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THE EFFECT OF SOUR SOY MILK AND FERMENTED CASSAVA *TAPE*ADDED TO DRINKING WATER TOWARDPRODUCTION AND QUALITY OF CHICKEN MEAT

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Abstract. *Now there are many opportunities in the development of production and accompanied by an increase in the quality of broiler chicken meat carcasses through biotechnology engineering, namely the use of Lactic Acid Bacteria (LAB) as probiotics, sourced from a result of fermentation traditional cassava* tape *and sour soy milk.Completely randomized design (CRD) were used which consisted of six treatments and four replicates. Each replicate consist of five chickens. The chicken was raised for 5 weeks and then slaughtering was done two times or two chickens in each replicate, so we had 48 sample to be analyzed. The treatments are as follow: drinking water not added probiotic as control (A); 1% of cassava tape in 1 liter water (B); 2% of cassava tape in 1 liter water (C); 1% of sour soymilk in 1 liter water (D); 2% of sour soymilk in 1 liter water (E); 1% of cassava tape + 1% sour soymilk in 1 liter water (F). The experimental commercial diets for starter phase (aged 1-3 weeks) was given councentrate type CP 511 and CP 512 for finisher phase (aged 3-5 weeks). The experiment started used the chicken aged 1 week with average weight of 174 – 181 g/birds. In conclusion of the research, had potential benefits improved for carcass production and quality broiler chicken meat, showed that increase of total protein serum, hight density lipoprotein (HDL) and also increasing organoleptic characteristic, also effect significantly decrease of total cholesterol and low density lipoprotein (LDL). It was sugested consumed the broiler chicken carcass meat to improved safety and healthy consumers.*
Keywords: *LAB probiotic*; *sour soy milk*;*cassava tape*; *production*;*quality*; *chicken meat*

1. Introduction

1.1. Background

The high level of consumer awareness about the safety of food consumed mainly from livestock products (meat, milk and eggs) in Indonesia, especially consumer security against chicken meat circulating in the market. Although high quality, delicious flavor and attractive appearance, food has no meaning if it is not safe for the health of consumers. Broiler chicken breast fillet contained higher moisture, fat, and ash contents, compared to Bali indigenous chicken as well as spent hen, but protein content were lower and only methionine were higher [1].To improve farm yields, an improvement in the quality of animal feed is needed. There are two objectives of improving quality, namely (1) Increasing digestibility, (2) Increasing the digestibility of animals. Several approaches can be implemented to achieve this goal, including the application of biotechnology. To increase digestibility, can be achieved through the fermentation of food from the beginning or bioprocess and the addition of food ingredients (minerals, enzymes and hormones), while to increase the digestibility of livestock can be done through the approach of probiotics and microbial transgenics [2]. Furthermore, [3]; [2] and [4], recommend to farms to

use probiotics (feed supplement additives) LAB, as a substitute for antibiotics in animal feed, because it plays an important role in the animal / animal body by increasing the composition of feed, balancing intestinal microflora, reducing anti-nutritional factors (phytic acid and phytate inhibitors) so that the health and growth of livestock is better.According to [3], that the effects of probiotics vary on chickens, from several different research results in chicken strains, maintenance environment, types of microorganisms used and in terms of concentration given and applied.Now there are many opportunities in the development of production and accompanied by an increase in the quality of broiler meat carcasses through biotechnology engineering, namely the use of Lactic Acid Bacteria (LAB) as probiotics.Based on the description above, there are no research results that try to combine several microorganisms as a source of probiotics derived from traditional food fermented cassava tape, as well as sour soy milk (without the addition of culture) given through in drinking water, this research was conducted to produce broiler meat carcasses, in terms of carcass production, organoleptic of meat, and blood plasma serum analysis.

2. Research Methods

2.1. Location research

The research was carried out at the Faculty of Animal Husbandry research station at Udayana University, at Bukit Jimbaran campus. Blood analysis was carried out at the Clinical Chemistry Laboratory of the General Hospital, Denpasar and analysis of samples was carried out at the Laboratory of Animal Feed, and the Animal Product Technology Laboratory, Faculty of Animal Husbandry, Udayana University, Denpasar.

