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Blood Cholesterol, LDL and HDL in Crossbred Local Chicken Feed Inulin of Dahlia Tubers as a Prebiotic

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Abstract

The feeding inulin of dahlia tubers as a prebiotic related to the quality of the resulting product is a product low cholesterol. The research was aimed to examine the role of inulin as a prebiotic derived from dahlia flower tuber in the form of powder and extract on blood cholesterol, low density lipoprotein (LDL) and high density lipoprotein (HDL) of crossbred local chicken. The research was assigned in a completely randomized design with 7 treatments and 4 replications (10 birds each), treatments applied were T0: basal ration, T1: ration + 0.4% powder of dahlia tuber, T2: ration + 0.8% powder of dahlia tuber, T3: ration + 1.2% powder of dahlia tuber, T4: ration + 0.39% extract of dahlia tuber, T5: ration + 0.78% extract of dahlia tuber, T6: ration + 1.17% extract of dahlia tuber. The birds were reared for conditioning from day 1 until 3 week, and dietary treatment was given thereafter until 11 week of age. Parameters observed were blood cholesterol, LDL and HDL. The data were statistically analyzed according to ANOVA and continued to Duncan test at the level of 5% probability. The results showed that feeding inulin in the form of powder or extract significantly ($P < 0.05$) decreased LDL and HDL, but not on blood cholesterol. In conclusion, feeding inulin in the form of powder in 1.2% (T3) and extract in 1.17% (T6), able to reduce levels of LDL and HDL but not yet capable of lowering blood cholesterol of crossbred local chicken.

Keywords: crossbred local chicken, inulin of dahlia tuber, blood cholesterol, low density lipoprotein, high density lipoprotein.

A. Introduction

Adult chicken meat demand is likely to increase. However, in reality the cultivation of chicken obstacles that growth is slower than broiler that has a short production period. Attempts to overcome these problems it has done poultry diversification through the development and cultivation of local chicken crosses a descendant among local male chicken with the female race. The local chicken crosses have relatively short production period so that more promising in supporting the poultry in Indonesia because it can be marketed at the age of 50-60 days.

Currently the community health awareness is increasing. People prefer foodstuffs of animal origin in particular poultry-fat and low cholesterol. Consumption of excess fat and cholesterol in humans, harmful to health as it can lead to atherosclerosis (clogged arteries). Recommended fat consumption as much as 15-30% of the total energy consumption and recommended cholesterol < 300 mg daily (Almatsier, 2001). Cholesterol is found in the blood along with triglycerides, phospholipids and apoproteins to form lipoproteins. Lipoproteins in the blood are

chylomicrons, very low density lipoprotein (VLDL), low density lipoprotein (LDL), and high density lipoprotein (HDL) (Sacher et al., 2004). Blood cholesterol levels are high resulting in accumulation of cholesterol in the body.

Cholesterol levels can be affected by animal feed consumed. High fat in the diet will result in increased levels of low-density lipoprotein (LDL) in the blood that is rich lipoprotein cholesterol (Muhajir, 2002), so that the necessary efforts to make low-cholesterol animal products, namely the addition of inulin as a prebiotic. Inulin is classified as a food ingredient that is classified as a prebiotic and provides the best prebiotic effect than other prebiotics (Azhar, 2009). Chemical properties of inulin is soluble in water and cannot be digested by digestive enzymes, but can be fermented by the intestinal microbes. Giving the prebiotic inulin is known to increase the amount of lactic acid bacteria (LAB) so that conditions become more healthy digestive tract, which in turn provide beneficial effects for the host. In addition, administration of prebiotic inulin as closely linked with the quality of the product that is low-cholesterol products. Previous research by Yusrizal and Chen (2003) reported that administration of inulin from chicory root of 1% real lower blood cholesterol levels compared to the control treatment on the broiler. This study aims to assess the role of inulin as a prebiotic to cholesterol, LDL and HDL local chicken blood crosses.

B. Methodology

1. Materials

Research using hybrid local chicken (chicken males with females laying hens) unsex, aged 22 days 280 tail with an average body weight of 180.46 ± 1.21 gram. The ration consists of yellow corn, rice bran, soybean meal, fish meal, vegetable oil, CaCO_3 , minerals, vitamins, flour and flowers dahlia tuber extract. Rations study prepared containing 19% protein and metabolizable energy of 2,800 kcal / kg for the period starter, and protein 17% with 2,800 kcal metabolizable energy / kg for finisher period (Table 1). Rations given treatment for 9 weeks of maintenance from 3 weeks to 11 weeks of age.

2. Method

Chickens reared for 11 weeks during the first 2 weeks chickens reared in cages litter. Age 3 weeks, chickens were weighed to obtain a uniform body weight and were moved to battery cages made of wire in accordance with the treatment and replications. Feeding starter performed at the age of 1 to 45 days and finisher feed is given at age 46 to 77 days. Inulin dahlia tuber extract powder and mixed into a little ration in the morning until consumed, followed by rationing without inulin accompanied ad libitum drinking water. Chickens were vaccinated Newcastle Disease (ND) at the age of 4 days and Gumboro vaccine at the age of 13 days to prevent disease.

Table 1. Experimental Rations and Nutrient Content.

Feed Stuffs	Starter	Finisher
Yellow corn	51,30	47.00
bekatul	15,00	25,00
Soybean meal	22.50	18.00
Fish flour	10,00	8.00
CaCO_3	0.70	1.20
Vitamins and Minerals	0.50	0.80
Total	100.00	100.00
The content of nutrients:		
Metabolic energy (kcal / kg) *	2821.89	2872.80
Crude Protein (%) **	19.46	17.56
Crude Fat (%) **	4.99	5.75
Crude Fiber (%) **	4.81	5,94
Methionine (%) ***	0.44	0.39
Lysine (%) ***	1.26	1.08
Arginine (%) ***	1.39	1.23
Calcium (%) **	1.02	1.01
Phosphorus (%) **	0.66	0.64

Source:

*)Based on calculations (Hartadi et al., 2005).

**) Analyzed proximate in Nutrition and Feed Science Laboratory, Faculty of Animal Husbandry and Agriculture, Diponegoro University (2014).

***) Based on Table NRC (1994).

3. Treatment design

The study used a completely randomized design (CRD) with 7 treatments and 4 replications, so that a total of 28 experimental units. Each test or experimental unit consisted of 10 chickens so that the overall amount of chicken as many as 280 birds. The treatments consisted of: T0 = ration without addition of flour and extracts of dahlia tubers, T1 = + 0.4% ration dahlia tuber flour, T2 = ration + 0.8% dahlia tuber flour, T3 = ration + 1.2% starch tubers dahlia, T4 = ration + 0.39% dahlia tuber extract, T5 = ration + 0.78% dahlia tuber extract, T6 = ration + 1.17% dahlia tuber extract. Parameter research includes blood cholesterol, LDL and HDL blood. Blood sampling performed at the end of the study as many as 1 whole chicken on each experimental unit. Blood samples were taken from the brachial veins in the wings as much as ± 3 cc then analyzed to determine the levels of cholesterol, HDL and LDL in the Laboratory of Clinical Pathology, Faculty of Veterinary Medicine, University of GadjahMada. Data analysis of variance (ANOVA) with F test at 5% level. If there is a real effect, followed by Duncan test (Steel & Torrie, 1991).

C. Result and Discussion

The mean blood cholesterol, LDL and HDL from application of starch and inulin extract dahlia tubers are presented in Table 2. The results of variance analysis showed that the source of inulin from dahlia tubers form of powder or extract significant ($P < 0.05$) cholesterol levels and a blood HDL, but not on blood cholesterol levels.

Table 2. Blood cholesterol, LDL and HDL on Local Chicken Crosses.

Treatment dahlia tubers	Blood cholesterol (mg/dl)	LDL (mg/dl)	HDL (mg/dl)
T0	136.50 $\pm$ 19.64	37.01 $\pm$ 9.35 ^a	80.84 $\pm$ 17.70 ^b
T1	127.76 $\pm$ 14.34	32.51 $\pm$ 2.79 ^{ab}	99.82 $\pm$ 14.23 ^{ab}
T2	122.17 $\pm$ 23.90	21.73 $\pm$ 14.67 ^c	106.38 $\pm$ 19.10 ^{ab}
T3	125.83 $\pm$ 15.80	26.77 $\pm$ 6.52 ^{bc}	105.13 $\pm$ 15.44 ^{ab}
T4	124.73 $\pm$ 19.03	30.52 $\pm$ 6.56 ^{abc}	92.10 $\pm$ 13.93 ^{ab}
T5	124.99 $\pm$ 10.64	23.96 $\pm$ 6.50 ^{bc}	93.24 $\pm$ 6.55 ^{ab}
T6	123.06 $\pm$ 9.22	21.06 $\pm$ 2.49 ^c	107.05 $\pm$ 15.56 ^a

Different superscripts in the same column indicate significant differences $P < 0.05$. Description: T0: The ration without flour and extracts of dahlia tubers, T1: Rations + 0.4% dahlia tuber flour, T2: Rations + 0.8% dahlia tuber flour, T3: Rations + 1.2% dahlia tuber flour, T4: rations + 0.39% dahlia tuber extract, T5: + 0.78% ration dahlia tuber extract, T6: + 1.17% ration dahlia tuber extract.

Treatment with the addition of inulin extract 1.17% (T6), produce high levels of LDL are markedly lower than T0 and T1, however, between the treatment T2, T3, T5 and T6 no different. On the other hand, HDL levels were significantly higher in T6 than T0, between the other treatments (T1 T2, T3, T4 and T5) showed similar values (Table 2).

Total blood cholesterol shows no significant effect ($P > 0.05$) but, numerically showed slightly lower as a result of treatment inulin dahlia tubers either powder or extract compared to the control treatment. This happens because inulin is a carbohydrate that is not digested by the host animal nonruminant, but can be fermented by microbes prebiotic digestive tract become a sort of chain fatty acid (SCFA) in the form of acetate, propionate and butyrate. Sort chain fatty acids are then absorbed and metabolized in the hearts and involved in the regulation of lipid and sugar (Heavy and Rowland, 2004). Lipid regulation process can be explained that propionate finish HMG CoA reductase which is a catalyst mevalonic acid formation of beta hydroxy beta methylglutaryl CoA. Mevalonic acid is a precursor of cholesterol. Thereby inhibiting the formation of cholesterol propionate (Kaur and Gupta, 2002). The metabolism of the above is supported by the data Fanani (not yet published), of propionic acid increased from 3.60 mMol / l (T0), 5.65 mMol / l (T3) up to 6.37 mMol / l (T6). The results of this study are supported by the findings of Velasco et. al. (2010), that the addition of inulin to the diet has a beneficial effect on blood cholesterol by reducing the concentration triasilgliserida in broilers.

Treatment with the provision of the highest inulin, are able to provide more fiber material to be fermented microbial digestive tract so that it can produce a high SCFA, especially acetate, propionate apart. Fanani's research results (data not published) show that SCFA, especially acetate increased from 14.66 mMol / l at T0 be 24.38 mMol / l at T6, also led to a decrease in pH in the digestive tract of 6.10 and 5.45 at T0 T6 (Krismiyo, unpublished). The second component of the metabolite could inhibit the growth of pathogenic bacteria and instead increase the number of BAL. The BAL Improved support increased enzyme bile salt hydrolase (BSH), which related in lowering blood cholesterol. In the opinion of Surono (2004), that inulin is known to increase the growth of LAB have a mechanism in lowering cholesterol by producing enzymes BSH that produce bile acids deconjugated (compounds that do not react with other compounds), in the form of cholic acid-free which is poorly absorbed by the gut smooth. The bile acids to form bile salts. Deconjugation bile salts easier wasted through feces resulting in more cholesterol is needed so that cholesterol in serum bile salts used to form again, which in turn causes serum cholesterol levels in the blood decrease. Furthermore, Hartoyo et al. (2005) states that hearted attempt to secrete bile acids to replace the lost with excreta.

The mechanism supported LDL levels were significantly lower as a result of the provision of inulin tubers of dahlias form of powder or extract compared with controls, whereas an increase in HDL cholesterol due to administration of inulin tubers of dahlias than in controls. Increasing HDL levels showed that there is a response from the treatment that is given, as Hartini and Okid (2009) states that high levels of HDL prevents the risk of occurrence of atherosclerosis by means transports cholesterol from peripheral tissues to the liver and reduces excess cholesterol. According to Murray et al., (1996) Molecular HDL lipoproteins are small relative to the other so that HDL can pass through vascular endothelial cells and into the intima to transport of cholesterol accumulated in the macrophages, besides HDL also have antioxidant properties that may help prevent the oxidation of LDL.

The above phenomenon has implications for chicken products in relation to cholesterol reduction. Tannock (1999) reported that the cholesterol-lowering mechanism known as BAL can be coprostanol degrade cholesterol, a sterol that cannot be absorbed by the intestine. Furthermore, coprostanol and the rest of the cholesterol issued together with the feces. Thus, the amount of cholesterol is absorbed by the body to be low.

LDL and HDL are two types of lipoproteins that function circulate in the blood so kosentrasinya cholesterol in the blood is influenced by the amount of cholesterol synthesized (Hasanuddin, 2013). Montgomery et al. (1993) suggests that LDL cholesterol plays a role in providing the body tissues for a major career for cholesterol from the liver to body tissues, so that the levels of LDL in the blood is influenced by the concentration of cholesterol. On the other hand, HDL is a lipoprotein that maintains the balance of cholesterol in order not to accumulate inside the cell, the balance is managed by the transport of sterols of the membrane at a rate equal to the amount of cholesterol is synthesized to the liver (Dietschy, 2003).

D. Conclusion

Provision of inulin in the form of flour to 1.2% (T3) and extract up to 1.17% (T6) can lower blood levels of LDL and HDL, but less capable of lowering blood cholesterol local chicken crosses.

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Use of Glycerol as Cryoprotectants in Freezing Sentul Chicken Semen

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Abstract

On the freezing semen chicken cryoprotectants required to overcome the damage of spermatozoa due to cold shock. This study aims to get the best concentrations of cryoprotectants glycerol concentration of 5%, 7% and 9% in freezing Sentul chicken semen. The semen used in this study came from three chickens Sentul and be repeated nine times. Semen was collected by messase methods for three times a week. Semen was evaluated macroscopic and microscopic. Furthermore spermatozoa diluted with egg yolk and the addition of three concentrations of cryoprotectants glycerol (5%, 7% and 9%). Semen diluted 0:25 ml is packed into straw. Then equilibrated at a temperature of 5°C for two hours. After equilibration to evaluate the motility and viability of spermatozoa. Furthermore, frozen in liquid nitrogen vapor for 10 minutes. Frozen semen is then stored in liquid nitrogen containers with temperature -196°C. After 24 hours, semen is thawed at 37°C for 30 seconds. The results showed that the percentage of sperm motility and viability of frozen semen cock Sentul using glycerol cryoprotectants 5% better P (<0.05) compared with the use of glycerol 7% and 9%. The use of glycerol 5% at this stage of equilibration and storage can reduce the damage of spermatozoa in the semen of chicken Sentul. Neither glycerol 5% could increase recovery rate after thawing.

Keyword: frozen semen, chicken Sentul, glycerol

A. Introduction

The chicken is a commodity cattle that is very common in Indonesia. A genetic resource of local chickens known to have a genetic variation is quite high. One type of local chicken is chicken Sentul among which is the original chicken Ciamis regency endangered and is now intensively maintained by several groups Sentul chicken lovers. In the breeding program of male sperm quality testing needs to be done to get high productivity. Semen that has led to poor quality eggs fertility is low and vice versa for good quality semen will produce a percentage of fertile eggs better. It depends on the stud, in particular the quality of the semen produced by stud.

One effort Sentul chicken germplasm conservation is the conservation of semen. Cryopreservation of semen is one of the common ways to extend the viability of spermatozoa

and one of the ways to preserve endangered germplasm chicken. Cryopreservation techniques as well as an additional supporting factor is excellent for in situ conservation and is also used in the selection program. Meanwhile, according to Fulton (2006) cryopreservation of germplasm will be a very valuable tool for the poultry industry and for the successful preservation of poultry genetic resources that still exist.

In the freezing process frequently encountered is cold shock and cell damage caused by the formation of ice crystals. Thus it is critical to the success of the poultry semen cryopreservation cryoprotectants with the election of the right to protect spermatozoa from freezing effect (Suidzinska and Lukaszewicz, 2008). Diluents semen should contain a source of nutrients, buffers, anti cold shock, cryoprotectants, antibiotics, easily soluble in water and must have a molecular weight small in order to more quickly penetrate into cells and reduced toxicity due to osmolarity is high (Alvarenga et al., 2005). To overcome the cold shock and the formation of ice crystals, then in the process of freezing semen cryoprotectants added to stabilize the plasma membrane of spermatozoa during the freezing process. Cryoprotectants role in protecting spermatozoa during cryopreservation (Arifiantini and Supriatna, 2007).

Glycerol is intracellular cryoprotectants are most widely used for freezing semen. Glycerol can go inside sperm cells to bind most of the free water, so that ice crystals are formed in the diluent medium at the time of freezing can be prevented. The concentration of glycerol used is different depending on the type of semen and diluent used (Azizah and Arifiantini, 2009).

Cryoprotectants are needed to prevent the formation of ice crystals, but also is toxic cryoprotectants during equilibration and after thawing. On the basis of research conducted with the use of cryoprotectants glycerol level of 5%, 7% and 9% to get the best of glycerol concentration on freezing semen on chickens Sentul as local chicken Indonesia.

B. Methodology

1. Materials

Sentul male chickens used as a source of semen in this study have sex adult, 1 year old, able-bodied and have the best quality of daily semen production. Sentul male chickens caged individually. Feed given in the form of finished feed (commercial feed) shaped pellets of companies PT. Gold Coin Indonesia. Feed nutrient content is at least 17% crude protein; 2229.40 Kcal of energy metabolism, a maximum of 6% crude fiber, at least 3% fat, up to 14% Ash, 0.6-1% phosphorus, and calcium 3.0-4.2%. Feed given at a dosage of 150 g / day and the provision of drinking water ad libitum. Chickens used Sentul male semen collector and adapted to the cage environment. Adaptation takes two months. Once accustomed to the cage environment and collectors, the new chicken can be used in research to be accommodated semen.

2. Method

This research was conducted in cages Poultry Breeding, Faculty of Animal Husbandry and Animal Reproduction Laboratory, Faculty of Veterinary Science IPB. The study was designed using completely randomized design (CRD) with three treatments cryoprotectants glycerol (5%, 7% and 9%) and nine Deuteronomy.

