-producing livestock. To achieve broiler chicken production standards, we need to feed ingredients that have good quality and quantity. Good productivity requires proper, balanced, and efficient feed. This is because feed is a major supporting factor for increasing poultry production. Feed plays a very important role in the success of poultry farming because the cost of feed controls about 60 to 70% of the total production costs of poultry farms.

Phytobiotics (probiotics) are a type of phytochemicals (phytochemicals) that are purely derived from plants (plants). As an additive, this material is reported to be able to stimulate growth and at the same time be used to maintain the health of poultry [13]. The utilization of probiotics as Natural Growth Promoters or NGPs has been identified as an effective alternative to antibiotics. Fitobiotics as NGPs
develop as feed additives, immunity, enhance performance, and is very effective in improving the health of the digestive tract [10].

One source or material that can be used as a source of probiotics is Ashitaba leaf. As a source of probiotics, Ashitaba (Angelica keiskei) is a multi-functional plant because it is rich in vitamins, minerals, amino acids, mineral elements, and active substances. Ashitaba plants can be used as a source of antioxidants, especially the leaves because they contain chemical compounds such as alkaloid, saponin, glycoside, triterpenoid, and chalcone. In chalcone, there are two flavonoid compounds namely xantoangel and 4-hydroxyxycine. This compound is what distinguishes Ashitaba from similar plants [1]. This compound has an active molecular structure and is an antioxidant that is very potential in capturing higher free radicals. This chalcone compound can cleanse the blood, suppress acid secretion, prevent the formation of thrombus, antibacterial prevent cancer, and improve kidney function in removing toxins from the blood efficiently [6].

Judging from the potential of Ashitaba leaves as a source of probiotics in feed, research is needed to be able to know the cholesterol and triglyceride levels of broiler chicken blood. The research purpose was to Knowing the use of Ashitaba leaves as a source of probiotics in feed against cholesterol levels and blood triglycerides of broiler chickens aged 5 weeks.

2. Materials and Method

2.1. Study Location
The study was conducted from April 10 to May 8, 2019, in a Broiler chicken house located in the Praya Village, Praya District, Central Lombok Regency, West Nusa Tenggara Province. The cattle used in this study were day-old unsex broiler chickens (DOC) produced by PT. Malindo Feedmill, Tbk with 25 heads. The sample size in this study was determined based on Federer's formula in [4].

2.2. Ration Arrangement
The basal feed used in this study was a complete feed of BR1 from 1-3 weeks old and BR2 for weeks 4 and 5 with the following nutrient content that can see in Table 1 dan Table 2. Table 1, based on analysis at the 2019 UGM Faculty of Animal Nutrition Laboratory, and Table 2, based on the feed composition table on the basal feed label.

| Feed Ingredients | Energy Metabolism (Kcal/kg) | Crude Protein (%) | Crude Fiber (%) | Crude Fat (%) | Calcium (%) | Phosphorus (%) |
|------------------|-----------------------------|-------------------|-----------------|--------------|-------------|---------------|
| Ashitaba leaf flour¹ | 1452.58 | 25.43 | 14.74 | 4.03 | 2.07 | 0.344 |
| Basal feed² | 3200.00 | 23.00 | 5.00 | 5.00 | 0.90 | 0.60 |
| Filler | 0 | 0 | 0 | 0 | 0 | 0 |

| Feed Ingredients | Level of Ashitaba Leaf Flour Giving (%) |
|------------------|-----------------------------------------|
|                  | P0 | P1 | P2 | P3 | P4 |
| Ashitaba leaf flour | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 |
| Basal feed | 98.00 | 98.00 | 98.00 | 98.00 | 98.00 |
| Filler | 2.00 | 1.50 | 1.00 | 0.50 | 0.00 |
| TOTAL | 100 | 100 | 100 | 100 | 100 |
2.3. Preparation
Ashitaba leaves are picked from the stems so that the stems are not processed, the Ashitaba leaves are washed clean. The Ashitaba leaves are put in a dehydrator for 2 hours with a temperature of 50 degrees Celsius, after that the grinding of Ashitaba leaves stage 1 to become flour, then sieving stage 1, grinding step 2 so that the flour becomes finer and continued with stage 2, the Ashitaba leaves are ready for use. Cage fumigation uses disinfectant liquid for the floor and wall of the cage. Fumigation is done 2 weeks before the DOC is inserted.