2.2. Research design

The design used in this study, namely Completely Randomized Design (CRD) with 6 treatments and 4 replications, so that there were 24 experimental units. Each experimental unit is filled with 5 chickens. The treatments are as follow: drinking water not added probiotic as control (A); 1% of cassava tape in 1 liter water (B); 2% of cassava tape in 1 liter water (C); 1% of sour soymilk in 1 liter water (D); 2% of sour soymilk in 1 liter water (E); 1% of cassava tape + 1% sour soymilk in 1 liter water (F). The chicken was raised for 5 weeks and then slaughtering was done two times or two chickens in each replicate, so we had 48 sample to be analyzed.

2.3. Animal sampling/randomization

A total of 120 broiler chickens at 1 week of age were given wing band numbers on the underside of the wing and then weighed. They almost have the same weight (+ 5% ie 181.02 g + 9.05 g). They were then divided into 6 parts according to body weight range. Then placed into 24 units of cages(according to the provisions that have been determined by means of the lottery). Therefore, the avarage weight of the chicken was relatively the same between treatments.

2.4. Feeding and Drinking Water

Commercial feed given to following a limited-controlled base according to production standards by [5]. The commercial feed given was CP. 511 for the "starter" (0-4 weeks) and CP. 512 for the "finisher" (4 weeks to harvest).

Drinking water is given *adlibitum*.The drinking water used was obtained from the local Regional Water Company. The tap water was precipitated overnight so that its chlorine contents was settle. The water was then added with probiotic as follows: Addition of 1% (23.12 g)of fermented cassava tape into one liter of drinking water (B treatments); 2% (46.24 g)of cassava tape into one liter water (C treatments); 1% (83,3 g) sour soy milk into one liter water (D treatments); 2% (166.6 g) sour soy milk into one liter water (E treatments), and 1% (23.12 g)of

cassava tape with 1% (83.3 g)sour soy milk into one liter water (F treatments). The concentration is determined based on the weight of dry matter.Soy milk, fermented at room temperature (32^{o}-34^{o}C) for 18-20 hours to form "curd" to produce sour soy milk.

2.5. Prevention of disease

Before the broiler is put in a cage, the cage is cleaned first and sprayed with disinfectant (1 liter of formalin: 20 liters of water). The cage is kept empty for a week. The newly arrived DOC (day old chick), was given a sugar solution (2 g of sugar: 1 liter of drinking water) for 5 hours. The type of vaccine given was Medivac ND *La Sota*at 4 days of age by dripping it on one of the chicken's eyes. Further vaccinations are not given.

2.6. The variables observed

The variables observed or measured in this research are: as follows

2.6.1. broiler carcass production:

1) Percentage of carcass, by dividing the carcass weight by cut weight then multiplying by 100%.
2) Percentage of chest, by dividing the chest weight by carcass weight then multiplied by 100%.
3) Percentage of thighs and calves, by dividing the weight of thighs and calves with carcass weight then multiplied by 100%.
4) Percentage of back, by dividing back weight by carcass weight then multiplied by 100%.
5) Percentage of wings, by dividing the weight of the wing by carcass weight then multiplied by 100%.
6) Percentage of non-carcass, obtained from comparison between non carcass with carcass weight multiplied by 100%. Non-carcass parts include the head, neck, legs and innards.

2.6.2.Organoleptic chicken meats.

Including color, aroma, taste, texture and overall acceptance is done using the "Consumer Preference Test" method, based on the level of preference with a hedonic scale, which has a value range of 1.0 (very much disliked) to 9.0 (very much liked) (Larmond, 1977 in [6]) and this value is written in a test format.

2.6.3.Chicken blood plasma serum analysis.

Includes total blood serum protein, blood serum cholesterol, High Density Lipoprotein (HDL) and Low Density Lipoprotein (LDL) analyzed in the Clinical Chemical Laboratory General Hospital located in Denpasar.The method of analyzing broiler blood serum first takes a broiler blood sample in a way [7]:

1) Broilers are slowly placed on a table that has been prepared in a sleeping position with the lower back, legs and wings pulled back.
2) If the chicken feels calm and does not move, then enter a 2.5 ml volume syringe (syringe) on the pectoralis externa wing vein.
3) After the syringe is fully filled, the blood is immediately closed and put into the ice flask, then as soon as possible the at laboratory is taken for analysis.