Preparation Materials diluents

Diluent used is glucose, egg yolks, penicillin, streptomycin, glycerol and ringer lactate. Concentration Glycerol is used as a diluent (Table 1).

Table 1. Composition of Diluent Used Frozen Semen

Composition	Glycerol		
	5 %	7 %	9 %
Ringer lactate (mL)	8.5	8.3	8.1
Yolk (mL)	1	1	1
Glycerol (mL)	0.5	0.7	0.9
Penicillin (IU mL ⁻¹)	1000	1000	1000
Streptomycin (mg mL ⁻¹)	1	1	1
Total (mL)	10	10	10
Osmotic Pressure (mOsmol kg ⁻¹) ^a	1230	1800	2298
pH ^b	7	7	7

^aDiluent osmotic pressure was measured using osmometer. ^bpH diluent adjusted (served) with *Tris hydroxymethyl aminomethan*.

The equipment used for the storage of semen and evaluation of both semen fresh or frozen semen is the syringe 1 cc, microtube 2 cc, a light microscope electricity (Olympus CH 20), microscopes, glass objects, glass cover, tube rack semen, counting chamber, plastic pipette, straw cutter or scissors, and refrigerators. While the equipment Involved to kriopresevasi semen Including freezing and thawing of frozen semen include collection tubes semen 2 cc, test tubes 5 cc, micropipette, tip micropipette, styrofoam box, set the storage of frozen semen (storage container) or container of liquid nitrogen (- 196oC), pipette, straw-sized 0:25 ml, 1 cc syringe fitted with connectors straw, tube racks, semen in a plastic box, Bunsen, a thermometer and a fridge.

Semen collection Fresh Chicken Sentul

Sentul chicken semen collection from each treatment three times a week. The technique used is semen shelter with sorting (massage) on the back of the chicken. Shelter semen carried by two people. Holding a chicken on his thighs with his left hand while massaging the back of the chicken to stimulate the release of semen, and another preparing large-scale semen reservoir tube and a tissue cleanser chicken manure. Ordering is done several times until the occurrence of a stimulus in chickens characterized by stretching the chicken's body and the release of proktodaeum cloacal papillae. When the erection reaches a maximum, right and left hands of people who do the sorting cooperate flushed semen. At the same time, the second man getting ready to accommodate large-scale semen reservoir tube.

Semen Evaluation Fresh Chicken Sentul

Fresh semen evaluation is performed to determine the quantity, quality and characteristics of fresh semen from a male chicken Sentul. Semen examination carried out according to standard methods which include macroscopic and microscopic evaluation.

a. Macroscopic Evaluation

Microscopic evaluation conducted to estimate the quality of semen in plain covering;

1. Volume: Total volume per ejaculation, can be directly observed on the scale tube.
2. Color: The color is observed in organoleptic through direct observation.
3. Consistency / degrees of viscosity: done in a bright place, by way of the tube is tilted and a few moments later reestablished. Scale viscosity of semen is observed that liquid (semen will soon return to the bottom of the tube, being (semen will soon return to the bottom of the tube at a speed that is slower than the first, most semen still attached to the wall of the tube) and thick (semen back to the bottom of the tube slowly and left semen on the outskirts of the tube).
4. pH is measured with a pH indicator.
5. Smell: can be determined by kissing on the surface of the tube.

b. Microscopic evaluation

1. Movement of spermatozoa

- a. Mass Movement (mass activity): It is an evaluation conducted to see the motility of spermatozoa to move together. How inspection and penilaan mass movement is dripping with semen to glass objects and then observed under a microscope with a magnification of 10 X 10 (100X), waves are seen in the form of a cloud-like clot. Assessment is done by looking at the thickness of the mass wave of spermatozoa and spermatozoa velocity change places. Ratings are determined from:
 1. Very good (+++) is a mass wave of thick and fast on the move.
 2. Good (++) is a thick mass wave but slow migratory or mass wave being but a quick move.
 3. Medium (+) is a mass wave of thin and slow move.
 4. Poor (0) or necrospermia (N) is no mass wave.
- b. Individual progressive movement / motility: progressive motility of spermatozoa by calculating the percentage of progressively motile spermatozoa of total spermatozoa in the sample. Because semen contains millions spermatozoa, the semen was diluted using physiological fluids (physiological NaCl 0.9%). As for the method of calculating the progressive motility of spermatozoa is subjective basis of five quantitative visual field using an electric light microscope (Olympus CH 20) magnification of 400 times in the range of 0-100% with a scale of 5%.

2. The percentage of spermatozoa (sperm count / ml of semen): How is the determination of sperm concentration, sperm diluted with formosalin much as 499 microns and semen as much as 1 micron then dribbled sperm that has been diluted to a glass object. The concentration was observed wearing a counting chamber is then observed under the microscope.
3. Percentage of Life (Viability): Performed by using the preparations and eosin staining nigrosin. Spermatozoa counted in 10 random visual fields, the head of spermatozoa which do not indicate that the spermatozoa stained and stained life is dead spermatozoa

$$\text{The percentage of live sperma} = \frac{\text{Number of Live Sperma}}{\text{Total Spermatozoa}} \times 100\%$$

4. Sperm abnormalities: Abnormalities of spermatozoa obtained by calculating abnormal spermatozoa with making preparations pillowcase and observed under a microscope with a magnification of 10 x 40. As for the method of calculating the number of abnormal spermatozoa is abnormal spermatozoa divided by 200 multiplied by one hundred percent visible. The percentage of abnormal spermatozoa will be obtained by using the following formula :

$$\text{Abnormalities of Spermatozoa} = \frac{\text{Abnormalitas of Spermatozoa}}{200} \times 100\%$$

5. Pressure Measurement Osmosis Fresh Semen Materials and diluents

Semen Packaging

Semen that has been qualified and then do the next process. The terms of motility that is more than 60%, the mass movement ++ / +++, the percentage of living at least 65%. Semen is diluted with the treatment of this type of cryoprotectants glycerol with a concentration of 5%, 7% and 9%, inserted into the straw.

Semen equilibration of Chicken Sentul

Furthermore straw that has been filled with semen was placed in the refrigerator for equilibration process, at a temperature of 5 ° C for 2 hours. Then half of the semen which has been equilibrated observation motility and viability (percentage of live sperm) to determine the decline in semen quality after equilibration. The rest of the Straw that has been equilibrated then placed on a shelf freezing, which placed 5 cm above the surface of liquid nitrogen for at - 110oC temperature for 10 minutes.

Storage

Frozen semen stored in liquid nitrogen for further testing.

Semen Quality Testing Sentul Post-thawing Frozen Chicken

Tests carried out 24 hours after storage. Semen freezing-thawing in warm water (37 ° C) for 30 seconds. Parameters measured in semen examination are the percentage motility and viability. The success of freezing also assessed by Recovery rate (RR) is the percentage of spermatozoa was successfully recovered from the freezing process is calculated by comparing the percentage of motile spermatozoa in fresh semen, and after thawing.

$$RR = \frac{\text{ThePercentage of Motile Sperma of ter Thawing}}{\text{ThePercentageog Motile Spermatozoa Fresh Semen}} \times 100\%$$

C. Result and Discussion

1. Characteristics of Semen Fresh Chicken Sentul

Macroscopic observation showed that semen quality fresh chicken Sentul fairly well (Table 2). All the characteristics of the fresh semen in the normal range. The degree of acidity (pH) is relatively neutral with the average of 0.12 ± 7:07, white, thick consistency, a great mass movement (+++) and a distinctive smell. As stated by Iskandar (2007) that the quality of good sperm should have a thick and creamy white. Although the average volume of chicken Sentul obtained only 0:12 ± 0:03 ml or lower than 0.2 ml volume Kampung chicken (Junaedi et al., 2016); 0:22 Pelung chicken ml (Junaedi 2015); and chicken Merawang 0:17 ml (Sartika, 2010). The low volume of research Sentul chicken due semen shelters often done in a week ie three times a shelter in a week. It shows that the semen shelters often do chicken can reduce semen volume.

Table 2. Characteristics of Semen Fresh Chicken Sentul

Parameter	Result
Color	White
Viscosity / consistency	Thick
Mass movement	+++
Smell	Typical
pH	7:07 ± 0:04
Volume (ml)	0:13 ± 0:01
Motility (%)	83.33 ± 1.86
Viability (%)	92.36 ± 1:51
Concentration (M/ml)	2956 ± 328.77
Concentration/Ejaculation (million/ ejaculation)	376.88 ± 36
Total Abnormalities (%)	6.87 ± 1:09
Primary abnormalities	
-Abnormalitas Acrosome (%)	1:11 ± 0.96
-Abnormalitas Head (%)	1:19 ± 0:29
abnormalities Secondary	
-Abnormalitas Weight (%)	0:08 ± 0:13
-Abnormalitas Tail (%)	4.73 ± 0.71
The osmotic pressure (mOsmol / kg)	277

Microscopic motility in Sentul chicken was $83.33 \pm 1.86\%$. This figure is within the range of normal motility which ranges from $> 70\%$ according to the instructions Dumpala et al. (2006). Motility is one indicator of the size of the ability of spermatozoa fertilize the ovum in the fertilization process. Progressive motility of spermatozoa (move forward) become an absolute benchmark that counts. This means moving spermatozoa spinning or moving in a much less that do not move are not used as a measure of quality assessment of spermatozoa. Viability of fresh semen chicken Sentul $1:51 \pm 92.36\%$ larger than the chicken viability Parent stock of $82.3 \pm 5.9\%$ based on the results of research Castillo et al. (2010), chicken Pelung 90.97% (Junaedi 2015) and Kampung chicken 91.14% by Junaedi et al. (2016).

Sentul chicken sperm concentration obtained was 2956 ± 328.77 million / ml and this figure is lower than some other breeds of chickens are 3.12 billion chicken Kampung (Junaedi et al., 2016); 3.1 billion chickens Arab (Ervandi, 2011); 3:19 Pelung chicken billion (Junaedi 2015) and 3 billion in chickens Filina (Saleh, 2004). The concentration of spermatozoa / ejaculate chicken Sentul is 376.88 ± 36 million / ejaculation. The concentration per ejaculate in chickens is calculated to determine the ability of males to cradles females.

The total percentage of abnormal spermatozoa chicken Sentul $1:09 \pm 6.87\%$. There are two kinds of abnormal spermatozoa were found in chickens Sentul i.e. primary abnormality includes abnormality acrosome $1:11 \pm 0.96\%$ and $\pm 0:29$ 1:19 head abnormality% while secondary abnormalities include abnormalities of body $0:08 \pm 0:13$ tail abnormalities 4.73% and $\pm 0.71\%$. In general, the primary abnormality factor that most fighting is a genetic disorder of the individual animals while secondary abnormalities were most instrumental factors are environmental factors. In general abnormality chicken spermatozoa abnormalities both in total and on primary and secondary abnormality is still in the low category.

2. Semen Quality Frozen of Chicken Sentul

Statistical analysis of variance showed treatment usage levels of cryoprotectants glycerol after equilibration significant effect ($P < 0.05$) on motility of frozen semen spermatozoa chicken Sentul. The percentage of motility in the use of glycerol 5% ($3:53 \pm 78.33\%$) better than the glycerol concentration of 7% ($71.77 \pm 6.97\%$) and glycerol concentration of 9% ($3:31 \pm 73.51\%$). Based on these results it can be seen that the concentration of glycerol overload can cause toxic to spermatozoa so that the content of glycerol which leads to high motility of spermatozoa is low. While the viability of spermatozoa after equilibration in glycerol treatment showed no effect ($P > 0.05$).

Sentul chicken frozen semen quality after thawing is best assessed quantitatively is the use of glycerol 5% to $36.48 \pm 4:28$ motility and viability $50.08\% \pm 3.89\%$ (Table 3). Based on statistical

analysis of sperm motility test on 5% glycerol treatment was significantly different p (<0.05), with 7% glycerol and glycerol 9%. The low percentage of motility and viability after thawing in chickens because spermatozoa are easily damaged. Poultry spermatozoa head shape like a crescent, causing the neck is broken in the process of storage. From these results, it is known that excessive use of glycerol which can degrade the quality of frozen semen. It is also explained by Ihsan (2013) that the metabolic processes spermatozoa will produce energy and a bit of lactic acid, but when the concentration of glycerol in excess diluent / too high, it will form more of lactic acid. Lactic acid can lower the pH and is toxic to spermatozoa.

Table 3. Quality of freezing semen at the various stages of the three concentrations of glycerol

stages freezing	Glycerol Concentration (%)		
	5	7	9
Fresh Semen			
• Motility (%)	83.33 $\pm$ 1.86	83.33 $\pm$ 1.86	83.33 $\pm$ 1.86
• Viability (%)	92.36 $\pm$ 1:51	92.36 $\pm$ 1:51	92.36 $\pm$ 1:51
After Equilibration			
• Motility (%)	78.33 $\pm$ 3:53 ^a	71.77 $\pm$ 6.97 ^b	73.51 $\pm$ 3:31 ^b
• Viability (%)	88.12 $\pm$ 3:57	87.17 $\pm$ 3.75	85.61 $\pm$ 3:15
After Thawing			
• Motility (%)	36.48 $\pm$ 4:28 ^a	30.92 $\pm$ 8.90 ^b	31.78 $\pm$ 8:53 ^b
• Viability (%)	50.08 $\pm$ 3.89	47.06 $\pm$ 9.94	43.53 $\pm$ 9:57
Recovery Rate (Rr)	44.03 $\pm$ 6:51 ^a	36.95 $\pm$ 10:17 ^{ab}	33.54 $\pm$ 11.72 ^b

Description: different letters that follow the numbers on the same row and column shows the difference (significantly different ($P < 0.05$)), while the results are not contained letters show results not significantly different ($P > 0.05$).

The success is not only seen freezing semen quality after thawing, but also from the number of spermatozoa were successfully recovered from the freezing process called recovery rate (RR). RR value of the use of diluent glycerol 5% higher (44.03 $\pm$ 6:51%) compared with 7% glycerol (36.95 $\pm$ 10:17%) and glycerol 9% (33.54 $\pm$ 11.72%). In the statistical analysis showed that 5% glycerol significantly different ($P < 0.05$) with glycerol 9% but not significantly different from the concentration of glycerol 7%. Glycerol will provide effective protection against spermatozoa during the freezing process if the concentration is in the optimum dilution.

Osmotic pressure test shows that fresh semen on chickens Sentul has a value of 277 mOsmol/kg (Table 2). Osmotic pressure testing is useful for determining the exact concentration of glycerol used in chicken semen freezing. The test results osmotic pressure on diluent semen is 1230-2298 mOsmol/kg (Table 1) shows the osmotic pressure is considerably higher than the osmotic pressure of semen chicken. The test results osmotic pressure diluent with the addition of a diluent of glycerol obtained semen frozen chicken with ideal osmotic pressure is 1230 mOsmol/kg. The ideal osmotic pressure obtained from the addition of 5% glycerol concentration in the frozen semen diluent. Based on these results it appears that diluent has hiperosmotik pressure. The high osmotic pressure outside the cell will cause the release of water from the cells, causing the cells to contract and the cell fluid that comes out is replaced by cryoprotectant (Souhoka *et al.* 2009).

3. The decline in the quality of spermatozoa Semen Frozen Chicken Sentul

a) Decrease in Motility

To facilitate the evaluation of the success and know the quality of each stage of the decline in this study, we evaluated the motility of fresh semen, after equilibration, and after thawing. The decline in the percentage of motility in the study of fresh semen - after equilibration - after thawing results showed that the use of glycerol 5% is the best. 5% glycerol to minimize the loss of quality of spermatozoa at each stage (Figure 1). Deterioration in the quality of fresh semen to after equilibration is low ranging between 5-11.56%, from after equilibration after thawing decline to high start between 40.85 - 41.85%. While overall that the decline in the quality of fresh semen-spermatozoa after thawing ranged 46.85-52.41%.

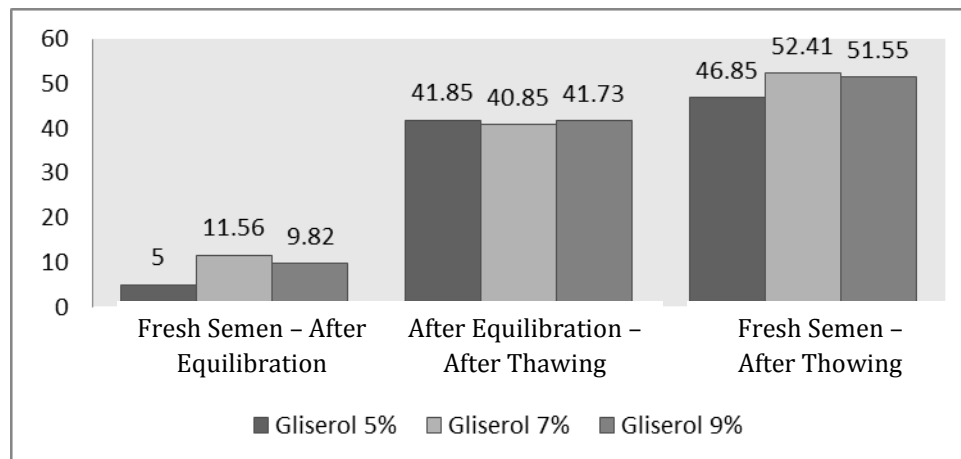


Figure 1. The decline in the percentage of sperm motility Sentul chicken at every stage clotting

b) Decrease in Viability

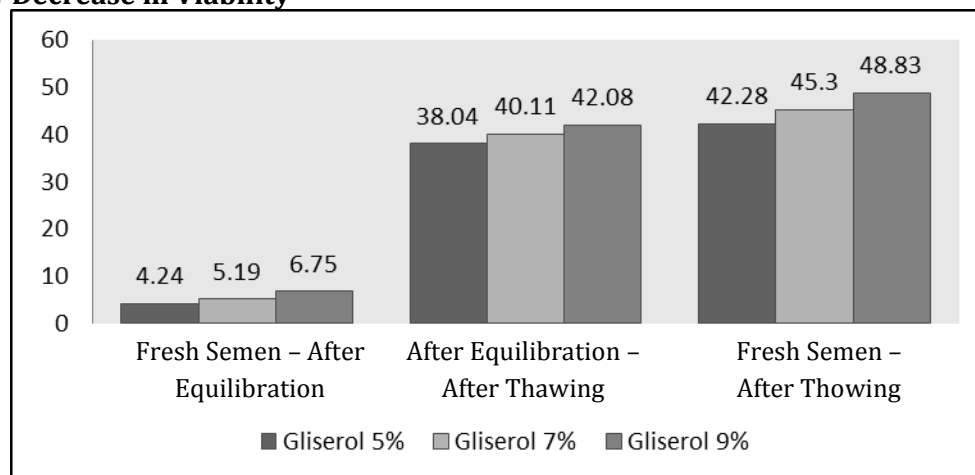


Figure 2. The decrease in the percentage of spermatozoa viability Sentul chicken at every stage clotting

From the results of research on semen frozen chicken Sentul with the use of three concentrations of glycerol was found that the decline in the quality of spermatozoa from fresh semen after equilibration obtained the best results in a row glycerol 5% (4:24%), glycerol 7% (5:19%), then glycerol 9% (6:75%), while after equilibration best account after thawing glycerol consecutively glycerol 5% (38.04%), glycerol 7% (40.11%) and glycerol 9% (42.08%). The quality of spermatozoa from fresh semen - after thawing use of glycerol 5% (42.28%) and glycerol 7% (45.3%) and glycerol 7% (48.83%). Loss of viability of spermatozoa occurs because the chemical properties that produce spermatozoa cell metabolism which can be toxic to life. Yulnawati and Setiadi (2005) explains that the spermatozoa are dead and become toxic to spermatozoa were still alive, so in general a quality decrease. The existence of substances that are toxic both derived from the spermatozoa that have died or are derived from substances contained of a diluent which has undergone oxidation due to storage can lead to high levels of free radicals that can damage the integrity of the plasma membrane of the spermatozoa. Neither the opinion Solihati et al. (2006) that the number of dead spermatozoa will affect the spermatozoa were still alive during the storage process.