2.4. Chicken Grouping
Fumigation is done 2 weeks before the DOC is inserted. The Cage fumigation uses disinfectant liquid for the floor and wall of the cage. Twenty-five broilers were placed in 5 different feed treatment groups, each treatment group was given replication 5 times. In this study, each group was given 1 head, so that all of the broiler chicks were evenly distributed in 25 cage units (experimental units). All chickens are kept for 35 days.

Feeding is done 2 times a day at 7:00 a.m. and evening at 4:00 p.m. and providing drinking water ad libitum. The feed is given and the remainder of the feed is collected and weighed. Weighing chicken body weight is done once a week.

2.5. Measurement of Blood Cholesterol and Triglyceride Levels
Measurement of cholesterol levels using the CHOD-PAP enzymatic reaction method. 3 ml of blood drawn using 3 ml sterile syringes. The blood taken is inserted into a tube without anticoagulants (purple on the lid) then put into a box filled with ice and analyzed in a laboratory. The instrument used for analysis is the spectrophotometer. The working principle is 1 ml sample or standard plus 1000 microliters or 1 ml reagent solution mixed and incubated for 20 minutes at room temperature then examined with a spectrophotometer. Normal blood cholesterol levels in ducks range from 125-200 mg/dl [3].

Measurement of triglyceride levels using the enzymatic reaction method GPO-PAP. 3 ml of blood drawn using 3 ml sterile syringes. The blood taken is inserted into a tube without anticoagulants (purple on the lid) then put into a box filled with ice and analyzed in a laboratory. The instrument used for analysis is the spectrophotometer. The working principle is 1 ml sample or standard plus 1000 microliters or 1 ml reagent solution mixed and incubated for 20 minutes at room temperature then examined with a spectrophotometer. Normal triglyceride levels in ducks range from 400-500 mg/dl [3].

2.6. Statistical analysis
All research data will be statistically tested using a completely randomized directional pattern design (ANOVA variety via SPSS). The average difference between treatments was further tested by Duncan's test according to [12].

3. Results and Discussion
Cholesterol and triglyceride levels are the most varied components of broiler chicken blood chemistry, in general, the percentage of protein, minerals, and vitamins decreases when the percentage of fat rises, therefore the variation in the nutritional value of poultry, including broilers, is influenced by fat content. Cholesterol and blood triglyceride levels of broilers are presented in Table 3.
Table 3. Cholesterol levels and triglycerides in serum blood of broiler chickens aged 35 days that get the addition of Ashitaba leaf flour.

| Observed Parameters | Level of Ashitaba Leaf Flour Giving |
|---------------------|------------------------------------|
|                     | P0 (0%) | P1 (0.5%) | P2 (1%) | P3 (1.5%) | P4 (2%) |
| Cholesterol (mg/dl) | 121.80  | 112.60    | 121.80  | 101.00    | 112.80  |
| Triglycerides (mg/dl)| 116.80  | 150.00    | 176.20  | 134.80    | 133.00  |

*= non significant (no significant effect)

The provision of Ashitaba leaf flour in broiler chicken rations did not significantly affect cholesterol levels (P > 0.05). Table 3 shows that the P0 and P2 treatment with 0% and 1% Ashitaba leaf flour sprinkled the highest cholesterol levels with a value of 121.80 mg/dl and the lowest cholesterol level was achieved at the P3 level with a value of 101.00 mg/dl, while P1 and P4 values of blood serum cholesterol levels of broiler chickens aged five weeks were found to be 112.60 and 112.80 mg/dl. There tends to be a decrease in the value of cholesterol numbers from P0 to P2. Crude Protein Content in Ashitaba Leaf Flour has a positive impact on protein content in the blood of broiler chickens (Crude Protein = 25.43%). Protein has an important role in the process of cholesterol transportation in the blood through the formation of lipoproteins which are formed from a combination of protein and fat. [5] lipoproteins function to mediate the transport of lipids from the liver to the tissues and from the tissues back to the liver so that lipoproteins have a very important role in maintaining cholesterol homeostasis (balance) in the blood. Cholesterol homeostasis aims to meet the needs of cholesterol in the blood when the cholesterol intake in the feed is insufficient, then [5] cholesterol will be synthesized from both the interstitial and extrahepatic tissue to meet the cholesterol needs in the blood.