The method of blood serum analysis carried out using a computer system with SYNCHRON CX System "BECKMAN COULTER" which is carried out according to the method that applies at the Laboratory Center. In the analysis of blood serum cholesterol, broiler was inhibited by absorbance (λ = wavelength 520 nano meters).

3. Results And Discussion

3.1. Research Results.

Based on observations in the field on carcass production, organoleptic tests of "steam" cooked meat and analysis of broiler blood plasma serum aged 5 weeks, as well as laboratory observations of the recorded data in Table 3.1

Since the beginning of cassava tape and sour soy milk treatment has also been calculated the total lactic acid bacteria (LAB) and the measurement of pH values in each week. So that the total mean value of the LABcassava tape is obtained from $8.6x10^3$ - $1.08x10^5$*cfu*/g with a pH value ranging 3.70 - 4.02. Whereas the total LAB of sour soy milk ranged from $8.98x10^4$ - $1.06x10^6$*cfu*/g with a pH value ranging 5.00 to 5.06.

The average 1week old broiler weight used in each study treatment was: (A) 175.29 g / head; (B) 175.18 g / head; (C) 174.45 g / head; (D), 174.12 g / head; (E) 175.43 g / head; (F) 181.81 g / head. While the weight of broiler slaughter aged 5 weeks obtained the average of each treatment, namely: A 1597 g / head; B 1437.5 g / head; C 1567.5 g / head; D 1497.5 g / head; E 1635 g / head; F 1580.50 g / head.

3.2. Discussion.

The ability of LAB in treatment B, C, D, E and treatment F can increase the activity of starch-breaking enzymes (amylase or ptialine), disaccharide-breaking enzymes, sucrose intestinal enzymes, intestinal maltose enzymes and intestinal lactose enzymes that can hydrolyze carbohydrates unavailable carbohydrate in rations consumed by broilers, when compared to the control treatment. In addition to increasing the activity of starch-breaking enzymes, it can also increase proteolytic activity such as pepsin enzyme, pancreatic protease and increase the activity of fat-breaking enzymes such as lipases which are involved in the digestion process of broiler rations. So that the absorption process of nutrients is more effective as fuel for oxidation and provides energy for other metabolic processes. Similarly, the results of protein digestion in the form of amino acids absorbed by the intestine to be channeled throughout the body are used to form cell biomass in muscle growth and replace damaged body tissue. Supported by the results of Sieo *et al* (2005) in [6], using several probiotic strains of Lactobacillus, as "Alternative Enzyme Carriers". In chickens that are given a commercial ration, it is useful as a "carrier for heterologous enzyme into the gastrointestinal tract of chickens".

3.2.1.Carcass Production.

The percentage of carcasses treated with B, C, D, E, and treatment F as a source of BAL through broiler drinking water has not significantly affected (P> 0.05) compared to control (A). This shows that the percentage of carcass as a measure of broiler meat production is strongly influenced by non-carcass parts such as the digestive tract, internal organs, blood, fur, head and feet [8]. Similarly, the statement of [13] states that the factors that influence the percentage of carcass are final weight, age of chicken, carcass weight and percentage of wasted parts other than carcass.

The percentage of breast in treatments of B, C, D, E, and F as a source of LAB, given through drinking water, had no significant effect (P> 0.05) when compared to control (A), but there was a higher tendency in B, C, D, and E,respectively at 4.13%, 0.74%, 0.65% and 3.81%, (Table 3.1). This is due to the fact that treatments with fermented cassava tape and sour soy milk, can provide additional LAB protein by increasing the activity of proteolytic enzymes that can break down proteins into essential amino acids and small amounts of peptides for the synthesis of some nonessential amino acids in muscle tissue that can be utilized by chicken for formation of muscle meat. Breast is a part of the body that composed of many muscle of meat and contains few bones, so that its development is balanced with the development of the chicken's body.

Table. 3.1 The Effect of Sour Soy Milk and Fermented CassavaTape Added to Drinking Water Toward Production and Quality of Chicken Meat.