D. Conclusion

From the research that has been done can be concluded that the use of glycerol 5% at this stage of equilibration and storage can reduce the damage of spermatozoa in the semen of chicken Sentul. Neither the addition of 5% glycerol concentrations can increase recovery rate after thawing.

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Development Strategy of Goat in Polinggona District

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Abstract

This research aims to identify the availability of input, effort and determine the feasibility of developing a business development of strategy of the District Polinggona. The method of this research was purposive sampling and was as many as 45 heads of household. Data collected consist of primary and secondary data. The result of this research showed the availability of inputs in the research area. Economically feasible to be developed because of the acceptance and the average obtained by the average total cost every goat breeder consecutively year of Rp. 10,120,888.89 and Rp. 9,733,614.43 with the value of R / C Ratio was 1.04. Obstacles encountered in the research area was the rainy season, still traditional inputs, using of care of livestock, lack of education and competition. Strategy needed to tackle the problem is to increase the production and quality of livestock as well as cooperating with the government Kolaka. The conclusion of this research were availability of the factors of production, encourage increased gains achieved so goats worthy effort in development and is supported by a development strategy that is effective in raising goats.

Keywords: development Strategy, feasibility analysis, SWOT matrix, and Mixed Nuts Ettawa goats.

A. Introduction

The livestock sector has an important role in providing animal protein, employment, poverty alleviation and development potential of the region. Demand for livestock products increased from year to year, in line with the improvement of people's nutrition awareness. Food and livestock products, especially meat, milk, and eggs are a source of animal protein that is needed for the quality of public nutrition (Sudrajat, 2000).

Commodity goat farm is the other side of some aspects of development are important and need serious attention coupled to appreciate the program's self-sufficiency in meat national level so that commodity this ranch is one of the important aspects that need to be considered as a source of meat that has quality and quantity in the global market competition.

The priority in improving the welfare of the community in the area of the farm is a very promising potential if supported by a maintenance management system that has a value of efficiency and effectiveness to improve the acceleration, the physical development of cattle that led to the increase in income and welfare of livestock farmers and their families.

Goats are growing in Sub Polinggona generally a goat types of Crossbreed Ettawa (PE) and goat nut, which has the ability to use quality feed is low, as the grass, weeds, agricultural waste (rice straw, corn straw, pod husks), cover crops (gliricidia, lamtoro gung, banana leaf) and others. Thus, the goats can be developed in paddy fields, plantations, forests, and even can be developed in the area of the yard.

District Polinggona has considerable potential for the development of goat. However, there are various issues that also need attention so that goats can thrive. Good potential for development and the problems that hamper the needs are well identified in order to develop

strategy development right goats in the District Polinggona. The purpose of this study was to identify the availability of input, effort and determine the feasibility of developing a business development strategy goat in the District Polinggona.

B. Methodology

1. Time and Research Location

This research was conducted in January to February 2015. The study was conducted in seven villages in the district Polinggona covering Village Polinggona, Village Pondouwae, Village Wulonggere, Village Puudongi, Village Plasma Jaya, Village Tanggeau, and Village Lamondape.

2. Data resources

The types and sources of data used in this study are primary data and secondary data. Primary data is data obtained from respondents by some farmers using a questionnaire that has been prepared and direct observations in the field. For secondary data is data obtained through the study of literature related to the potential data sub-district of offices and relevant agencies.

3. Population and Sample

The population in this study is the livestock farmers who raise goats. The research location 7 villages that were determined by purposive sampling based on the highest number of livestock reared livestock farmers each village. The number of respondents in rural areas taken is 15 people who were taken according to the number of cattle most, if certain villages not reached 15 people, hence census is applied.

4. Variables

The variables were observed in this study is:

- a) General description of the study area
- b) Availability of inputs that include goat raising goats population in each village, the availability of forage in the pasture, the land area that can be used for a population of goats, the availability of facilities and infrastructure development as well as systems and goat rearing.
- c) Feasibility goat rising based on the system and track marketing and benefits during the maintenance.
- d) The development strategy that should be applied in the goat raising, goat farming technology implementation and support of local government policies, related to livestock development

5. Data analysis

Hypothesis 1 was tested using descriptive analysis, i.e. by observing the extent to which the availability of inputs (seed, feed, cages, land, labor, capital) at the study site. Hypothesis 2 was tested using the formula:

$$Pd = TR - TC$$

Where: Pd = Revenue of goat breeders

TR = Total Revenue

TC = Total Cost

These calculations are used to determine the benefits of capital invested (Soekartawi, 2002). To determine the feasibility hence formulated:

$$R/C = \frac{TR}{TC}$$

Where : R/C = Ratio

TR = Total Revenue (Rp)

TC = Total Cost (Rp)

To see the feasibility in accordance with the results of the analysis, the criteria used is:

R/C Ratio > 1, stated that the livestock farming profitable.

R/C Ratio = 1, stated that livestock farming is experiencing a breakeven (*Break Event Point*).

R/C Ratio < 1, stated that livestock farming is not profitable.

Hypothesis 3 tested with data retrieval using SWOT analysis (strengths, weaknesses, opportunities and threats). The data was then tabulated and analyzed descriptively. SWOT analysis is to identify the various factors systematically to formulate the company's strategy. This analysis is based on the logic that maximizes the strengths and opportunities, but at the same time minimizing weaknesses and threats strategic decision making process is always associated with the development of the mission, goals, strategic and corporate policy.

C. Result and Discussion

1. Description of District Polinggona

a. Geographic Location and Condition

- a) District Polinggona located 70 km from the district capital is Kolaka. Administratively, District Polinggona have boundaries as follows:
- b) North side adjacent to District Tanggetada
- c) South side is bordered by District Watubangga
- d) The western side is bordered by District Watubangga
- e) Easter with District Ladongi

District Polinggona extensively whole is 46.65 km², where most of the land is used for agriculture and livestock. Type of plant widely cultivated is the type of crop and livestock types are widely cultivated are cattle, goats, and some types of poultry such as chickens, ducks and other fowl.

b. Land Use

District Polinggona located in a mountainous area with an altitude of 75-300 m DPL, temperate and the highest rainfall occurs from August to December while the dry season occurs from May to July. Broad picture of land in District Polinggona according to their use can be seen in Table 1.

Table 1. Land Use at District Polinggona 2014

No.	Type	Area (Km ²)	Percentage (%)
1	Building / Surrounding	4.79	10.26
2	Agriculture	19.99	42.86
3	Plantation	20.34	43.59
4	Other	1.53	3.29
Total		46.65	100.00

Source: Secondary Data (Central District of Polinggona), 2013

Based on Table 1 it can be seen that the land use is the largest in the district Polinggona Plantation as many as 43.59% of the total land. Other land uses for the buildings as much as 10.26%, 42.86% and rice paddies as much more as much as 3.29%.

From the above we can know that the main livelihood in District Polinggona is from plantation sector. But some people have a goat farm livelihood as a sideline. This is supported by the opinion of Murtidjo (1993). In the countryside, the goat is quite popular as a sideline. Even goats are considered as family savings, because it can be sold at any time, especially in the midst of the pressing economic needs.

2. Business Development of Goat

a. Breeders Characteristics Sample

Characteristics of the sample breeder in question is the number of animals that are cultivated by breeders, age, formal education possessed, farming experience, and the number of dependents breeder. The characteristics of the sample farmers in the district can be seen in Table 2.

Table 2. Characteristics of Samples Breeders in Sub Polinggona 2015.

No	Description	Total	Mean
1	Number of Livestock (Tail)	495.00	11.00
2	Age (years old)	1,919.00	42.64
3	Education (years)	486.00	10.80
4	Breeding experience (Year)	325.00	7.22
5	The number of dependents (Person)	136.00	3.02

Source: Primary Data Analysis 2015

Based on Table 2 can be seen that the average number of livestock that are cultivated breeder is 11 head. This shows that the number of livestock breeder have enough to be able to develop goat rising in meeting the needs of family life. This was stated by Sarwono (2007) that is currently goat rearing not only in the countryside, but has spread in various places as more and more goat that appeared due to demand for meat and dairy goat which is constantly

increasing. The average age of breeder is 42 years, this shows that breeder belong to the productive age so we can say they have the potential workforce for goat rising.

Educational owned breeder sample is an average of 10 years showed that the average education level of the sample breeder with high school. Experience breeder sampled average is 7 years. Old farming for goat breeders influence on their knowledge and expertise in dealing with the problems that arise so that the possibility to increase production in the future. Number of dependents breeder sample average of 3 people, the number of dependents can be used as labor in the family to be able to assist in business activities include livestock goat.

b. Availability of Facilities / Infrastructure of Production

1) Availability of Seeds

In terms of the provision of seeds goats, the goat breeders in the district Polinggona prefer using natural mating; it is because more farmers find it easier livestock naturally mated. This is in contrast with Rochadi, et al (1993) that the way that can be taken by companies as well as small and medium-scale farms; first, introduce various types of goat by crossing with goats in the region. Second, having obtained a goat breed that can improve body weight gain and economical, then determined as an option to be developed further. In addition, farmers also do not understand the methods of other goats mating and hardly ever do any other method other than natural mating methods alone. To get the seeds of natural mating, breeders get it from other breeders by borrowing or renting goats from other breeders stud if a farmer does not have a stud goat. In this way farmers at District Polinggona can get the seeds they raise goats that will later.

2) Availability of the Cage

In Sub Polinggona enclosure built using simple materials that are widely available in the study area, the foundation of the enclosure is made of cement bricks or buffer of wood alone with poles made of wood or bamboo. The roof is made of thatch while the floor is made of boards or bamboo that have been split and mounted so slightly apart. The goal is for the easy flow and goat droppings fall directly onto the bottom of the cage, making it easier when cleaning the cage. Cages are generally only a few walls as a barrier. This is done so that the air circulation is maintained, in addition to let the sunlight in the mornings remain logged in and not so hot. This is in accordance with the opinion of Cahyono (2008) that the enclosure has a very vital function among others to protect livestock from predators such as tigers, wild dogs, jackals, and so on, to protect livestock from the sun, the rain, the cold, and the wind fast and easy to clean and are collected for agricultural fertilizers.

Based on the description above, it can be seen every breeder each have one cage, therefore the availability of the cage at District Polinggona reasonably available.

3) Availability of Forage

To meet the needs of livestock feed goats in the study area, the farmers acquire the grass and forage that grows wild in the surrounding rice fields or plantations are quite a lot in the area of research. In addition, farmers at District Polinggona also deliberately planted grass and forage needed by cattle around the house or enclosure cattle they have. So, the availability of forage for goats at District Polinggona is sufficiently available. This is in contrast to the opinion (Sajimin, et al., 2000) that the development of livestock, especially ruminants is still dependent on the availability of forage pretty good quantity, quality and continuity throughout the year. Forage used for ruminants are often deficient, especially in the dry season with low quality

4) The Availability of Capital

At District Polinggona, goat rising has been running long enough and raising goats were traditionally hereditary inherited by the parent breeder before. To run a goat raising, farmers at District Polinggona generally use their own capital. Polinggona goat breeders at District the capital gain from the sale of goats that they raise earlier. Based on the description above, it can be said that the availability of capital on a sample breeder at Polinggona District provided enough.

5) The Availability of Workers

In accordance with research, goat raising are not able to provide employment to a large number. Outpouring of labor is supporting the ongoing efforts of goats. According to Table 2 the number of residents at District Polinggona, an unknown number of largest residents at District Polinggona namely the productive age group (16-60) of 2750 people or 45.45% of the population at District Polinggona. Therefore, it can be said that employment at District Polinggona reasonably available.

6) The Availability of Tools

Equipment used goat rising at District Polinggona quite simple as a bucket, sickles and machetes, shovels, wheelbarrows, etc. Buckets used to lift water for livestock drink or to clean the cage, sickles and machetes used to cut forage, shovel used to retrieve the goat manure from underneath the cage when cleaning cages and wheelbarrows to remove the green feed and livestock manure. The equipment can be obtained at the store farm implements that are around the area of research at an affordable price.

Based on the explanation and description above, the factors of production / input for goats is available at District Polinggona. Thus, one hypothesis which says that the "Input for goat rising is available at District Polinggona" acceptable.

3. Analysis of Feasibility of Goat

In doing goat rising would not be separated from the advantages to be obtained farmers in maintaining the size of time or a certain period. To determine the amount of benefits obtained breeder for livestock raising goats, necessary economic analysis goat rising is done by calculating the total costs used during maintenance, such as the total cost is used, the total receipts breeder during maintenance and the amount of revenue generated during the maintenance of livestock goat. Thus, we get a big advantage in the can by a breeder so that it can be said that a decent profit businesses developed. The analysis of goat rising can be seen in Table 3.

Table 3. The average of Goat Business Economic Analysis Per Year

Description	Goat Business Economic Analysis Per Year
Seeds (USD)	1,466,666.66
Labor costs (US \$)	7,330,000
Additional feed costs (US \$)	4,600
Cost of medicines (USD)	131.970
Depreciation of equipment (USD)	94.600
Depreciation cage (USD)	705,777.77
Total cost (USD)	9,733,614.43
Receipts (IDR)	10,120,888.89
Revenue (USD)	387,274.46
R / C Ratio	1:04

Source: Primary Data Analysis 2015

Based on Table 3 above, may explain the average production costs incurred, receipts, revenue and R / C ratio on goat raising as follows:

a. Production cost

Production costs are all costs incurred in order to obtain absolute result, to produce a good or service is certainly no material, energy and other kinds of sacrifices that cannot be avoided (Waris, 1992). As for the cost of production incurred by goat breeders is the cost of seedlings, labour, feed costs, the cost of medicines, equipment depreciation costs and fees cage.

1) Seed cost

Costs used to obtain seeds adapted to the economic situation of the farmers in the District Polinggona. The total cost of the average use in obtaining seeds in one out of Rp. 1,466,666.66.

2) Workers' wages

The employment consists of three activities, namely repair cages do one a year, cleaning cages made 1 time a day and the supply / feed retrieval is done 1-2 times a day. Wages are given to each labour is based on daily wages. The costs depend on the number of workers and the type of activities carried out by labour. Labour costs for the repair / manufacture of cages per day Rp. 30,000 / person, for the cleaning activities cage per day Rp. 10,000 / person and for wage-taking operations / supply of feed per day Rp. 10,000 / person. The average labour costs incurred to labour for one year per breeder Rp. 7,330,000.

3) Additional Forage Cost

At District Polinggona, farmers do not provide additional feed in the form of concentrate on livestock, the farmers only provide additional feed in the form of minerals is given 1-2 times daily. The average costs incurred by farmers for the provision of minerals in cattle in one year are Rp. 4,600.

4) Medicines costs

At District Polinggona, there are two types of medications used the breeder-worming and flea control. Award-worming is done three times a year and the average total costs incurred by farmers for the use of worm medicine for a year of Rp. 106.800 lice drug delivery is done every

day which is 1 times a day by spraying into the cattle with the average total costs incurred by farmers Rp. 570 and the average total cost of the use of drugs during the year amounting to Rp. 131.970.

5) Cost of Depreciation Equipment and Cages

Equipment used in every stage of the goat rising is a spade, sickle or machete, wheelbarrows and buckets. Equipment depreciation Cost per farmer per year is Rp. 94.600 and depreciation costs per year amounting to Rp. 705,777.77 depreciation cost of each piece of equipment is determined by the amount of each of the tools used and its economic life.

b. Revenue

Acceptance is the total output produced and the total yield manure that assessed the rupiah in other words the multiplication of the total production of livestock manure and results obtained with the selling price. Based on Table 7 it can be seen that the average receipts per goat breeders in the district Polinggona for a year is Rp. 10,120,888.89.

c. Income

Revenue from goat rising is revenue that the breeder is reduced by the total cost (Soekartawi, 2002). Based on Table 7 it can be seen the average revenue per goat breeders in the district Polinggona for a year is Rp. 387,274.46

d. R/C Ratio

Based on the value of R / C ratio can be determined the feasibility of goats in the District Polinggona. From table 7 known the value of R / C ratio obtained from goat raising 1.04 or the value of R / C ratio > 1 so this shows that the goat raising in the District Polinggona is economically profitable and feasible to be developed. Thus the second hypothesis which states that "goat raising economically feasible to be developed in the District Polinggona" accepted.

4. Development Strategy of Goat

a. Determining External Factors

Goat raising development cannot be separated from several contributing factors. As for the external factors in the development of goats in the District Polinggona as follows:

1) Market Opportunities

a) Request for Goat Meat Market is on High

From interviews conducted on a sample of farmers in the field, it is known that they always get requests from agents or from consumers who come directly to goat breeders in the district Polinggona. Based on the interview can be seen that the market demand for goat meat is quite high.

b) Price of Meat Goat Relatively High

Goat meat is one type of food that is consumed by many layers of middle to high society. In addition to having good taste, goat meat is also a source of high-protein food so that it becomes one of the factors that caused the price of goats in the market is relatively high.

c) A good relationship between the farmer and Agent

Breeders are aware of the importance of the market and the importance of fostering good relations with the agent, because with a good relationship price offered by the agent is not too low on the selling price. This relationship can be evidenced by the farmers who sell their livestock with fixed agent (subscription).