The addition of Ashitaba leaf flour in broiler chicken feed had no significant effect on blood serum triglyceride levels of five weeks old broiler chickens (P> 0.05). Table 3 shows the lowest blood serum triglyceride levels reached at the P0 level without the addition of 116.80 mg/dl of Ashitaba Leaf flour. The highest value was obtained at the P2 level giving Ashitaba leaf flour by 1% with a value of 176.20 mg/dl, this means that there is an increase in the blood serum triglyceride level of broiler chickens from P1 to P4 but the control has the lowest blood triglyceride value, the function of triglycerides is to meet the energy needs of the body.

4. Conclusion
The average value of cholesterol and triglyceride levels in broiler chicken blood due to feeding with the addition of Ashitaba leaf flour showed no significant effect. There tends to be a decrease in the value of cholesterol numbers from P0 to P2 and there is no significant effect (p> 0.05) in reducing the number of triglycerides in the blood serum of broiler chickens.

Acknowledgments
The authors are very much to Research institutions and community service (LPPM) of PendidikanMandalika University for their cooperation in providing research facilities.

References
[1] Baba K, Taniguchi M, Shibano M, Minami H, 2009. “The Components and Line Breeding of Angelica keiskeikoidzumi”. Bunseki Kagaku, Desember, Vol. 58 No.12.
[2] Firazullah Rachmad, 2015. Potensi Pemanfaatan Ekstrak Daun Ashitaba (Angelica keiskei) untuk Meningkatkan Kadar HDL (High Density Lipoprotein), Menurunkan Kadar Kolesterol Total, dan Kadar LDL (Low Density Lipoprotein) pada Bebek Peking (Anas peking) Hiperkolesterololemia. Skripsi Fakultas Kedokteran Hewan UNTB. Mataram J.
[3] Fuller, R. J. M. Savendra and S. Macfarlane. 1997. Probiotics and Intestinal Infection. In. Probiotics 2: Applications and Aspect. Edited by. R. Fuller. Chapman and Hall.

[4] Hanafiah, K. A. 2001. Rancangan Percobaan Teori dan Aplikasi Buku Fakultas Pertanian Universitas Sriwijaya. Palembang. 243p.

[5] Hasanudin. S. V. D. Yunianto and Tristiarti. 2013. Profil Lemak Darah pada Ayam Broiler yang diberikan Pakan Step Down Protein degan Penambahan Air Perasan Jeruk Nipis Sebagai Acidifier. JTTP Vol. 3 No. 1. Juli 2013.

[6] Inamori Y, Baba K, Tsujibo H, Taniguchi M, Nakata K, Kozawa M, 1991. “Antibacterial Activity of Two Chalcones, Xanthoangelol and 4-Hydroxyderricin, Isolated from the Root ofAngelica keiskei koidzumi”. Chemical and Pharmacy Bulletin Osaka University of Pharmaceutical Science. 39(6);1604-5.

[7] Kamalia, Andi Mujnisa dan Asmuddin Natsir. 2014. Pengaruh Penambahan Berbagai Level Tepung Daun Katuk (Sauropus androgynus) terhadap Kadar Kolesterol, Trigliserida LDL dan HDL Darah Broiler. Buletein Nutrisi dan Makanan Ternak Volume 10. No1 Tahun 2014.

[8] NRC.1994. Nutrient Requirements of Poultry. 9th ed. National Press. Washington.

[9] Melindasari Destriana, Bambang Dwiloka dan Edjeng Supriatna, 2016. Profil Perlemakan darah Ayam Broiler yang diberi Pakan daun Kayambang (Salvina molesta). Fakultas Peternakan dan Pertanian. Universitas Diponegoro Semarang. Jurnal Ilmu Peternakan 24 (1): 45-55 ISSN 0852-3581. Fakultas Peternakan UB,http:/jiip.ub.ac.id/.

[10] Panda, A. S.R. Rao, and M. Raju. 2009. Phytobiotics, a natural growth promoter. Poultry International, July 2009. Pp:10-11.

[11] Sufro, T. 1992. Fish Meal. Manufacture, Properties and Utilization. In G. Borgstrom: Fish as Food. Academy Press. New York, San Francisco, London.

[12] Steel, R. G. D. And J. Torrie. 1993. Principles and Statistical Procedures of a Biometric Approach. Translation B. Sumantri. Gramedia. Jakarta.

[13] Zuprizal, 2004. Antibiotik, ProbiotikdanFitobiotikdalamPakanUnggasIlmiahPopuler. Majalah Poultry Indonesia No 284. Jakarta.