Variabel	Treatment[1)]						SEM[2)]
	A	B	C	D	E	F	
II. Carcass Production							
Carcass (%)	66,46 [a]	67,06 [a]	65,72 [a]	66,57 [a]	64,70 [a]	65,06 [a]	8,20
Breast (%)	30,99 [a]	32,27 [a]	31,22 [a]	31,19 [a]	32,17 [a]	29,70 [a]	3,82
Thighs and leg (%)	34,10 [a]	32,78 [a]	33,52 [a]	32,28 [a]	33,92 [a]	33,62 [a]	4,13
Back (%)	21,90 [a]	21,39 [a]	21,66 [a]	23,40 [a]	21,60 [a]	23,63 [a]	0,88
Wings (%)	13,02 [a]	13,57 [a]	13,60 [a]	13,13 [a]	12,32 [a]	13,06 [a]	0,30
Non Carcass (%)	23,23 [a]	23,79 [a]	23,56 [a]	24,33 [a]	22,88 [a]	24,92 [a]	0,64
III. Organoleptik							
Color	5,00	6,75	6,60	6,15	6,10	6,15	
Taste	5,85	6,30	7,10	6,25	6,70	5,55	
Texture	5,90	6,60	6,75	5,95	6,45	6,20	
Aroma	5,75	6,35	7,35	6,40	7,10	5,95	
Overall acceptance	5,90	6,55	7,10	6,25	6,70	6,05	
IV. Blood Serum Analysis							
Total Protein (g/dl)	2,34[d]	3,95 [bc]	3,83[c]	4,52[ab]	4,83 [a]	4,57 [ab]	0,22
Cholesterol (mg/dl)	185,50 [a]	152,00[bc]	119,00[b]	105,00[c]	145,50[bc]	179,00[a]	5,21
HDL (mg/dl)	92,50 [b]	88,50 [b]	99,75 [a]	97,50 [b]	114,00 [a]	114,00 [a]	4,21
LDL (mg/dl)	76,50 [a]	56,50 [b]	22,50 [d]	31,50[cd]	26,00[cd]	53,50 [c]	4,98

Information:

1) Drinking water without cassava tape and sour soy milk as control (A), giving 1% cassava tape in 1 liter of drinking water (B), giving 2% cassava in 1 liter of drinking water (C), giving sour soy milk 1 % in 1 liter of drinking water (D), giving 2% sour soy milk in 1 liter of drinking water (E) and giving 1% cassava tape with 1% sour soy milk in 1 liter of drinking water (F).
2) SEM: "Standard Error of The Treatment Means"
3) The value with the same letter on the same line in each treatment is not significantly different (P> 0.05).
4) Value with unequal letters on the same line in each treatment is significantly different (P <0.05).
5) Organoleptic scale: 1 (very very dislike), 2 (very dislike), 3 (dislike), 4 (rather dislike), 5 (dislike), 6 (rather like), 7 (likes), 8 (very like), 9 (really really like).

The percentage of thighs and legs in the control treatment (A) showed a higher value compared to treatment B, C, D, E, and F, but it was not statistically significant (P> 0.05) (Table 3.1). The decrease in the percentage of thighs and legs in treatment of cassava tape and sour soy milk maybe related the components of the formationof meat or muscle that accumulate more toward the breast, while thigh and leg muscles are active moving tissues, and thus it can obtained a lower percentage of thighs and legs. This fact is the finding of [10] that in general, the quality improvement of broiler chickens is aimed at the provision of breast meat that determines the quality of the broiler. Therefore, the selection on thigh and leg filling is less noticeable which causes improvement in thigh and legresponses are less aimed than the response to breast meat.