2) Threat

a) Rainy Season

Goat is one of multiplied animals that is in their daily lives require food according to body weight. The rainy season may hamper the farmer to take the forage that is needed by goats which resulted portion feeding the goats is reduced. In addition, during the rainy season goats are also susceptible to disease, which is one threat to breeders because it can inhibit the growth of goats and reduce the quality of livestock.

b) The Absence Guidance

The absence of counselling to farmers resulted in farmers often make mistakes in the application of production inputs and farmers do not know the information about innovations in the field of livestock.

c) Competition

The existence of competition caused farmers trying to continue to maintain the quality of livestock in order to dominate the market goats. This resulted in the market for goat becomes narrow.

b. Determining Internal Factor

For success in business development activities of goats there are some important things that need to be held as the strength of a rancher. As for the internal factors in the development of goats in the District Polinggona as follows:

1. Strength

a. Self Capital

Livestock is a venture capital equity (private) issued goat livestock to run a business that is generated from the sale of livestock carried out previously. In addition, they also get the legacy of their parents before. By using its own capital, then the goat herders earn greater revenue.

b. Seed Easily Obtained

For goats seed stocks to be maintained in the future, in the District Polinggona goat farmers obtain seeds from natural mating animals. Breeders get from fellow breeders of goats in the District Polinggona.

c. Available Employment

Availability of labour then the job done faster and better.

d. Interests breeders High Enough

With the little experience that farmers have then their interest to make goat raising already high enough. With that interest, then problems will arise during the process of goat raising can be more easily overcome.

e. Provided Easy Forage

At District Polinggona there are still many land overgrown with grass and forage that is a source of fodder. The entire feed given comes from forage crops taken from the location of the breeder cultivation. Thus, farmers do not have difficulties in terms of providing fodder for their goats.

f. There are currently no Deadly Disease Virus Attacks

Absence of virus deadly disease against goats in the area of research led to farmers earns a greater income because you no longer incur the cost of tackling the deadly virus attack.

g. Easy marketing

At District Polinggona farmers sell their animals alive to agents and consumers directly. Thus, farmers do not need to spend money to do the cutting. Moreover, farmers do not need any transportation costs to markets for their livestock because of the agents or consumers who picked directly from farmers.

2. Weaknesses

a. Lack of Treatment of Livestock

The care of cattle is one important factor in improving the quality of livestock products. At District Polinggona, care of the cattle is still rarely carried out by farmers. It can be seen from the supplemental feeding and cleaning animals that are rarely performed by breeders.

b. Traditional Farming Technology

Technology is an important factor in increasing the production of goat rising. A job that is done will be more efficient in terms of time and labour. At District Polinggona, cultivation technology is still carried out simply (traditional) which can be seen from the inputs they use like a shovel, a sickle or machete, wheelbarrows and buckets that have not been replaced.

c.Strategy

Determining the appropriate strategy for the development of goat rising is to make the SWOT matrix. SWOT matrix is constructed based on external factors and internal consisting of opportunities, threats, strengths and weaknesses.

Based on the SWOT matrix can be composed of four main strategies SO, WO, ST and WT.

1. Strategy 'SO (Strength-Opportunity)'

Business development strategy goats in the district Polinggona with all the strength to take advantage of the opportunities that exist, namely:

a) Increase the number of population of goats (S1, S2, S3, S4, S5, O1, O2)

Aims to increase the production of goats to meet the high market demand for meat goats and supported by relatively high prices and production facilities available to allow for the holding of increasing the number of livestock population aimed at improving farmer incomes.

b) Maintaining a good relationship with agents (S5, O3)

Aims to provide agencies offer decent prices on goat so that mutual benefit between the two sides. The strategy for the development of goat rising can be seen in the following figure.

	Strength (S)	Weakness (W)
Internal	1. Available capital 2. Production features are easy and obtainable 3. Power work available 4. Interest breeder enough high 5. Easy Marketing	1. Lack of care of livestock 2. Cultivation Technology is still traditional
External	6. There is no deadly viral disease	
Opportunities (O)	Strategy 'SO'	Strategy 'WO'
1. High Demand 2. Price is relatively high 3. A good relationship with agent	1. Multiplying amount population of live stock goat (S1, S2, S3, S4, S5, O1, O2) 2. Keeping good relationship with agent (S5, O3)	1. Increasing care to livestock (W1, O1, O2) 2. Replacing tool sold production with tech (W2, O1, O2)
Threats (T)	Strategy 'ST'	Strategy 'WT'
1. Rain Season 2. Absence of counseling 3. Presence of competition	1. Increasing quality of live stock (S1, S3, S5, T3) 2. Powering counselling (S4, T3) 3. Providing or plant in source woof forage in around cage (S2, S3, T1)	1. Ask in government to empower counseling (W1, W3)

Figure 1. Determining the strategy with SWOT matrix

2. Strategy 'WO (Weakness-Opportunity)

Business development strategy goats in the District Polinggona can minimize weaknesses to exploit the opportunities that exist, namely:

- Improve the care of livestock (W1, O1, O2) By improving the treatment of livestock, the livestock quality will be better in order to keep supply and relatively high prices.
- Changing the means of production are old tech (W2, O1, O2)

The high demand and high prices need to be balanced with good technology to expedite the process of production which will increase the income of farmers' goat.

3. Strategy 'ST (Strength-Threats)'

Business development strategy Polinggona goats in the district can address existing threats using all the power.

- Improve the quality of livestock (S1, S3, S5, T3) Intended that the demand for goat meat is increasing, so the animals can breed.
- Powering counselling (S4, T3) Aims for farmers to obtain information and innovation in the farm so that farmers can be more skilled in performing goat raising and obtain maximum results. Therefore, the required counselling.
- Provide a source of forage around the cage (S2, S3, T1) Aiming to facilitate the farmers take the necessary green feed cattle, in other words keeping inventories fodder occurs when the rainy season in order to avoid a reduction in the portion giving feed to livestock. With the supply of forage resources like that, the farmer no longer need to worry with their cattle will feed shortage during the rainy season arrives.

4. Strategy 'WT (Weakness-Threats)'

Business development strategy goats in the District Polinggona to minimize weaknesses and avoid the threats that exist, namely: *Asking the government to enable counselling (W1, T3)*

With the intervention of the government to enable PPL in District Polinggona, then the goat breeders will be able to know the information developed on how to care and maintenance of goats is good and true and very useful for farmers. Based on the SWOT matrix strategy it can be seen that a strategy is needed to be able to minimize the weaknesses and threats, which are:

- Improve the quality of livestock production and to keep prices and demand remain high.
- To collaborate with the government in Kolaka to enable the counsellor to breeders can better know the procedures for the care and maintenance of goat well.

D. Conclusion

The conclusion of this study are the availability of production factors, lead to greater gains achieved thus worthy of goat rising in development and is supported by an effective development strategy in the maintenance of goats.

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Feeding Effect of Soybean Meal Tannins Protected Against Nitrogen Balance of Thin Tailed Sheep

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Abstract

The study was aimed to determine the effect of granting Soybean meal protection against nitrogen balance of thin tailed sheep (male). The experimental animals were 16 thin tailed sheeps (males) aged 8 months old with average body weight of 11.81 ± 1.65 kg. The research was assigned in completely randomized design (CRD) 4 treatments and 4 replicates T0 (complete feed + soybean meal without tannins), T1 (complete feed + protected soybean meal 0.5% tannins), T2 (complete feed + protected soybean meal 1% tannin), and T3 (complete feed + protected soybean meal 1.5% tannins). The parameters observed dry matter intake (DMI), DMI /% BB, DMI / $BB^{0.75}$, nitrogen intake (NI), N-Faecal, N-Urine, N-Digested and N-Retention. Data were variance analyzed by F test ($P < 0.05$), followed by Duncan's Multiple Range Test. The results showed that DMI, DMI /% BB, DMI / $BB^{0.75}$, nitrogen intake (NI), N-Faecal and N-Digested no effect ($P > 0.05$) of treatment. N-Retention Lowest in T2 (9,87 g/day) while T0 (11,76 g/day), T1 (11,71 g/day), T3 (11,86 g/day) no significant ($P > 0.05$), inversely with N-Urine decreased in T2 (3,09 g/day) dan T0 (2,04g/day), T1 (2,23 g/day) dan T3 (1,95 g/day) no significant ($P > 0.05$) as a result of treatment. Based on the results of this study concluded that the use of various mangrove leaf tannin levels up to 1.5% to protect soybean meal no effect on consumption, N-Faecal, and N-digested but protection cake with tannin 1% decrease N-retention and increase the excretion of N-Urine.

Keyword: thin tailed sheep, tannin, nitrogen balance, soybean meal

A. Introduction

Sheep is one ruminant which has been developed in Indonesia, especially Java. Local sheep populations highest spread in West Java (61%), Central Java (16%) and East Java (8%), 18% spread outside Java (Director General of the Ministry of Agriculture Livestock and animal health RI, 2013). Sheep are animals producing meat, leather, milk and wool. Development of sheep should be promoted as an effort to reduce beef imports. In addition to meeting the substance of domestic beef demand, and also create opportunities to meet the demand of foreign markets. These small ruminants have high adaptability to various environmental conditions and feed which is poor, because the maintenance is relatively inexpensive, quickly produce benefits and can be used as savings (Mahaputra, et al., 2003; Purbowati, 2011).

Adequacy of feed for livestock is very important because it is needed to meet the basic necessities of life, growth, production and reproduction. Feed with sufficient nutrient content and according to the needs of livestock produce optimal productivity. Biologically ruminant feed

quality is influenced by the availability of feed protein that is able to contribute to the proliferation of microbes in the rumen and capable of supplying the feed protein in the intestine (Cahyani *et al*, 2012). Fulfilling the needs of protein in ruminant feed should be calculated the amount of protein that can be degraded in the rumen and the amount of protein is not degradation in the rumen.

Soybean meal has the potential to be used as a source of protein feed because of a protein contained in soybean meal may reach 44-49%. Ruminant feed utilization as necessary to get attention so that not much degraded in the rumen so as to supply the amino acid requirements of ruminant directly without much interference from the role of microbes. Therefore protein soybean meal needs to be protected from rumen microbial degradation. How the protection of the protein can be done by giving the condensed tannin from mangrove leaves. Therefore, measurement of nitrogen balance Thin Tailed sheep to determine the effect of tannin protected soybean meal with different levels of administration. This study aimed to determine the effect of soybean meal to the balance of tannins protected nitrogen thin tail sheep ram.

B. Methodology

1. Materials

Research conducted at the stables at the Agricultural Faculty of Animal Science Diponegoro University for 5 months, consisting of 1 months of preparation and 4 months of maintenance. Proximate analysis carried out in the Laboratory of Nutrition Feed, Faculty of Animal Husbandry and Agriculture, Diponegoro University, Semarang. Using a thin tail sheep ram 16 tail 8 months old with a body weight of 11.81 ± 1.65 kg were placed in individual cages at random to obtain treatment. Before entering the fold of quarantine treatment and the provision of vitamin B complex and worm medicine Albendazole.

2. Methode

The ration consisted of complete feed supplemented with soybean meal as a protected mangrove leaf tannin treatment. Tannins obtained from the mangrove leaves mangrove leaf extract using soxhlet method with 96% alcohol solvent (Marnoto *et al*, 2012). Pumpkin filled with solvent 100 gram sample of about 2/3 of the contents of the flask, soxhlet ignited. Sampling was conducted after the cycle 12x solventmoisture. Results of the extraction solvent is evaporated to separate the compounds and then crystallized into crystalline tannins.

Soybean meal is protected with the way the crystals are dissolved in water tannins. Soybean meal was sprayed with a solution of tannin respectively 0%; 0.5%; 1% and 1.5% until evenly distributed, the percentage of tannin is calculated based on the volume per weight. Complete feed formulated using elephant grass, rice bran, soybean meal protected, cassava peel and minerals. The composition of the feed material used in the study, are presented in Table 1.

Table 1. Formulation and Nutrient Content of Feed Materials Used in Research

Feed Stuffs	Composition	BK*	PK*	SK*	TDN**
	Kg (Dalam BK)	%	-----%BK -----		
Bulrush	29	94,84	17,33	39,38	53,65
Bekatul	29	91,38	3,41	32,76	82,71
BKT	15	88,39	46,00	5,09	89,73
Leather Cassava	26	88,12	4,69	20,08	58,20
Mineral	1	93,92	0	0	0
Full feed	100	90,24	14,13	26,90	69,12

Description: BKT = Protected soybean meal, BK = Dry ingredients, PK = Crude protein, LK = fat Rough, SK = Coarse fiber and TDN = Total Digestible Nutrient.

Source: *) Proximate analyzed at the Laboratory of Nutrition and Feed Faculty of Animal Science and Agriculture, University of Diponegoro, **) Based on calculations using formulas Hartadiet *al*. (1993)

3. Design of Experiments and Data Collection

The study was conducted based on completely randomized design with 4 treatments and 4 replications. T0 (soybean meal without tannins), T1 (tannins protected soybean meal 0.5%), T2 (protected soybean meal tannins 1%) and T3 (tannins protected soybean meal 1.5%). The preliminary study was conducted over a one week study followed for ten weeks, and the recording is done daily feed consumption. The feeding is done three times a day i.e. morning at 07.00 am, at 14:00 noon, and at night at 21:00 pm, while the drinking water supplied adlibitum.

Total collections held in the fifth week for seven days, taking stool done every hour for 24 hours during the collection period. To prevent evaporation of nitrogen in the feces then sprayed sulphuric acid (H₂SO₄) 20%. Total feces during the collection period was mixed until homogeneous, then take 10% for the analysis of N-Stool. Total urine for total collection is homogenized and then added 20% H₂SO₄ to lower the pH to about 3. The urine was sampled approximately 10% and stored in a freezer for N-Urine analysis. Proximate analysis were performed: 1) analysis to determine the water content of dry material by heating the sample in an oven at a temperature of 105-110°C for 4-6 hours until a constant weight is obtained, 2) analysis of nitrogen using methods Kjeldahl.

C. Result and Discussion

Summary results of the study are shown in Table 2. Includes dry matter intake (DMI), based on the weight of the metabolic DMI, DMI based on the percent of body weight, consumption of nitrogen (N), N-Faeces, urine-N, N-digested, and N-retention for , Average DMI (g/day) is shown in Table 2. The results of analysis of variance showed that the protective effect of soybean meal with the tannins are not significant ($P>0.05$) on DMI, DMI (g/Kg^{0.75}), DMI (%W), consumption of N, N-faeces expenditure and N-digested but significant ($P<0.05$) against the N-urine, and N-retention.

Table 2. Average Consumption Dry (BK), Consumption N, N-Faeces, N-Urine, N-Digested and N-Retention on Experiments Animal

Parameter	Treatment			
	T0	T1	T2	T3
DMI (g/day)	649,37±102,58	666,54±97,52	607,63±43,51	657,49±81,67
DMI (g/kg ^{0.75})	91,73±3,06	91,31±3,15	88,29±2,11	91,19±2,73
DMI (%W)	2,09±0,03	2,12±0,06	2,15±0,10	2,13±0,07
N- Intake (g)	16,34±2,58	16,77±2,45	15,29±0,87	16,54±2,05
N-faeces (g)	2,54±0,15	2,84±0,22	2,33±0,15	2,73±0,23
N-Urine (g)	2,04±0,42 ^b	2,23±0,76 ^b	3,09±0,39 ^a	1,95±0,45 ^b
N-Digested	13,80±2,74	13,93±2,39	12,96±0,94	13,81±2,37
N-Retention	11,76±1,17 ^a	11,71±0,73 ^a	9,87±1,13 ^b	11,86±0,92 ^a

Description: Different superscripts in the same row shows the real effect ($P<0.05$); N (nitrogen).

Based on F test DMI no real effect ($P>0.05$) as a result of treatment. The range of average dry matter consumption of lamb is from 607.64 to 666.54 g/day. This suggests that the difference in the percentage of tannin does not result in taste and a distinct fondness for thin tailed sheep so that the amount of feed consumed relatively the same. Besides the feed has the same nutritional value and feeding each sheep so that there is no difference in dry matter intake. This is explained by Anggorodi (1994) which states that the palatability of feed qualitatively affected by the physical properties of feed that include shape, smell, taste and texture. Furthermore Puastuti *et al.* (2006) states that the protection treatment of soybean meal with banana juice does not affect the taste or smell so do not reduce consumption. Results were much lower than the results Arifin (2009) using a complete feed from various agricultural wastes that have physical properties and the same particle size, the value of DMI ranged from 901.46 to 956.71 g/day.

Dry mater consumption is measured based on metabolic body weight (DMI^{0.75}) analyzed using ANOVA also affect not significant ($P>0.05$) with an average ranging between 88.29 to 91.72 g/kg^{0.75} (Table 2), Hal it indicates that the protection of soybean meal does not give effect to the experimental unit caused by the type and form of feed given to each experiment the same. Described by Kamalidin *et al.* (2012) and Yulistiani *et al.* (2010) states that the different types and forms of feed ingredients that make up the ration may lead to differences in the level of palatability which ultimately led to differences in the amount of feed consumed by livestock. Results were much higher than the results reported by Sunarso (2012) that the male goats PE DMI^{0.75} by king grass silage ranged from 36.97 to 54.98 (g/kg^{0.75}).

DMI level by percent weight (%W) effect was not significant ($P>0.05$) to the experimental unit. Average DMI (%W) range 2,09- 2,16% in the same range as the result of research Sunarso (2012) is between 1.79 to 2.70% of body weight, the average range of the DMI more higher than

the basic living needs of 1.70% (Devendra & Burns, 1994). Feed intake is the foundation that supports basic needs, growth, production and reproduction (Sunarso, 2003; Mayulu, 2009).

Average consumption of N each treatment T0 (16.34 g/day), T1 (16.77 g/day), T2 (15.29 g/day) and T3 (16.54 g/day). Consumption of N was positively correlated with the consumption of DM in Table 2. Consumption of N depends on dry matter intake and N content of each treatment. Described by Yulistiani et al. (2011) that the consumption of nitrogen increases with increasing levels of protein in the feed concentrate. In quantitative terms relative dry matter intake as much and qualitatively each treatment contains the same percentage of N then statistically analyzes of variance showed that the effect was not significant ($P>0.05$). The amount of N consumed will be used by rumen microbes to synthesize microbial protein, the other part will escape from the relegation process and then be distributed to post-rumen digestive organs. This is in accordance with the opinion of Kariuki & Norton (2008) that the purpose of protecting soybean meal with condensed tannins is to decrease protein degradation in the rumen and increase the supply of protein in the gut.

Total N-digested as shown in Table 2 ranged from 12.96 to 13.93 g/day. Based on the results of statistical analysis of the treatment effect was not significant ($P>0.05$) to the N-digested. The absence of the effect of treatment on the N- undigested influenced by the consumption of the same relative N and N-stool did not show any difference from each treatment. Total N-stool as shown in Table 2 (2.33 to 2.84 g/day) effect was not significant ($P>0.05$) as a result of treatment. Fecal nitrogen output level was positively correlated with the consumption of nitrogen. In line with those reported by Yulistiani et al. (2011) that the output of N in the feces are not affected by the presence of tannins in soybean meal, so that absorption of N to be better compared to the control.

Nitrogen is nitrogen consumption in the stool that is not absorbed in the digestive tract and wasted as faeces, means more faecal N content, the lower the amount of N absorbed in the body of a sheep. The high N feces caused by tannins loose from binding endogenous N protein complex from the intestinal tract. Meanwhile, the research Komolong et al. (2001) quebraco tannin supplementation extracts can lead to an increase in faecal N, N retention as a result, no different from the feed without supplementation. The high N feces caused by tannins loose from binding endogenous N protein complex from the intestinal tract.

Table 2 shows that the protection of soybean meal with different tannin levels significant effect ($P<0.05$) N retention. Retention N is the number of N that can be used body after N-consumption reduced by N-feces and N-urine. The average retention of N ranged from 9.87 to 11.86 g / h, T2 different from T0, T1 and T3, but T0, T1, and T3 no significant ($P>0.05$) as a result of treatment. Differences in N retention is also influenced by the N-urine output are different ($P<0.05$) between treatments. Retention of N and N-urine output has a value which is inversely proportional, in which the N-urine output T2 highest and lowest N retention. This is in contrast to the results of research Puastuti et al. (2006) that the use of protected soybean meal has no effect on the value retention of nitrogen. N-urine showed the extent of nitrogen that can be utilized by livestock body well absorbed from the gastrointestinal tract as well as from the animal's body. Protection protein by mangrove tannin extract to 1.5% proven not affect the solubility protein soybean meal. Suspected concentration of tannin used not quite able to lead to effective protection, it indicates that the amount of N excretion (feces) is relatively the same, which means N digested equally.

D. Conclusion

The use of various levels of tannin leaf mangrove up 1.5% to protect soybean meal no effect on consumption, N-stools, and N-digested but protection cake with tannin 1% decrease N-retention and increase the excretion of N-Urine.

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The Effect of Adding Section and Level of Different Banana Heart on the Organoleptic Qualities of Beef Sausage

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Abstract

This study aims to determine the effect of adding parts of different level banana heart and the interaction between parts of different level banana to the organoleptic quality of beef sausages. The study design was completely randomized factorial 3 x 3. Factors A banana is a part where the A1 (the inside of the banana white), A2 (the outside of the heart of the banana light purple), and A3 (a mixture of the inner and outer parts banana heart). Factor B is the level where the addition of banana B1 (0%), B2 (15%), and B3 (30%). Parameters measured were the level of resilience, color, aroma, taste and preference. The research result of addition of a section banana heart at different levels indicate that there are highly significant effect on the elasticity, color, aroma, taste and preferences of beef sausage with the average value of 2,804, which means a bit chewy, 2.767 indicates that the sausages brown, 2.433 which shows sausage savoury aroma, which shows the value 2,352 sausages taste bad, 2, 815 which shows the value of rather like. Based on the results of this study concluded that the addition of banana heart mixture of the inner and outer generate resilience, aroma, and taste of the sausages were better than those just added to the inside or the outside only. Additions to the level of 30% better than the addition of 15% and without the addition (0%). Interaction factor and level parts of banana heart showed a different response at the level of resilience, color, aroma, taste and preference of beef sausage.

Keywords: sausage beef, banana heart and appearance quality

A. Introduction

Various studies conducted by health experts managed to unravel the properties of banana heart was excellent for health. Without knowing a lot banana heart contains nutrients that are beneficial to the body, which are: 12.05% protein, carbohydrates 34.83% and 13.05% total fat. In addition to carbohydrates, banana also contains protein, minerals (especially phosphorus, calcium, and iron), as well as a number of vitamins A, B1 and C (Astawan, 2008). Another important component is at the heart of banana fiber food is very beneficial for health.

The utilization banana heart to be processed into sausage banana heart is attractive for development, particularly for small and middle-scale industry. The processing of heart bananas into banana heart sausage is relatively easy and requires only a simple technology that can be applied by small-scale industries and households. Banana has a fiber structure that is almost similar to the fiber structure of the meat (Aspiatun, 2004), thus allowing it to be added to the processed meat products such as sausages. This study aims to determine the effect of adding

different level parts of banana heart and the interaction between different levels of parts of banana heart to the organoleptic quality of beef sausages.

B. Methodology

This research was conducted in January and February 2016 in Unit Teaching Livestock Products Processing Industry Hasanuddin University, Makassar.

1. Materials

The ingredients used are fresh meat (thigh beef), fresh banana heart, ice cubes, sugar, salt, garlic, tapioca flour, low-fat milk powder, pepper, STTP and flavourings. While the tool used is a grinder (display devices), minced (for milling and manufacture of dough), Stauffer (crusher materials), blender, tissue, knives, pots, tablespoons, teaspoons, rope Rafiah, cutting board, bowl, shells sausage, gas stoves, ice plastic, scales, and stationery.

2. Method

Fresh beef which is part of the thigh cleaned and removed parts of fat and tendon. Selection of banana heart. This study used a banana heart of stone. Banana heart skin is the outermost dark purple and hard discarded. The separation among parts of the banana heart. The inside of the banana heart is the dominant part white, the outside is part of light purple, and parts of the mixture is a mixture of white inner and outer light purple.

Table 1. Formulation Materials for Beef Sausages with Extra Banana Heart

No	Factor A	Factor B (Gram/Gr)								
		I	II	III	IV	V	VI	VII	VIII	IX
1	The outside part	0	45	90	-	-	-	-	-	-
2	The inside part	-	-	-	0	45	90	-	-	-
3	Mix	-	-	-	-	-	-	0	45	90
Mixed Materials										
1	Fresh meat	300	300	300	300	300	300	300	300	300
2	Ice cube	90	90	90	90	90	90	90	90	90
3	Tapioca flour	60	60	60	60	60	60	60	60	60
4	Milk powder	60	60	60	60	60	60	60	60	60
5	Seasoning	10	10	10	10	10	10	10	10	10

Organoleptic quality assessment was conducted on the:

- Elasticity
- Color
- Aroma
- Taste
- Preference

3. Research design

Data obtained from observations, further processed by using a completely randomized design (CRD) factorial pattern of 3×3 .

A factor is part of the heart bananas. Where in this section A1 (the inside of the banana heart of white color), A2 (outer light purple), while the A3 (a mixture of the two sections). While the provision to Factor B is the level of banana heart where B1 (0%), B2 (15%), and B3 (30%).

4. Data analysis

Data were analyzed by analysis of variance based on completely randomized design factorial pattern of 3×3 , which is processed in SPSS mathematical model as follows: $Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \epsilon_{ijk}$

C. Result and Discussion

Sauce Elasticity

The series of organoleptic assessment are to determine the quality of the sausages one of which is suppleness. The average value of elasticity of beef sausage with the addition of banana heart can be seen in Table 2. The results showed that the plasticity ranges between 1,500 who

showed less chewy up to 3,589 which show the value chewy, with the average 2,804 that shows the meaning rather chewy.

Effect of the Part of Banana Heart

The results indicate that the variance analysis there is a significant influence on the banana heart to the elasticity of sausage. Parts of banana heart used is the inner part that contain a lot of starch, the outer which contain fiber, and a mixture of the inner and outer parts of banana heart. Real difference test results showed that the experiment shows that the inner and the mixture have a higher level of resilience compared with the outside of banana heart. This shows that the fibers contained in a banana heart outer can result in low elasticity beef sausages. According to Fauziah (2014) that the content of amylopectin starch content primarily in the manufacture of sausages additional material effect on resilience. Giving higher amylopectin provide better resilience. Thus the banana heart outer has a lower content of amylopectin.

Table 2. Effect of Parts and the Levels of Banana Heart Against Suppleness Sausage

Part of Banana Heart	Level of Banana Heart			Mean
	0%	15%	30%	
The Inner	1,500	3,467	3,733	2,900 ^b
The Outer	1,500	3,000	3,367	2,622 ^a
Mix	1,500	3,500	3,667	2,889 ^b
Mean	1,500 ^x	3,322 ^y	3,589 ^z	2,804

Explanation: - Different superscripts in the same row and column showed significant differences ($P < 0.05$).

- Elasticity value: 1 = Not very chewy, 5 = very chewy

Effect of Banana Heart Level

Analysis of variance showed that the addition of banana heart levels of to manufacture beef sausages very significant effect. The test results showed that the smallest real difference in levels of the addition of premises 15% (3.322) and 30% (3.589) resulted in a higher elasticity compared with no addition (0% of 1,500). It shows that more and more parts of are added the better the level of resilience sausage. Increased elasticity sausages by the addition of banana heart may be caused by the content of amylopectin of banana heart (Hui et al., 2001). The other thing is the possibility of their binding properties of water or the binding of meat owned by banana heart, where the sap contained therein have this capability.

Effect of Interaction

Results of analysis of variance showed that the interaction between the addition of parts and banana heart level to the level of resilience sausage very significant effect. This can be seen in Figure 1, of the average value of the addition of the inner and the mixture continued to increase in suppleness to the addition of 15% and 30%. However, the level of resilience highest in the inside and the addition of a mixture of the inner and outer of banana heart with a level of 30% which is constantly increasing, while the addition of the outer occur lower level of resilience in the addition of 15% and 30%

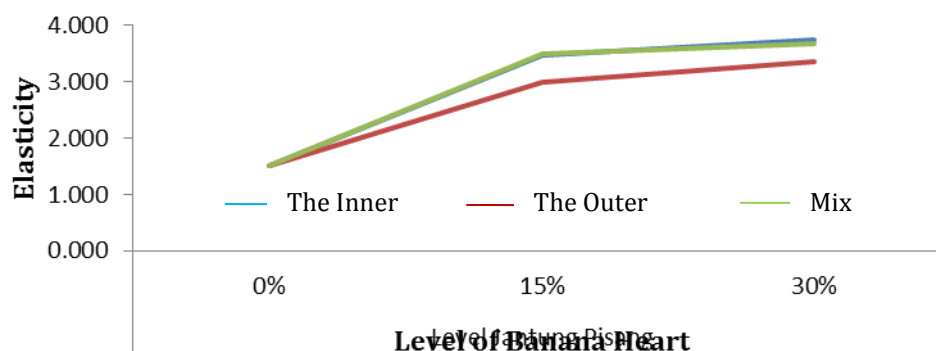


Figure 1. Interaction addition of parts and the level of banana in the level of resilience beef sausages.

Sausage Color

Color is the most physical first sectional views of consumers, the color can also provide the appeal of a product. In the experiment of making sausage of beef with the addition of a section and the level of banana heart color was tested by panellists who provide an objective assessment (Aberle, 2001). The average value of beef sausage color with the addition of banana

heart can be seen in Table 3. The results show that the color of sausages ranging between 2.667 which shows yellowish color, up to 2,856 which shows a brownish color, with the average 2.778 which shows a brownish color. Brownish color on the sausage of beef, written by banana heart likely resulted from the sap contained in banana heart. Described by Effie (1980) that the brownish color that is contained in of banana heart can be reduced by boiling banana heart that had been cut into pieces and then milled and mixed into the dough. With the addition of milk and flour to the dough can also reduce the brown color on the sausage.

Effect of Banana Heart Part

The results indicate that the variance analysis there is a significant influence on the banana heart part of sausages color. Parts of banana heart used are the inner part that contains the duke, the outer which contain fiber, and mixed (mixture of the inner and outer parts of banana heart). The results of the experiment showed that the inside (2711) and mixed (2767) has better colors low compared with the outside of banana heart (2822).

Table 3. Effect of Part and the Levels of Banana Heart against the Color of Sausage

Part of Banana Heart	Level of Banana Heart			Mean
	0%	15%	30%	
The Inner	2.667	2.633	2.833	2.711 ^a
The outer	2.667	2.933	2.867	2.822 ^b
Mix	2.667	2.767	2.867	2.767 ^a
Mean	2.667 ^x	2.778 ^y	2.856 ^z	2.767

Explanation: - Different superscripts in the same row and column showed significant differences ($P < 0.05$).

- The color values: 1 = pale, 5 = reddish brown

Effect of Provision Level

Analysis of variance showed that the addition of banana heart level to beef sausage-making a very significant effect on the quality of color. The test results showed that the smallest real difference in addition to the level of 15% (2.778) and 30% (2,856) to produce a better color compared with no addition of banana heart (0% ranging from 2.667). It shows that the higher the levels of the better the addition of color sausages.

Effect of Interaction

Results of analysis of variance showed that the interaction between addition and level parts of banana heart against color levels sausage very significant effect. This can be seen in Figure 4, of the average value of addition the inner and the mixture continued increase in color on addition of 15% and 30%. In addition is the color on addition decreased 15%, addition of the outer continues an increase to the level of addition of 15% and decreased the level of 30%, while in the mixture continued to increase to the level of color stability addition of 30%. But the best color levels in this experiment, there on the addition of the outer level increments of 15%.

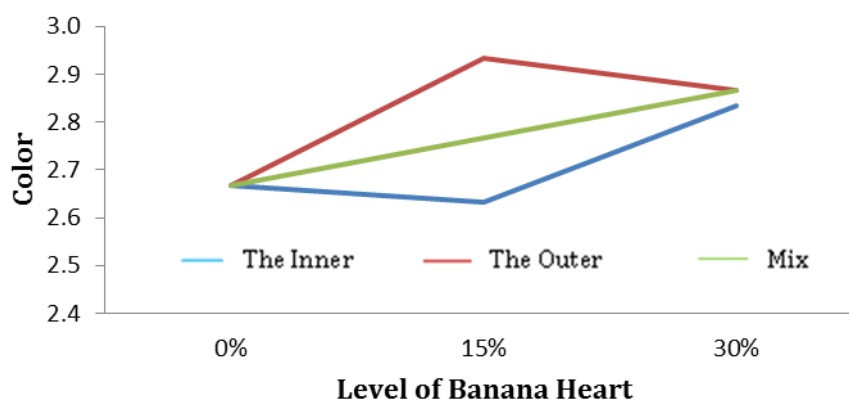


Figure 2. Interaction addition of parts and levels of banana heart on the color of beef sausage.

Sausage Aroma

A pleasant aroma will invite the appetite of consumers to try the sausage meat added with banana heart in experiments conducted average value of beef sausage aroma with the addition of banana heart can be seen in Table 4. The results showed that the scent range between 1.267

which shows aroma very savoury up to 3,233 which shows the value rather savoury, with the average 2.433 which shows the unpleasant aroma of sausage.

Effect of Banana Heart Part

The results indicate that the variance analysis there is a significant influence on the level of banana heart against aroma of sausage. Parts of banana heart used is the inner part that contain a lot of starch, the outer which contain fiber, and a mixture of the inner and outer parts of banana heart. Real difference test results showed that a mixture of the inner and outer has a higher rate of aroma compared to only use the inside and outside of the heart bananas.

Table 4. Effect of Parts and the Levels of Banana Heart on the Aroma of Sausage

Part of Banana Heart	Level of Banana Heart			Mean
	0%	15%	30%	
The inner	1.267	2.300	3.333	2.300 ^a
The outer	1.267	2.900	3.133	2.433 ^a
Mix	1.267	3.200	3.233	2.567 ^b
Mean	1.267 ^x	2.800 ^y	3.233 ^z	2.433

Explanation: - Different superscripts in the same row and column showed significant differences ($P < 0.05$).

- Value aroma: 1 = very untasteful, 5 = Very tasteful

Effect of Provision Level

Analysis of variance showed that the addition of banana heart level to manufacture beef sausages very significant effect. The test results showed that the smallest real difference in levels of additional premises 15% (2.800) and 30% (3,233) resulted in higher sausage aroma compared with no addition (0% of 1,267). It shows that more and more of the addition better for increasing the aroma of sausage. This is probably caused by the content of banana heart is almost the same as the content of the beef. Similar content is mutually binding so that the aroma of banana heart and bacon balanced.

Effect of Interaction

Results of analysis of variance showed that the interaction between the addition and level part of banana on the aroma of sausage was highly significant. This can be seen in Figure 3, with the average value addition is continued improvement aroma mixture on the addition of 30%. The level of best fragrance contained in the addition part in increasing the level of the addition of 30%. While on the outside and mix only increased from the level of addition of 0% to 15% while the 30% level is not too increased of quality aroma.

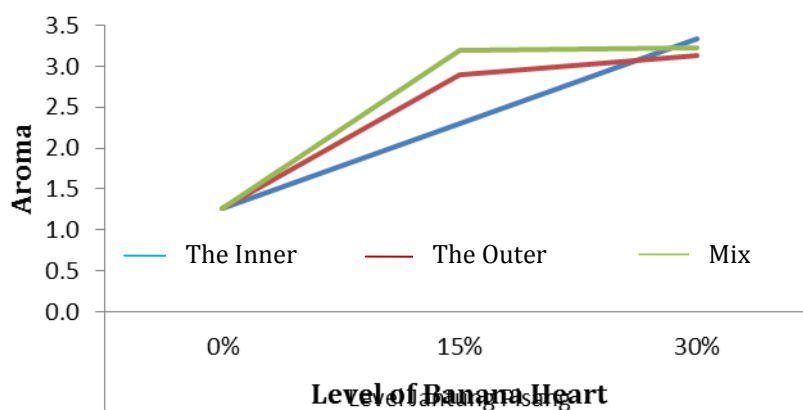


Figure 3. The interaction of addition of part and the level of banana in the aroma of beef sausages.

Sausage Flavor

The average value of beef sausage flavor with the addition of banana can be seen in Table 5. The results showed that the taste of sausage ranged between 1.667 indicating sausage tastes very bad up to 2,911 which show the value of a little tastier sausage flavor, with the average 2,352 which shows the value of sausages bad taste.

Table 5. Effect of Part and the Level of Banana on the Aroma of Sausage

Part of Banana Heart	Level of Banana Heart			Mean
	0%	15%	30%	
The inner	1.667	2.300	2.400	2.122 ^a
The outer	1.667	2.400	3.033	2.367 ^a
Mix	1.667	2.733	3.300	2.567 ^b
Mean	1.667 ^x	2.478 ^y	2.911 ^z	2.352

Description: - different superscript in the same row and column showed significant differences ($P < 0.05$).