The percentage of back and wings follows treates with fermented cassava tape and sour soy milk did not significantlydiffer (P> 0.05) compared to control (A), but in E treatment, there were a decreases in back and wing percentage of 1.37% and 5.38%, respectively, compared to treatment A. This maybe due to the fact the back and wings are composed of many bones and a little meat compared to the breast, thighs and legs, so that their growth decreases with increasing age of the chicken. This is supported by the statement of [13]; parts of the body with many bones have constant growth, such as wings, head, neck, back and legs, and their percentage decreases with increasing chickens age (states that parts of the body with many bones growth slower than the

overall development of the body).
The percentage of non-carcasses all treatments B, C, D, E and F were noted to be the same as treatment A. However, in treatment E there was a tendency of lower 1.51% compared to control (A). This can be related to the fact that broilers in treatment E (2% sour soy milk) during the growth process can meet the balance of protein and energy formation needed in the metabolic process. Also, it may due to the role of endogenous LAB in the digestive tract of broiler in producing several coenzymes, so asto increase the activity of dietary gastrointestinal enzymes and effecttiveness of the process of fat absorption that is circulated throughout the body via the blood stream, especially in preventing the accumulation of fat formation in the neck of the broiler. Whereas in the control treatment, the most fat are distributed to the neck and abdomen and wrapping the internal organs and digestive tract; for the treatment B, C, D and F, little amount of fat is distributed both on the neck and abdomen of broiler.

3.2.2.Organoleptic of meat.

The panelist gave the highest color preference for broiler stewed subjected to treatment of probiotic of sour soy milk andcassava *tape*, because it possesses bright white color. On the contrary, broiler meat color of treatment A (control) was rather dull or white slightly brownish. It is thought that the content of lecithin in sour soy milk may act as an antioxidant (Jacobson 1985 in [6]), where as organic acids on fermented cassava *tape*is a reducing agen that can affect the molecular status of myoglobin to block excess oxygen from external influences.
The stability of this meat color to oxygen is associated with postmortem pH levels a resulted fromlactic acid accumulation of muscle glycogen cleavage [9]. The presence of elements of simple monosaccharide carbohydrates is dissolved easily in water and absorbed by body of chickens to form organic acids in meat. So that at the time postmortem, the occurrence of glycolysis (decreased pH) is slowed, due to adequate of glycogen reserves during slaughter of chickens. Furthermore, it is also said that the determinants factor for the color of meat depends on the concentration of meat pigments (myoglobin), the type of myoglobin molecule, the chemical status and physical condition of myoglobin with other components in the meat. Moreover, feed, age, stress, pH and the presence or absence of oxygen may significantly determine the color of meat.
Treatment with sour soybean milk and cassava *tape*resulted in an increase in taste value of the aroma and flavor of broiler meat compared to the control treatment. This maybe due to the fact that the treatment of sour soy milk andcassava *tape* in chicken drinking water, can provide additional form of essential amino acids, substances resulted from of hydrolysis of stachyose and raffmosa carbohydrates derived from soy sugar (polysaccharide, oligosaccharides) and some B vitamins (except vitamins B12) (Lee *et al* 1990 in [6]), whereascassava *tape* contains organic acids and few alcohols that contribute in breakdown of saturated fats into free fatty acids and essential amino acids that accumulate in broiler meat. So at the time of boiling the meat will produces aroma and taste or flavor of meat that are more delicious and taster or savory (in the form of inosine mono phosphat = IMP). Similarly, phenolic compounds from soybean oil and cassava tape undergo breakdown during the fermentation process can provide mono unsaturated fatty acids, also play a role in the aroma and flavor of boiled broiler meat. There is a close relationship between aroma and flavor of meat [9], because some meat components develop after cooking process. Like amino acids, carbohydrates, fats, B vitamins are the precursors that form the aroma and flavor of cooked meat. Supported by the statement of Vander Ouweland, Olsman and Peer (1978) in [9] that the effect of heat when boiling can bring the flavor of meat from various types of reactions, such as pyrolysis of peptides and amino acids, sugar degadration, fat decarboxylation, thiamine degadration and ribonucleotides, as well as interactions involving sugars, amino acids, fats, sulfuric acid and ammonia. Furthermore, the results of the comments from the panelists recorded that the cassava tape treatment had the aroma and flavor of boiled

broiler meat that was aligned with the Mc product. Donald. Whereas the treatment of sour soy milk has the aroma and flavor of KFC products. It is suspected that seasoning flour from KFC contains soy protein isolates, andseasoning flour Mc. Donald contains flour from fermented sweet potatoes. Of course the two fast food restaurants each have advantages and disadvantages, from several aspects of organoleptic and business.