- Value flavors: 1 = very bad, 5 = Very tasty

Effect of Banana Heart Part

The results indicate that the variance analysis there is a significant influence on the banana to the taste of sausage. Part of banana used is the inside that contains the duke, the outside of which contain fiber, and mixed (mixture inside and the outside of the heart of the banana). Real difference test results showed that a mixture of the inner and outer part (2.567) higher compared to the inside (2.122) and outer (2.367). It is caused by the content of starch and fiber on the inside and the outside of banana each binding so that the resulting flavor is better when compared to which use of the outside or inside of the banana alone (Sukaeni, 2014).

Level Effect of Provision

Analysis of variance showed that the addition of banana heart level to manufacture beef sausages was highly significant. The test results showed that the smallest real difference in addition to the level of 15% (2.478) and 30% (2.911) produces a better taste than without the addition (0% amounting to 1.667). It shows that the more part are added the better the level of the resulting flavor. Improved taste of sausage, one of which, can be influenced by the content of banana fiber which almost the same as meat fibers (Rust, 1987).

Influence of Interaction

Results of analysis of variance showed that the interaction between the addition and level part of banana to taste the sausage was highly significant. This can be seen in Figure 4, the level of the best flavors are on the addition of a mixture of the inner and outer parts of banana which continues to rise to the level of the addition of 30%. The inner has increased, but only at the level of the addition of 15% and the addition of 30%, while on the outside is constantly increasing and on the inside have increased but not too much.

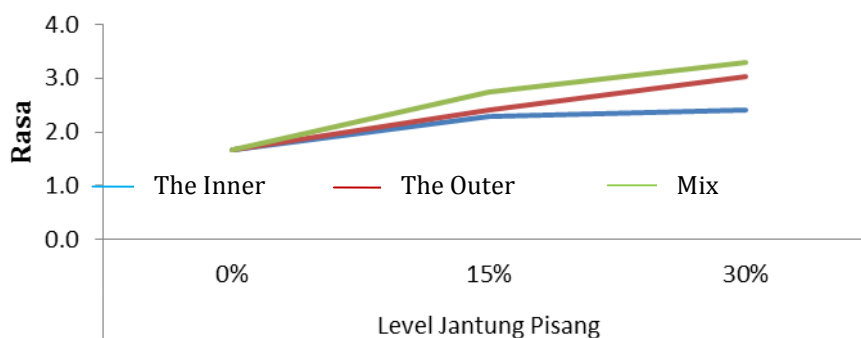


Figure 4. Interaction addition of part and the level of banana flavor beef sausages.

Sausage Fondness

The series of organoleptic assessment to determine the quality of the sausages is a favorite or commonly referred to as the hedonic test. The average measurement results can be seen in Table 5. The results showed that the level of preference ranging from 2,044 panellists which showed strongly dislike up to 3.389 which shows a little like, with the average 2,815 which shows the value of a little love. According to Lawrie in Parakkasi, A. (2003, Ed.), that the taste, color, appearance and elasticity of food will affect preference level panellists to food.

Table 5. Effect of Part and the Level of Banana Against Fondness of Sausage

Part of Banana Heart	Level of Banana Heart			Mean
	0%	15%	30%	
The inner	2.133	3.067	3.567	2.922 ^b
The outer	2.000	3.133	3.433	2.856 ^b
Mix	2.000	2.833	3.167	2.667 ^a
Mean	2.044 ^x	3.011 ^y	3.389 ^z	2.815

Description: - Different superscripts in the same row and column showed significant differences ($P < 0.05$).
 - Value flavors: 1 = very unhappy, 5 = very fond.

Influence of the Part of Banana Heart

Results of analysis of variance showed that there was a significant influence on the level of banana against fondness of sausage. Part of banana used is the inside that contains the duke, the outer of which contains fiber, and mixed (the inner and the outer of the heart of the banana). The results of organoleptic test showed that the panellist preference level of the of sausage of beef with a mixture of banana tends to be higher in the additional part in the banana compared to the outside and the mixture.

Influence of Addition Level

Analysis of variance showed that the addition of banana heart level to manufacture beef sausages was highly significant. The test results showed that the smallest real difference in addition to the level of 15% (3.011) and 30% (3.389) produce a better flavor compared with no addition (0% of 2,044). It shows that the more part are added the better level of panellists' fondness.

Influence of Interaction

Results of analysis of variance showed that the interaction between the addition and level part of banana on the level of sausage fondness was highly significant. This can be seen in Figure 5, level of the best flavors is on the addition of the inner of banana which continues to increase to the level of the addition of 30%.

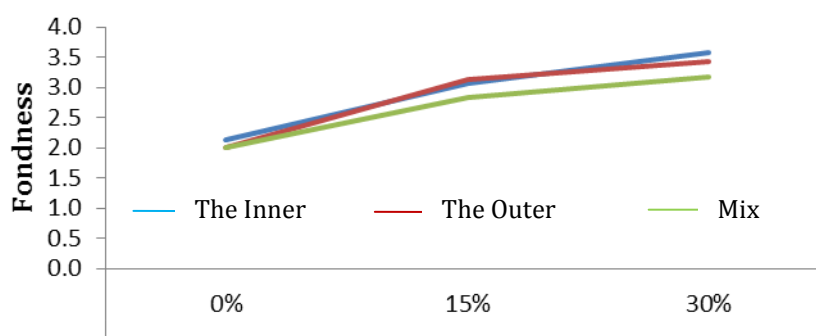


Figure 5. The interaction of addition of part and the level of banana in the level of preference beef sausages.

D. Conclusion

Based on the results and the preceding discussion, it can be concluded that the addition of banana which is a mixture of the inner and outer generate resilience, aroma, and taste of the sausages were better than those just added to the inner or the outside only. Addition to the level of 30% is better than the addition of 15% and without the addition (0%). The interaction of factor and level part of banana showed a different response at the level of resilience, color, aroma, taste and preference of beef of sausage.

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Analysis on Different Phases Cycle in Production of Laying Hens

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Abstract

This study aims to determine the productivity of the eggs produced in each phase of production of laying hens. The research was conducted in the village Bende Wundulako District of Kolaka that lasted approximately one month i.e. October to November 2011. The number of chickens is kept as many as 1,577 animals, strain CP 909. The productivity of egg laying hens is very different. Where in each cycle has increased from the initial production to experience the peak of production, which then slowly decreased. Daily egg production (hen-day production) at an early stage about 18.11%, 87.45% and the peak production of the final phase of 44.75%. While the percentage of egg production average weekly Phase I (17.45%), phase 2 (87.09%) and phase 3 (45.20%), for the production of eggs early (Hen-Housed Production EEG) the initial stage 18, 03%, peak production of 89.84% and 32.17% reject rate. Ties The result shows that the peak of egg production is high both in the production of eggs daily, weekly or early egg production Hen-Housed EEG) average is above 80%. So, it can be concluded that the productivity of egg laying hens are very different. Where in each cycle has increased from the initial production to experience the peak of production, on the cusp of production the number of eggs that produced very high.

Keywords: laying hens, the analysis phase of the cycle, hen-day production, hen-housed production EEG

A. Introduction

Livestock in Indonesia is one of the subsectors of agriculture that is needed to meet the food needs of the community, especially the nutritional needs of the animal protein. The livestock commodity in Indonesia at this time comes from the poultry sector, almost 70% of the poultry industry. Ranch chicken laying during this time has grown very remarkable and today is a scale business industry that is very modern which is supported by four subsystems that is enough sturdy, i.e., upstream, downstream, subsystem cultivating and supporting industries (Malik, 2003). Laying chicken population to date has spread throughout the region in Indonesia. With the increasing demand and the need for eggs, it is necessary to increase the production and development of business by breeding companies especially laying hens. The success of a livestock business of laying hens is influenced by three main factors, namely; feed, seed, and management (Murtidjo, 1994). Companies that have ignored the management and the resources tended not to survive and thrive. One effort that can be done to meet the needs of commercial eggs is not enough just to do with increasing the number of existing farms, but an existing business should be supported by good maintenance management.

Chicken laying an excellent result of cross breeds of chickens nations that have high egg productivity. Characteristics of chicken egg is capable of producing 200 grains / head / year, the efficiency in the use of feed, and do not have the nature of the brood (Johari, 2004). The population of laying hens in Southeast Sulawesi continued to increase from year to year, which since the year 2005 - 2011 recorded increases. This indicates that the level of consumption would result from animal production primarily of eggs continues to rise, so it is necessary to increase production to meet consumer needs.

It can be seen from the increasing demand for eggs from year to year. Enterprises laying hens attracted many farmers. Increased consumption of eggs will increase the poultry farm, both in terms of livestock numbers and the number of farmers continues to increase, both farmers with a small or large scale. During his life laying hens will have three production phase or three production period, i.e. the initial production period (0-6 weeks), or grower juvenile production period (7-14 or 7-16 weeks), the nesting period (15 or 17 and 52 or 55 weeks). At the start of the age of one day up to 6-10 weeks of age chickens grow proportionally (Kartasudjana & Suprojanta, 2006). However, up to 15-16 weeks, growth has begun to diminish. At this time the chicken production system began to grow and the reproductive hormone system began to develop properly. This is what determines the quality of laying hens in the egg-laying period later.

The nesting period is calculated from the chicken reaches 5% hen-day that is lower than 50% hen-day. Hen-day is a measure of technical efficiency of egg production which compares the production of the day by the number of chickens that live in the day so early nesting period is varied for each type of chicken (Yunanta, 2004). Medium type chickens (laying hens or chicken endowment) will start stepping on the nesting period longer than laying hens' mild type (chicken white leghorn laying hens). Mild type chickens will start laying eggs at the age of 15 or 16 weeks, while the medium type chickens will start laying eggs between 22 to 24 weeks. The determining factor when it is started laying genital maturity of laying hens is kept (Malik, 2003). In adolescence maintenance has been described that the decisive factor is the provision of additional light, quality, and quantity of rations given. Laying hens were given additional light at night will spawn faster with tiny eggs early in the nesting period, since that treatment in the early years and adolescence will be visible result after chickens reach egg-laying period. Based on the description above, it is aimed at doing this study is to analyze the different phases of the production cycle of laying hens

B. Methodology

1. Materials

This research has been conducted in the village of Bende Wundulako, District Kolaka that lasted approximately one month i.e. October to November 2011. The study population was laying hens that have been entered into adolescence and already started production. Strain of chickens is kept, namely CP 909 and the number of laying hens as many as 1,557 birds. Sampling was done by means of random sampling by dividing stratified 3 categories / phases: the initial phase of production (5-6 months), the peak production phase (7-8 months) and late phase (17 -55 weeks).

2. Method

The technique of data collection is done in two ways, namely: primary and secondary data. Primary data is data obtained through direct interviews with respondents, by using a list of questions (questionnaire). While secondary data is data obtained from the offices and agencies with research

3. Technique of Data Analysis

The data obtained will be taken using Quantitative Analysis. Analysis of the data using the formula:

a. Daily Production of Eggs or Egg Hen-Day Production::

Which is a measure of production of laying hens that live every day? The formula:

$$\text{Hen-day (HD)} = \frac{\text{the amount of egg production (grain)}}{\text{the existing number of laying hens}} \times 100\% = \dots\% \text{ PPH}$$

b. production Weekly

In principle, the same as the first treatment only measured in one week (seven days). The formula:

$$\text{Production Weekly (\%)} = \frac{\text{total production of eggs every week}}{\text{the average number of laying hens every week} \times 7} \times 100\% = \dots\%$$

c. Early or production Laying Hen-Housed Egg Production

Hen-Housed Egg Production which is a measure of productivity is calculated based upon the number of laying hens start laying eggs.

Formula:

$$\text{Hen-house Production HHP} = \frac{\text{the amount of egg production (grain)}}{\text{the amount of the initial layer}} \times 100\% = \dots\% \text{PPA}$$

C. Result and Discussion

1. Daily Egg Production or Hen -day

Daily egg production or hen-day can be seen in Table 1.

Table 1: Production of Eggs Early Stages of Production, Peak Production, and Rejected.

No.	Productivity Eggs	Item number	Percentage (%)
1.	Early stage	8533	18.11
2.	Production peaks	42 502	87.45
3.	Final phase	15 221	44.75

Data Source: Data Primer (2011)

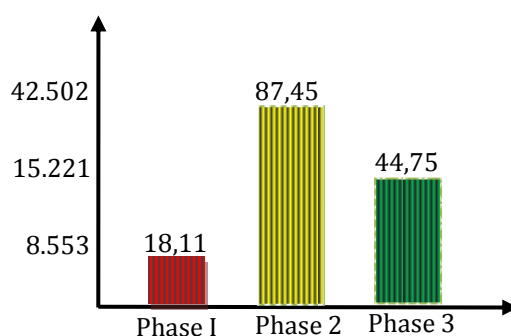


Figure 1. Graph of the average daily production of eggs in or called hen-day

From the graph above can be explained that in phase 1 or the early stages of egg production reaches approximately 8553 items with a percentage (18.11%), while in the second phase of egg production has increased significantly to reach 42 502 items with a percentage (87, 45%). Thus, the difference in the percentage of the initial phase to the second phase amounted to 69.34%. At this stage the chickens begin laying eggs after the age of 5 months or from the age of 19-24 weeks and gains have stabilized or reached its peak at the age of 25 -34 weeks, due to the level of chicken production increased at the beginning of the first cycle. Chickens produce at the beginning of the first cycle of egg production will increase until it reached its peak. It is also explained by Wahyu (2008) that egg production will increase from the start of first cycle to the peak point, this percentage is increasing, and after two months of production reached peak and then slowly diminishing return. In the first two months of production, not only the percentage of eggs increased, weight and large size of eggs also increased. In this phase, the need for food also increased, as described by Rasyaf (2005) that this phase should get a chicken meal maximum intake, diet provided adds libitum. Feeding is done twice daily in the morning and sere day as much as 110-120 g / head / day. Food rations consisting of maize and bran concentrate. While the drinking water supplied add libitum (continuous). Added by Rasyaf (2008) that the intake is insufficient that cause peak achieved lower production, as well as the size of an egg. Similarly, egg production decreased faster than the chicken gets enough food intakes. A shortage of nutrients will cause decreased egg production.

There are three levels of food intake is usually worn during the production to meet the needs of food substances remain primary. In terms of nutrition, the first 20 weeks is important. During this time the chicken will reach its peak egg mass dam will reach the maximum level. By feeding program now, the production peak will occur between ages 26 dam 32 weeks. It is described by

Rukmana (2007) that the peak of egg masses will usually occur at about 10 weeks later. Laying hens fed actually is to meet the needs of all substances amount of food at different levels of production. So, there are three things that must be known exactly how many nutrients are consumed laying every day, how the laying requirement for a certain level of production and how the content of nutrients available in the ration (Amrullah, 2003).

At peak production, more than 90% of egg production will be achieved by the majority of laying hens. It requires about 18 g of dietary protein per day, including those necessary for the growth and production of fur. The protein requirement for egg-laying chickens were closely related to the rate of egg production and weight of the protein would be expected for laying hens in the menu is much lower than that required during the initial period is 18 to 20%. The period of enlargement until late pullet production, protein needs only 13%; but once the egg production reached its peak demand for feed will increase to 17 to 19%. Adjustment of feed production levels in the period of production necessary to sustain maximum production and efficient business. While in phase 3 or phase to the end of the number of eggs produced reached 15 221 grains, with the percentage reached 44.75%. So the difference from the second phase to the final phase amounted to 41.59%.

In phase chicken production has experienced a decline in production. The decrease in production due to the age old chicken, and has begun to diminish their ability to utilize calcium (Anonymous, 2000). The older age of laying hens increasingly reduced egg production while increasing their rations. This means the protein needs are also diminishing. To save protein, phase feeding is done two or three different types of rations. Thus, phase feeding is not intended to re-stimulate the production of eggs, but it is for breeding laying hens during production more economical (Sudaryani, 1996) and besides that at the age of 72-74 weeks the chickens are no longer productive.

2. Egg Production Weekly

Weekly egg production can be seen in Table 2. From the above chart can be explained comparison of the production of eggs produced by a matter of a week in phase 1, phase 2 and phase 3. In the initial phase of production of eggs per week has increased continuously, with the percentage increasing from week 1, to -2, 3rd, and 4th week. Total percentage in the first week reached 11.36%, 14.47% the second week. Thus, the difference is of 3.11%. At three weeks the percentage reached 19.27%. Thus, the difference is in the second and third week to 4.8%. In the fourth week the percentage reached 24.70%. The difference from the third week and the fourth week reached 5.43%. So the difference in the percentage of each week continues to grow.

Table 2: Production of Eggs Early Stages of Production, Production Peaks and Rejected in the Weekly.

Sunday	Productivity Eggs					
	Phase 1		Phase 2		Phase 3	
	Total grains	Percentage (%)	Item number	Percentage (%)	Item number	Percentage (%)
1	1254	11.36	8882	83.34	3,950	48.83
2	1592	14.47	9141	86.12	3684	45.98
3	2119	19.27	9,356	88.43	3,499	44.36
4	2708	24.70	9538	90.50	3,239	41.64

Data Source: Data Primer (2011)

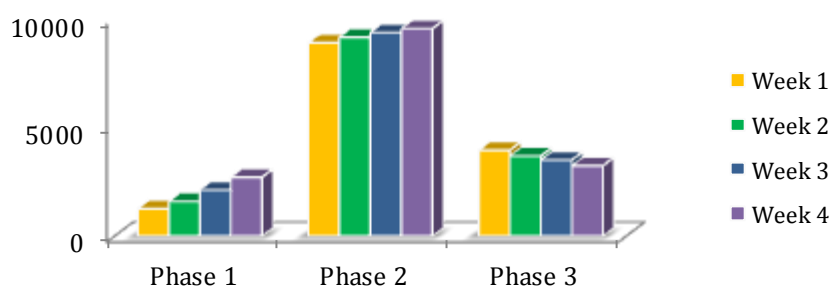


Figure 2. Graph of the average production of eggs by the count per week

In the second phase which at this stage of cattle was experiencing the peak of production, so that the number of eggs produced is higher than in the initial phase. In this phase, the percentage in the first week reached 83.34%, 86.12% reached the second week, third week reached 88.43% and the fourth week reached 90.50%. Difference comparison of each week, from the first and second week to 2.78%, the second and third week of 2.31% and the third and fourth weeks was 2.07%.

While at the end of the third phase or inversely proportional to the first and second phases. In this phase, the number of weekly egg production is already declining (Wahyu, 1997). Which percentage in the first week of production reached 48.83%, and as we enter the second week of egg production dropped up to 45.98%. Likewise rivals 44.36% third week and the fourth week of decline reached 41.64%. In this phase the animal laying power will continue to decline with age cattle.

3. Production of Eggs Early or Hen-Housed egg Production

Early stages of egg production, production peaks and rejects in the calculation of hen-housed can be seen from Table 3.

Table 3. Average Production of Eggs Early Stages of Production, Production Peaks and Rejects in the Calculation of Hen-Housed

No.	Productivity Eggs	Item number	Percentage (%)
1	Early stage	8533	18.03
2	Production peaks	42 502	89.84
3	rejected	15 221	32.17

Source of data: primary data

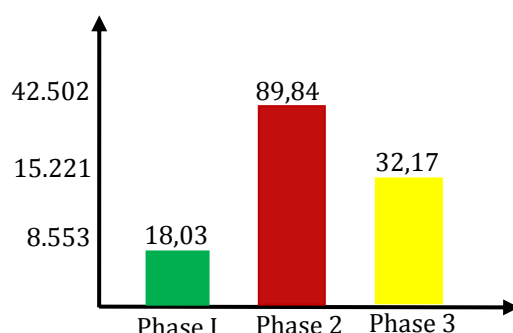


Figure 3: chart production at the beginning of the number of chicken production

Based on the graph above, is seen that the ratio of each percentage of egg production experienced a progressive increase significantly and also decreased significantly (Zainal, 2002). In the initial phase of egg production, the number of eggs produced reached 8533 items with a percentage of 18.03%, while in the second phase, the phase where the animals are already experiencing the peak of production so that the number of eggs produced is very high, reaching 42 502 items with the percentage reaches 89 , 84%. Difference percentage in the first and second phases have reached about 71, 81%. While in the third phase, where the power lay cattle has begun to decline. So at this stage the number of eggs produced is also decreased. So that the eggs produced only reach about 15 221 items with a percentage of 32.17% only. The difference from the second and third phase is of about 57.67%.

Based on the chart above, it is known that the HHP obtained from the comparison of egg production by the number of performance chicken coop while HDP value obtained from the comparison of egg production by the number of chickens at the start of production. HHP and HDP calculations are very important in determining the level of profitability and business efficiency of a poultry farm. This is in accordance with the opinion of Sudarmono (2009) which states that the HD (Hen Housed) and HD (hen day) aims to determine the level of production is generated every day so that it can be compared with previous production.

D. Conclusion

Based on the results of this study concluded that the productivity of egg laying hens are very different. Wherein each cycle has increased from the initial production to experience the peak of production, on the cusp of production the number of eggs that produced very high.

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Dry Matter Digestibility and Natural Organic Matter Mulberry Feed Gamal Leaves on Male Goat Crossbreed Ettawa

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Abstract

This study aimed to test the level of dry matter and organic matter mulberry natural food and Gliricidia at Ettawa goat crossbreed (PE) males. This research was conducted in March and April 2016 in the village Ranomentaa Toari District of Kolaka. The material used is 12 PE male goats aged 4-6 months with a body weight of 10.44 ± 1.13 kg. Research compiled by complete randomized design (CRD) 3 treatments and 4 replications, P1 (100% mulberry), P2 (50% and 50% mulberry Gliricidia), P3 (100% Gliricidia). The parameters observed were dry matter intake (DMI), organic matter intake (OMI), dry matter digestibility (DMD) and organic matter digestibility (OMD). The data obtained were analyzed using ANOVA with F test ($P < 0.01$ and $P < 0.05$), when there is a continued effect with least significant difference test (BNT). Dry matter consumption and OMI highly significant ($P < 0.01$), while DMD and OMD not significant ($P > 0.05$) as a result of treatment. DMI highest average at P3 (295.41 grams), in line with the highest OMI on P3 (271.21 grams). While the percentage DMD and OMD each ranging between 39.82 to 41.23% and from 40.55 to 43.87%. The absence of the effect of treatment on DMD and OMD caused by the degradation rate of the different natural feed caused by the content of crude fiber (CF) and lignin as well as anti-nutritive substances in the forage. Based on the results of the study concluded that the DMI and the best OMI on Gliricidia, but had no effect on DMD and OMD.

Keywords: Goat crossbreed Etawa, Mulberry Leaves, Leaves Gamal, Natural Feed, consumption, digestibility

A. Introduction

Crossbreed goats goat Ettawa a result of crossbreeding of beans with goat Ettawa goats, goats have characteristics that have long hanging ears, fur color black or white as snow with and have a body weight of 40 to 45 kg (Atabany, 2001). Goats Ettawa itself was imported from India in the Dutch period, given the origin of the goat Ettawa that of the country of India (Jamnapari) which is different from the climate and season with Indonesia, goats are often known as goat PE (Peranakan Ettawa), today considered as the local goats. Ettawa size similar to but more adaptive to local environments Indonesia because it is a cross between a goat Ettawa and a goat Nuts.

Goats of this type easily thrive in cold temperate areas, a big man coat color vary; white striped, red-brown, patches - patches of black or a combination of these and on the back there is a thick fur and long. Listening goats crossbreed Etawa generally very fond of beauty feathers and face shape. Because it is very rare type of goat is used as a goat to be slaughtered (cut) to be eaten, they are more use is as pets for collection. Even supposedly ancient times, those who have Etawa goats will look appetizing and who it was in the public eye.

Feed is anything that can be given to livestock, in the form of organic and inorganic materials are partially or completely digested and do not disturb the health of livestock. Good feed a

positive influence on body weight gain than that of feed is an important factor affecting the growth (Susetyo, 2001). In addition to genetic factors, one of the environmental factors that most affect livestock production, especially the quantity and quality of feed consumed and the end product of the fermentation process and the rumen microorganisms rumen itself.

The amount of food and the quality of the food was either not able to change the body of cattle genetically smallish, but feeding in low numbers will not be able to provide body weight gain and growth carcass optimally in accordance with the genetic potential that exist in each animal as the speed of growth, a high percentage of the carcass, it may only be realized if the animal can obtain enough food (Parakkasi, 1995).

Forage contains nutrients that can determine the growth, reproduction and animal health. Good fresh green feed is when the composition is arranged between the low protein and high in protein. Foliage is a source of high fiber for ruminants. Foliage is usually in the form of grasses (Yani, 2001). However, forage derived from the grass singly on Ettawa crossbreed goats produce negative growth. As a result of the low content of its protein so its digestion too low. Animals with high production levels (growth, pregnant and lactation). Need more protein supply feed origin. Giving the fastest protein needs is by giving Concentra, but the price of concentrate feed is relatively expensive and not affordable by farmers.

Therefore, the author took the initiative to conduct research on natural feeding easily available and also has a relatively high nutrient content. This is the background research about the digestibility of dry matter and organic matter of natural food Gamal and mulberry on the male of crossbreed Ettawa goat.

B. Methodology

1. Materials

The study was conducted from April to May 2016 held at the Village Ranomentaa Toari District of Kolaka. Analysis of organic matter carried out in the Laboratory of the Faculty of Animal Husbandry, Haluoleo university, Kendari. Using as many as 12 heads of PE goat, sex male initial body weight of an average of 10.44 ± 1.13 with a range of age 4-6 months are placed in individual cages at random to obtain treatment. Materials used are forage in the form of Gliricidia leaves and mulberry leaves, water, plastic clip. Tool used for weighing scales goat body weight, feed scales, analytical balance, faeces storage containers, buckets, and laboratory equipment.

2. Method

The study was conducted in two stages of the first stage of the preparation of the second phase of testing in vivo. The preparation phase consists of the manufacture of cages gathering cattle and others. While the testing phase in vivo in general usually do two introductory periods and the data collection period. However, in certain circumstances, there is one period before the second period is a period of adaptation.

Especially for digestibility measurement period collection or data collection will be done three days in ruminant livestock feed in the collection started three days before the collection of feces. Because the estimate of 48 hours is required in the feed stream that is not digested by the digestive tract that was released today is the remainder of the feed that is given beforehand. The parameters measured in this study is the consumption of feed digestibility Dry Materials (DMD) and Organic Materials (OMD) cattle goats to feed complete with different protein content, can be calculated by the following formula:

Feed consumption (g) = Feeding (grams) - the rest of the feed (g)

$$\text{DM digestibility (\%)(\%)} = \frac{\text{BKconsumpted} - \text{BKfesces}}{\text{BKconsumpted}} \times 100\%$$

$$\text{OM digestibility (\%)} = \frac{\text{BO consumed} - \text{BO feces}}{\text{BO consumed}} \times 100\%$$

Description: DM = Dry matter OM = Organic Materials

3.

Design of Experiments and Data Collection

The study is based on completely randomized design (CRD) (Gasparz, 1991). Composed of 3 treatments 4 replications for each treatment P1 = 100% mulberry, mulberry P2 = 50% + 50% Gamal and P3 = 100% Gamal

The preliminary study was conducted over a one week study followed for 3 months. The feeding is done three times a day i.e. morning at 08.00 pm, during the day at 13:00 pm, and in the afternoon at 16:00 pm, while the drinking water supplied adlibitum. Total collections held in the third week for four days, taking stool done every hour for 24 hours during the collection period. Total feces during the collection period was mixed until homogeneous, and then taken for analysis 10% dry matter and organic matter feces.

C. Result and Discussion

Summary results of research on natural feeding mulberry and Gamal to the parameters tested in goats crossbred Ettawa (CE) are presented in Table 1. Based on the analysis of variance of the obtained results that the natural feeding on mulberry and Gamal male of PE goat was highly significant ($P < 0.01$) on dry matter intake (DMI) and organic matter intake (OMI), but not significantly ($P > 0.05$) on the percentage of dry matter digestibility (DMD) and organic matter digestibility (OMD).

Table 1. Mean DMI, OMI, DMD and OMD on of Cross Bred Goat Males Given Natural Feed Mulberry And Gamal

variables	Treatment			Sig.
	T1	T 2	T 3	
DMI (g / head / day)	246.41 ^a	272.42 ^a	295.41 ^b	0.0013
OMI (g / head / day)	216.05 ^a	244.49 ^b	271.21 ^c	0.0002
DMD (%)	39.82	40.40	41.23	0.6169
OMD (%)	40.55	41.40	43.87	0.1616

Description: Different superscript on the same line indicate significant difference ($P < 0.05$)

1. Dry Mater and Organic Mater Intake

The average dry matter intake goats are fed natural mulberry and the highest in treatment T3 Gliricidia (Gliricidia) of 295,41gr/head/day and the lowest in treatment T1 (mulberry) 246,41 gr/head/day. Results were much lower than Sunarso study (2012) that the dry matter intake average on a male goat that uses grass field with grass silage king ranged 328.76-471.05 g/head/h.

The average dry matter intake (DMI) P1 (100% mulberry) did not differ by treatment with T2 (50% and 50% mulberry Gamal). This suggests that feeding T1 and T2 have not been able meningkat A power feed given to cattle. But the value of T3 DMI highly significant ($P < 0.01$) in the T1 and T2. DMI T3 containing high due Gamal Gamal dry matter content is much higher than the mulberry leaves. Besides the different types of feed can cause taste and preferences are different for goats so that the amount of feed consumed differently. This is explained by Anggorodi (1994) which states that the palatability of feed qualitatively affected by the physical properties of feed that include shape, smell, taste and texture. Added by Witariadi (2015) that Gliricidia leaves can be used as a basal feed goat or mixed in with the process of withering.

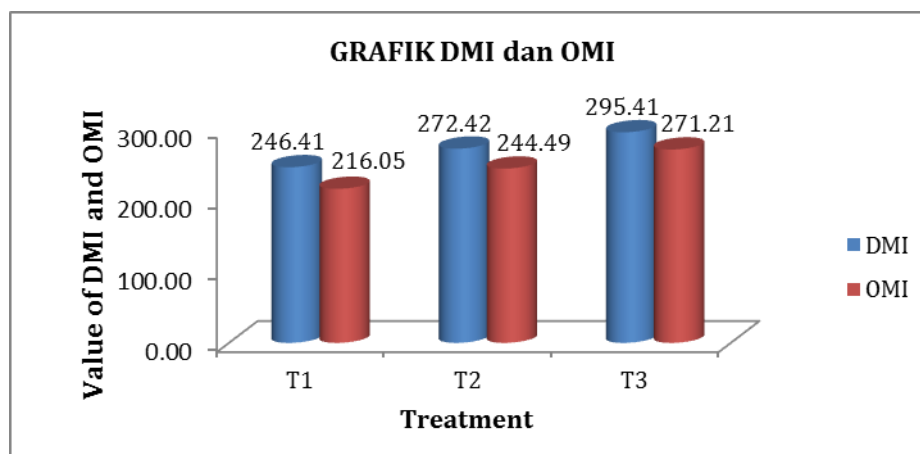


Figure 3 Graphics of DMI and OMI

Based Test F of organic mater intake (OMI) between T1 (100% mulberry), T2 (50% and 50% mulberry Gliricidia) and treatment T3 (100% mulberry) were significantly different ($P < 0.01$) in. This suggests that the different feeding is T1, T2 and T3 are able to provide different level of

palatability to livestock goats. Table 3 shows that the highest OMI Gamal granting 100% (T3), this indicates that the distinctive aroma of withering *Gliricidia* reduced drastically and also reduce levels of cyanide was avoided livestock for consumption. Described by Abrianto (2011) that the plant *Gliricidia* does have a distinctive aroma that is less favored, especially cattle never eat it at all, but it is not a problem in cattle that has been accustomed to eating. Gamal shortcomings can be circumvented by familiarizing cattle to consume Gamal.

Average increase in line with increased OMI DMI (Figure 3). DMI and OMI linkages increase shows that the organic material content of the feed is part of the dry matter of feed. Then DMI will always be higher than the OMI. This is in accordance with the opinion of Sutardi (1980) which states that the organic material is closely related to the dry ingredients for the organic material is part of the dry matter.

2. Dry material digestibility and Organic Materials

Based on the analysis of variance of the obtained results that the average percentage of DMD and OMD not significant ($P > 0.05$) to the experimental unit. In contrast to research Chakra et. al. (2014) that administration of a variety of forage (grass field, hibiscus and *Gliricidia*) with cedar concentrate "molmik" shows the differences exhibited significantly different between treatments.

Table 1 shows that the natural feeding mulberry, mulberry mix with Gamal and Gamal does not affect DMD and OMD the goat experiment. Percentage DMD and OMD in this study each ranging between 39.82 to 41.23% and from 40.55 to 43.87. The low percentage OMD DMD and the result of different levels of feed degradation caused by crude fiber and lignin content of the forage. Perry et. al. (2003) explains that the feed ingredients that contain high fiber will reduce the value of digestibility of nutrients other as to digest crude fiber required a lot of energy.

Besides anti-nutritional substances contained in forages such as tannin in *Gliricidia* and compound 1-deoxynojirimycin (DNJ) also can affect the level of digestibility. Their tannin content in *Gliricidia* can bind to protein feed and also the cell walls of microorganisms thus reducing the availability of microorganisms that serve to degradation feed in the rumen. This is supported by Jayanegara and Sofyan (2008) that tannins can bind to the cell wall of the microorganism and may inhibit the growth of microorganisms or enzyme activity. The reduced dry matter can also be caused by decreasing microbial activity, which is caused by the presence of tannins.

Furthermore, compound 1-deoxynojirimycin (DNJ) on mulberry acts to slow the rate of metabolism and hydrolysis of nutrients in livestock body described by Breitmeier (1997) that the DNJ compounds can inhibit hydrolysis of oligosaccharides became monomer-monomer. Added by Arai et al. (1998) which states that the DNJ can inhibit hydrolysis of carbohydrates into monosaccharides.

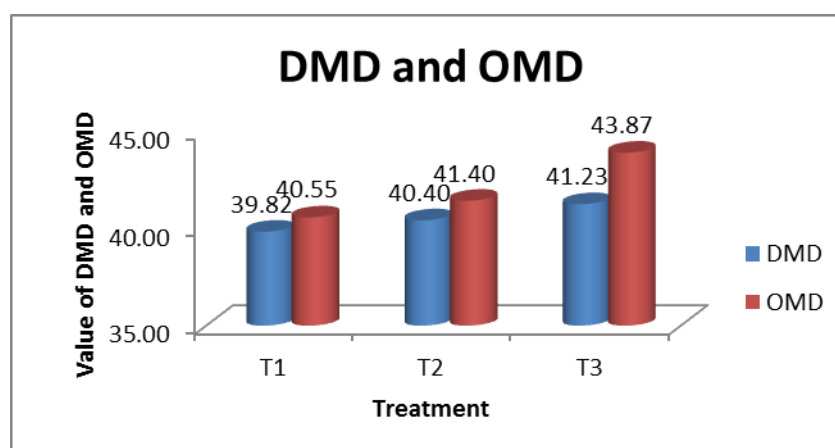


Figure 4. Graphics of DMD and OMD

Although DMD and OMD showed no significant effect on the experimental unit but can be seen in Figure 4 increase DMD and OMD line. This indicates that the components of dry matter and organic matter closely where organic materials are part of the dry ingredients. Described by Tillman et al. (1998) that most of the organic material is a component of dry matter. If the dry matter digestibility coefficients equal, then the organic matter digestibility coefficient is the same.

D. Conclusion

Based on the results of research on natural feeding mulberry and *Gliricidia* at Crossbreed Etawa male goat concluded that the consumption of dry matter and organic matter is best to P3 (*Gliricidia* 100%), but had no effect on digestibility of dry matter and organic matter.

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The Influence of Fermentation and Long Storage on the Silage of Corn Tebon

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Abstract

The study aims to determine the effect of fermentation time complete feed and silage of Tebon corn to changes in pH and nutrient content. This research was conducted in January to March 2015, in the Laboratory airy College of Agricultural Sciences (STIPER) Kendari and analysis of feed materials to be carried out at the Laboratory of Animal Nutrition and Feed Faculty of Animal Husbandry Haluoleo university. Materials used in this study were aged 60-70 days corn Tebon, pollard 20%; copra 20%; premix 30%; corn Empok 25%; salt 2.5%; minerals 2.5%, Aquadest, a buffer solution pH 7. The catalyst, concentrated H₂SO₄, distilled water, 0,1N H₂SO₄, NaOH 40%, indicatormix, 0,1N NaOH. Equipment used in this study include: chopper, plastic, rope scales, vacuum, freezer, Erlenmeyer, pH meter, analytical balance, pumpkin Kjeldahl, Erlenmeyer, glass beaker, destructor, distillation, titration tools, ovens and furnaces. The method used in this study is completely randomized design experiment Nested with 2 treatments, three long storage and 3 replicates (2x3x3) on each treatment. The treatment tested was: Concentrate + Tebon corn with different fermentation time, concentrate + corn silage Tebon with different fermentation time, then do Silage-making, mixing Silage, Silage Testing. The parameters in this study the degree of acidity (pH), nutrient content includes dry matter (DM), organic matter (OM) and crude protein (CP) before and after fermentation. Based on the results of complete feed nutrient content analysis showed that each - each fermentation time treatment effect ($P < 0,01$) to change the content of DM, OM and CP when compared to the control with the average low enough pH ranged from 4.18 to 4, 38. Based on this research can be concluded that the fermentation time very real impact on the quality of corn silage Tebon. Fermentation feed concentrate and corn Tebon (KT) decreased nutrient content higher than the complete feed made from concentrates and corn Tebon silage (KS).