The low value of the aroma and flavor of cooked chicken meat in the control treatment (A), because the heat degradation of thiamine produces formic H_2S and reactive sulfuric substances (such as metanetiol) increase at heating time (Galt and Macleod 1984; Persson and Von Sydow 1973 in [9]). The H2S contribution that develops from cystine residues and meat protein cysteine causes "off-flavors" of the aroma of cooked meat. Large amounts of volatile carbonyl from poultry meat often result from stecker degradation of amino acids or linoleic degradation and other unsaturated fatty acids (Zapsalis and Beck 1986 in [12]).

The organoleptic value of the texture of boiled meat showed an increase in the treatment of sour soy milk and cassava tape treatment, compared to the control treatment. It is suspected that the probiotic treatment of LAB can form myofibril proteins such as myosin and where ATPase enzymes are produced which play a role in preventing formation cross-linkages between actin-myosin, so that the meat has a fine texture with soft fiber bonds and makes it easy to penetrate teeth into the flesh marked by increased tenderness, or the ease with which meat is chewed into smaller pieces (Weir, 1960 in [9]). The high content of lysine, arginine and histidine in soyghurt (Lee *et al* 1990 in [12]) which is almost the same as sour soy milk, plays a role in the formation of meat molecules containing 2 amino acid groups namely desmosin and isodesmosin, as well as the possibility the same for the tape treatment of sweet potato which contain alcohol esters mainly plays a role in the formation of binder woven meat [9], more or less will affect the texture of the meat. Furthermore it is also said that the texture of meat is an important determinant of meat quality, at least determined by three components of meat, namely the structure and contraction status of myofibrils, the content and degree of cross-linking of connective tissue and the binding capacity of water by meat proteins and meat juices. Tenderness is also influenced by ante-mortem factors and post-mortem factors. The provision of sour soy milk and cassava tape in drinking water for 4 weeks of treatment can affect the three meat components that play a role in determining the texture of broiler meat.

The overall acceptance of boiled broiler meat in the control treatment (A) received a lower rating than the treatment of sour soy milk and cassava tape treatment. This is due to an increase in the value of panel results related to eating quality, especially the preference for color, aroma, texture and flavor of boiled broiler meat, and directly shows the high overall acceptance of the acceptance value in B, C, D , E and F compared to Atreatment.

3.2.3.Analysis of Blood Plasma Serum.

The results showed that there was an increase in total serum protein in the probiotic treatment of LAB cassava tape and sour soy milk (treatment B, C, D and F) compared to control (A). This is due to an increase in the activity of digestive enzymes naturally with the presence of LAB sourced from cassava tape and sour soy milk in the broiler digestive tract. So that it is more effective and optimizes the digestibility of feed that is not digested by digestive enzymes naturally becomes available or useful for the formation of essential amino acids and essential fatty acids according to the metabolic requirements of the broiler body. Furthermore, the results of absorption of nutrients by cells of the intestinal mucosa to be channeled throughout the body in the form of blood plasma components such as albumin, globulin and fibrinogen are quite high. So that the excess amino acids will be degraded through the carbohydrate (gluconeogenesis) pathway to produce energy for the synthesis of plasma essential amino acids, as obtained in treatments D, E and F. Total serum plasma broiler proteins are in the standard range of 4.0-5.5 g / dl with 4.5 g / dl in chicken [7]. Whereas the cassava (B and C) tape treatment was higher than

the control treatment, but still below the standard (Table 3.1). The low total plasma protein especially in the control treatment (A) is because the balance between energy and protein consumed by broilers cannot meet the needs of limiting amino acids that are needed in the body's metabolism, thus reducing the growth of blood plasma components, such as gamma globulin acting as anticorpora (the body's defense against germs), it was proven only in the control treatment (A), as many as 4 broilers died at the age of 3-4 weeks (from an initial of 20).

The total blood plasma serum protein treatment containing sour soy milk (D, E and F) is higher than the cassava tape treatment, this is because the soursoy-baccili-containing [14]of soy milk grows faster to acidify milk and produce more peptidase enzymes than enzymes that act as proteinases in sour soy milk. On cassava tape more carbohydrase and lipase enzymes are produced, so that some amino acids formed as components of blood plasma are the result of compounds between the kreb cycle (stage III), with multiples of protein anabolism processes that are not as fast as sour soy milk treatment forms macromolecules of cells.The treatment of B, C, D, E and treatment F through broiler drinking water as a source of probiotic LAB to a decrease in blood serum broiler 1-4 weeks, was statistically significantly different ($P < 0.05$) to the control (A) (Table 3.1).

The low blood serum cholesterol in the treatment given probiotics LAB tape sweet potatoes and sour soy milk, because the LAB fermented products contain the enzyme bile salt hydrolase (Gilliland *et al* 1985 in [11]). Some references report that LAB can produce large amounts of proteinase enzymes, lipases such as lecithinase (plays a role in cholesterol esterification), Hydroxymethyl-glutaral-CoA reductase, azoreductase and nitroreductase in which enzymes prevent absorption of fat in the gastrointestinal tract, resulting in VLDL (Very Low Density Lipoprotein) in the liver down. So that naturally fermented ingredients are more available essential amino acids that play a role in the process of protein metabolism and ration fat consumed by broilers. The probiotics are microbes from food that are beneficial for the microflora in the digestive tract and are able to degrade cholesterol, resulting in a marked decrease in fat, so also the flow of VLDL that comes out of the liver decreases, resulting in a decrease in blood plasma cholesterol.

The results obtained HDL levels (the smallest lipoprotein with the most protein content and the smallest fat concentration) control treatment (A) was the same as the 1%cassavatape (B) and 1% (D) sour soy milk treatment, which was lower than the treatment C, E and F. This shows that the probiotic concentration of LAB in this study, which is 2% both in the form of cassava tape and sour soy milk and a combination of (F) results in increasing HDL levels (good cholesterol). Furthermore, it can be interpreted that the plasma / blood serum of broilers in treatment C, E and F contained higher unsaturated fatty acids compared to the control treatment and concentration levels of 1% (treatment B and D). Remembering the role of HDL in collecting excess cholesterol from broiler tissue and returning it to the liver, then removing it along with bile (LAB has a bile salt hydrolase enzyme) and does not settle in the aortic intima. Contrary to LDL (the smallest lipoprotein, only one of the largest protein content and one of the smallest fats) contains the most cholesterol from all lipoproteins and this is the main cholesterol sender in the blood (LDL = bad cholesterol). In this study, the highest plasma / broiler LDL serum levels were obtained in the control treatment (A), whereas in probiotic LAB cassava tape and sour soy milk (B, C, D, E and F) there was a significant decrease, meaning the effect of consumption probiotics given as in treatment C and E as much as 2% greatly affect the decrease in LDL levels and increase in HDL levels. This is due to several acids-organic acids, essential amino acids, vitamins and minerals contained in cassava tape and sour soy milk which are given through broiler drinking water, useful to improve the metabolic processes of the broiler body as needed. This condition has an impact on the welfare of broilers fulfilled, broiler health conditions are maintained, which in turn produces broiler meat carcass in accordance with expectations. It looks attractive carcass appearance, not easily contaminated during processing and is a guarantee of halal quality, as well

as safe and healthy for consumption.It was very important, namely the results of maintenance in the form of meat carcass products have a healthy level of food safety (food safety) for consumption purposes (without containing residues of animal medicines that cause mutations or resistance to some pathogenic microbes).

4. Conclusions and Suggestions

4.1 Conclusion

Conclusion of the results of this study that the provision of cassava tape and sour soy milk as a source of probiotic Lactic Acid Bacteria (BAL) in broiler drinking water (1 - 5 weeks) gives:

1) The production of carcass and commercial carcasses obtained is the same as the control treatment, quantitatively there is an increase.
2) Organoleptic value of broiler cooked meat obtained higher value (rather like = 6.0 to like = 7.0), compared to control (preference value 5.0 = normal).
3) There is an increase in total serum and HDL protein, on the contrary there is a decrease in broiler blood serum cholesterol and LDL.

4.2 Suggestions

This research can be applied to improve the production and quality of broiler meat carcasses that are safe and healthy for consumers in the wider community.

This research can also be applied to animal feed companies by adding cassava tape or sour soy milk in the form of flour / powder, in anticipation of the damage caused by the nutritional content of feed produced during its distribution.

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