Keywords: Tebon corn, fermentation, complete feed

A. Introduction

Problems of general farm in tropical countries like Indonesia are a factor of the ambient temperature is high enough. These conditions have a direct impact on metabolic systems and thermoregulation in the body of livestock. Relatively hot environment causes some animals to lose appetite, so that the quantities of intake of food (nutrients) that enter the body are also less. Nutrient intake was essential to meet basic needs (maintenance), development of the body and to the need to reproduce. The implications of the condition of nutrition of livestock is less, leading to weight gain daily (average daily gain / ADG), which is still very far from the expected results at both farm people and industry.

Complete feed is a mixture of feed materials including crude fiber source with balanced proportions that is processed and blended into the mixture with a uniform nutrient content in accordance with the needs of livestock. The advantage in the use of complete feed, among others: provide balanced nutrition for cattle; can control the balance between forage and concentrates; increasing the value to agricultural wastes; reduce residual feed; reduce the selection by livestock (Reddy, 1988). In an effort to maintain the availability of complete feed,

it can be done by preserving complete feed. One way to preserve the complete feed is fermented.

The changes that occur during the fermentation process is largely influenced by the activity of microorganisms. With the activity of microorganisms is then preserved material will undergo changes such as the level of acidity (pH) and nutrient content. The quality of fermented complete feed will depend on a long fermentation process to achieve stable phase. The faster the fermentation entered the stable phase (pH 4) the damage caused by microorganisms will become smaller. This is because microorganisms will not actively degrade the nutrient content material on the condition of low pH (acidic).

The length of time needed to reach the stable phase is influenced by several factors such as substrate / material to be fermented, type of microorganisms that thrive and environmental conditions (temperature, oxygen and water content). So that the fermentation can run well then be provided the substrate that contains soluble carbohydrates (WSC). One of the constituents of complete feed containing carbohydrates is dissolved Tebon corn. Based on the above explanation it is necessary to investigate the effect of fermentation time Tebon complete feed and silage corn to changes in pH and nutrient content.

B. Methodology

1. Materials

This research was conducted in January through March 2015, conducted in the laboratory airy College of Agricultural Sciences (STIPER) Kendari and analysis of feed materials to be carried out at the Laboratory of Animal Nutrition and Feed Faculty of Animal Husbandry Haluoleo university. Materials used in this study is Tebon corn umur60-70hari, pollard 20%; copra 20%; premix 30%; corn Empok 25%; salt 2.5%; minerals 2.5%, Aquadest, pH7 buffer solution. The catalyst, concentrated H₂SO₄, distilled water, 0,1N H₂SO₄, NaOH 40%, indicatormix, 0,1N NaOH. Equipment used in this study include: chopper, plastic, rope scales, vacuum, freezer, elenmeyer, pH meter, analytical balance, pumpkin Kjedahl, Erlenmeyer, glass beaker, destructor, distillation, titration tools, ovens and furnaces.

2. Method

The method used in this study is Complete Randomized Design (CRD) Nested with 2 treatments, three long storage and 3 replicates (2x3x3) on each treatment. The treatment tested was:

- a) Concentrate + corn tebon fermentation period of 21 days KT (L31)
- b) Concentrate + corn tebon fermentation period of 31 days KT (L41)
- c) Concentrate + corn tebon fermentation period of 41 days KT (L51)
- d) Concentrate + corn tebon silage fermentation time 15 days KS (L10)
- e) Concentrate + corn tebon silage fermentation time 25 days KS (L20)
- f) Concentrate + corn tebon silage fermentation time of 35 days KS (L30)

3. Research procedure

a. Silage making

There are also ways of making silage of Tebon corn is as follows:

- a) Tebon corn after the cut withered for 1 day.
- b) Tebon corn chopped (chopper) with a length of approximately 3-5 cm.
- c) Aerated for 1 day.
- d) Put in a silo or a plastic bag under anaerobic conditions.
- e) Stored for 21 days.
- f) For the treatment (KTL31-KTL51) Tebon corn that has been chopped and aerated directly mixed with the concentrate and vacuumed.

b. Mixing silage

This mixing of Tebon corn silage with concentrate (KSL10-KSL30) so that a complete feed with a proportion of 50% silage and concentrates 50% based on the dry matter content. Initial nutrient content of the complete feed is obtained from the calculation based on the results of laboratory analysis and a large percentage or a proportion of each ingredient is used as a constituent of complete feed.

c. Testing of Silage

Silage Tests conducted in the laboratory with the Method of Analysis

- The degree of acidity (pH) That
- Dry Mater (DM) That
- Organic Mater (OM) That
- Protein Rough

4. Observation variable

The variables that observed in this study as follows:

- The degree of acidity (pH).
- Nutritional content includes dry matter (DM), organic matter (BO) and crude protein (CP) before and after fermentation.

5. Statistical analysis

The data obtained in this study will be tabulated with Excel program for further analyzed using analysis of variance (ANOVA) with Complete Randomized Design Nested. In case of differences continued by Least Significant Difference (Sastrosupadi, 2000).

C. Results and Discussion

The results of the analysis of the nutritional content of the raw materials making up complete feed and complete feed initial nutrient calculations are presented in Table 1

Table 1. Nutrient content of the raw material of complete feed and initial nutrient calculation complete feed.

Raw Material	DM (%)	OM (%)	CP(%)
Corn Tebon *	24.03	90.76	9.65
Corn Tebon silage *	21.85	87.22	7.93
Concentrate *	88.90	85.89	15.60
KT **	56.46	88.33	12.63
KS **	55.37	86.56	11.76

Description: * The results of laboratory analysis.

**the calculation results.

KT = Concentrate + Tebon corn.

KS = Concentrate + Silage of Tebon corn.

The results of the analysis of the content of DM Tebon maize by 24.03% (Table 1) was obtained after corn Tebon silage undergo withering before it is made. As for the content of DM corn Tebon silage (21.85%) lower or decreased since been through the process of silage. The crude protein content of silage of corn Tebon of 7.93% (Table 1) according to reports Preston (2006) which states that, silage maize plants including fruits, young (corn silage, milk stage) has a nutrient content DM 26%, TDN65%, CP 8 % and SK 26%.

The decline in the nutrients that occur in silage of Tebon corn due to the utilization of the substrate contained in the material by microorganisms to grow and develop during the silage process lasts. If the bacterial growth is dominated by BAL then the silage process will go well, because the lactic acid produced by BAL will lower the pH of silage.

The Physical Quality of Complete Feed

Observations physically against each treatment silage of Tebon corn including color, texture, smell and presence / absence of fungi during fermentation are presented in Table 2.

Table 2. The results of physical examination each treatment

Treatment	Colour	Texture	Smell	Mushroom
KT (L31)	Yellowish green	Soft	Acid	Nothing
KT (L41)	Yellowish green	Soft	Acid	Nothing
KT (L51)	Yellowish green	Soft	incisive acid	Nothing
KS (L10)	Yellowish green	Soft	Acid	Nothing
KS (L20)	Yellowish green	Soft	Acid	Nothing
KS (L30)	Yellowish green	Soft	incisive acid	Nothing

Table 2 shows that, in principle, complete feed fermentation is conducted in this study occurs in anaerobic so the resulting forage conditions became greenish-yellow, soft texture, smell sour and not moldy. This is consistent with the statement of McDonald (1981) that the anaerobic fermentation is a process that will lead to forage ensilage not brown or black,

smelled sour, not moldy, not slimy, like the original texture and pH of 4.2 or less. A color change in the fermentation ensilage may be due to the Maillard or browning reaction as a result of excessive heat production (Wallace & Chesson, 1995).

When compared between treatments, the physical condition of each complete feed is relatively the same, except for the treatment with the longest length of fermentation showed differences in a relatively sharper smell. This shows that the longer the storage time cause acidity is increased as a result of the dominance of lactic acid bacteria.

pH For Silage Feed of Corn Tebon

pH measurement results from the fermentation of Tebon corn in this study showed no difference from each treatment will however be seen that the pH of each treatment, the lower along with the duration of fermentation. If the material contains a lot of WSC then dominant microorganisms is BAL, but if it contains protein Clostridium bacteria will thrive and inhibit a decrease in pH. The content of complete feed fermentation pH (Table 3)

Table 3. Mean pH fermented of complete feed.

Treatment	pH
KT (L ₃₁)	4,38
KT (L ₄₁)	4,23
KT (L ₅₁)	4,22
KS (L ₁₀)	4,24
KS (L ₂₀)	4,31

Description: The same Superscript in the same column showed no significant differences ($P > 0.05$).

Decrease in pH during fermentation due to the soluble carbohydrate content in complete feed is available in sufficient quantities, so that it will support the activities of BAL to produce organic acids that are useful for lowering the pH in the silo. In addition to soluble carbohydrates, protein content in complete feed is not too high (11-12%), so the opportunity to dominate the Clostridium bacteria are also becoming smaller. This is supported by a statement McDonald (1981), to produce the quality silage protein content of 10% of dry matter. If the raw material contains high protein then it will hinder the ongoing decrease in the pH during ensilage.

Fermented all treatments showed the average pH low enough ranged from 4.18 to 4.38. Referring to Kusumawardana (2007) states that the silage with a pH of 4 to 4.5 is still quite good silage. This indicates there has been a process of anaerobic fermentation involving BAL activity which revolutionized carbohydrates into lactic acid so that the condition of complete feed pH drops to a more acidic than the initial conditions.

The Nutritional Content of Silage Corn Tebon

The results of the analysis of the nutrient content of complete feed showed that each treatment and fermentation time effect ($P < 0,01$) to change the content of BK, BO and PK when compared with controls. The average is the result of complete feed nutrient content analysis is presented in Table 4.

Table 4. Average of the Nutrient Content of Corn Tebon Silage

Treatment	Nutrient content (%)		
	DM	OM*	CP*
KT(L ₀)	56,46 ^b	49,08 ^b	8,09 ^b
KT(L ₃₁)	33,50 ^a	28,72 ^a	3,74 ^a
KT(L ₄₁)	31,78 ^a	27,17 ^a	3,48 ^a
KT(L ₅₁)	31,60 ^a	26,63 ^a	3,43 ^a
KS(L ₀)	55,37 ^b	47,71 ^b	7,80 ^b
KS(L ₁₀)	34,62 ^a	29,01 ^a	3,90 ^a
KS(L ₂₀)	33,42 ^a	28,55 ^a	3,72 ^a
KS(L ₃₀)	31,96 ^a	26,73 ^a	3,50 ^a

Description :*)in a state *as fed*.

^{a-b} Different superscripts in the same column indicate a significant influence ($P < 0,01$).

Dry matter content show differences to control each treatment. This may be due to indications of increasing water produced during fermentation as a result of an overhaul of the nutrients in complete feed both for respiration and activity of microorganisms. Mc Donald (1981) and Foley et al., (1973) states that water produced during the fermented of is produced as a result of respiration which still goes on, because at this stage the carbohydrate is simple to be converted into CO₂, H₂O and heat. A decrease in dry matter is also affected by changes in protein and organic matter because both are still included in the fraction of dry matter.

Differences in organic matter content of each treatment with control occurs because of an overhaul of soluble carbohydrates which is a fraction of the organic material by microorganisms during fermentation to produce acid - an organic acid that is useful in lowering the pH conditions of complete feed. Besides, the oxidation process in the initial fermentation will also affect the content of organic matter.

The decline in crude protein occurs in KT and KS treatment. According to Yani (2001), the protein will be overhauled by microbes, especially microbial proteolytic into amino acids and NH₃ during the fermentation process, which causes a decrease in protein. Each treatment showed a difference only to controls. While between each treatment showed no difference. This indicates that the long fermentation and treatment of complete feed with different constituent materials (Tebon corn and silage Tebon corn) has no effect on changes in nutrient content complete feed.

The Decline in Nutrient Content of Complete Feed

Consequences must be received in the fermentation process is the decline in nutrient content of feed, it is because the process of respiration at the beginning of incubation and overhaul performed by microorganisms to grow and progress. The magnitude of the decline that occurred as a result of the fermentation process will affect the quality of complete feed. The greater the reduction that occurred then the quality of complete feed would be lower. The results of calculations of reductions in nutrient content in complete feed fermentation are presented in Table 5.

Table 5. The Average of Reduction in the Nutrient Content of Complete Feed.

Treatment	Decrease in Nutrient Content		
	CP	DM	OM
KT(L31)	22,96	20,36	4,35
KT(L41)	24,69	21,91	4,61
KT(L51)	24,86	22,46	4,66
Rata-rata	24,168^b	21,579^b	4,544^B
KS(L10)	20,75	18,70	3,90
KS(L20)	21,95	19,16	4,08
KS(L30)	23,42	20,98	4,30
Mean	22,042^a	19,612^a	4,093^A

Description: ^{A-B} different superscripts in the same column indicate a significant influence (P<0,01).

^{a-b} Different superscripts in the same column shows the real effect (P<0,05).

Based on the above table it can be seen that the length of fermentation does not affect the decline in nutrient content. But the effect of treatment of complete feed KT and KS indicate a difference. It can be caused due to the treatment of KT process of respiration occurs more frequently during the early incubation. While the treatment of KS, as a starting material to be fermented is already in the form of silage, the respiration process is not running. This is in accordance with the opinion of McDonald (1981) which states that the reduction in dry matter may occur at this stage of aerobic and anaerobic. At this stage of aerobic dry matter decline occurred because respiration continues, so that glucose is the fraction of dry matter will be converted into CO₂, H₂O and heat. While the decline in the anaerobic stage because the glucose is converted into lactic acid, ethanol, acetic acid and CO₂ by BAL, protein is converted into amino acids and ammonia by proteolytic bacteria and fat will be converted into VFA by bacterial lipolytic (Wallace & Chesson, 1995).

According to Kusumawardana (2007) a decrease in organic matter due to the overhaul of food substances, one of which is the use of organic materials in the form of carbohydrates dissolved from the raw materials for the activity of LAB to produce organic acids that are useful for lowering the pH during ensilage. The difference between treatments was shown

complete feed can be caused due to the availability of different initial organic material. In the treatment of complete feed KS, because the constituent materials have first undergone a process (silage), the availability of the initial organic material will be lower. The end result will be decreased lower.

Decrease in crude protein content greater in KT treatment ($P < 0.01$), indicating that the treatment of Clostridium activity in breaking down the protein remains high. While on treatment of KS because the constituents of complete feed has undergone a process in advance (silage), so it already has the acidic conditions that will inhibit the growth of proteolytic bacteria. In accordance with the opinion of Wallace and Chesson (1995) that, proteolytic Clostridia will ferment amino acids that are building blocks of protein into ammonia, amines and volatile organic acids. The average of crude protein content of the final outcome fermentation complete feed from each treatment were worth approximately 11% is still considered good enough. This is in accordance with the opinion of Suryadi (2006), that the complete feed with a crude protein content of approximately 12% ready to be given to cattle without other ingredients blended.

D. Conclusion

Based on this research can be concluded that the fermentation time is very real impact on the quality of silage of corn Tebon. Fermentation feed concentrate and Tebon corn (KT) decreased nutrient content higher than the complete feed made from concentrates and silage of Tebon corn (KS).

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Effect of Natural Feed Mulberry and Gliricidia against Percentage Non Carcass and Carcasses Males Goat Ettawa Crossbreed

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Abstract

This study aims to assess the effect of natural feed mulberry and gliricidia against carcass percentage and non-carcass male goats Ettawa crossbreed. This study was conducted for 4 months starting in January to April 2016, located in the Village RanomentaaToari District of Kolaka. This study used 12 male goats Crossbreed Ettawa age ranges of 4-6 months that were placed in 12 individual cages. The materials used are natural feed (Gliricidia leaves and mulberry leaves), water, salt, and medicine. The equipment used is the individual cages, where food, drinking, machetes, scales, basins, cutter, knife, plastic bags, rope and a cutting table. The design used in this study is completely randomized design (CRD) 3 treatments with 4 replications. Treatment 1 (T1) (100% mulberry leaf), T2 (50% of mulberry leaves, 50% Gliricidia leaves) and T3 (100% Gliricidia leaves). The parameters were observed in the study were: weight gain (WG), slaughter weight, carcass weight and percentage, and the percentage of non-carcass weight. The results showed that the average W. Gited Nations T3 (26.98 g/day) was significantly different ($P < 0.05$) with T2 (22.83 g/day) and T1 (22.42 g/day), but T2 and T1 are not significantly different. In line with the average slaughter weight is from highest to lowest T3 (13.29 kg), T2 (11.21 Kg) and T1 (10.37 Kg). Followed by the average carcass weight were significant ($P < 0.05$) as a result of treatment. The average carcass weight T1 (4.17 Kg), T2 (4.24 Kg) and T3 ((5.38 kg). Whereas in the average carcass percentage effect is not significant ($P > 0.05$) as a result of treatment with a range of 38.43 -39.43%. Similarly, the weight of non Kakas and non carcass percentage of the average range of 50.73 to 55.09%. Based on the results research, it can be concluded that the natural feeding mulberry and gliricidia real effect on body weight gain, slaughter weight and carcass weight but had no effect on carcass percentage, non carcass weight and carcass percentage.

Keywords: natural feed, carcass non carcass, male goat hybrid Etawa

A. Introduction

A goat is one kind of livestock that have fairly good development prospects in the supply of meat. One type of goats is suitable for development of the goats Crossbreed Ettawa. Goats Crossbreed Ettawa is one of the local goat population in Indonesia is quite high and widespread, the current population of goats Crossbreed Ettawa is highest in Southeast Sulawesi Kolaka District, amoWGting to 15 123 individuals (Department of Agriculture, Horticulture and Animal Husbandry, 2015).

Gender factor affects the performance of livestock production caused by their effect on the tissues of the body at once affecting growth and carcass percentage of livestock and gender causes difference in the rate of growth on gender, hereinafter the same age male animals usually grow faster than female animals, besides the nutrient content of feed also affect the weight or percentage of carcass and non carcass. Mulyono (2000) suggested that the forage contains nutrients that can determine the growth, reproduction and animal health. Good fresh green feed is when the composition is arranged between the low protein and high in protein. Livestock productivity reflected by the rapid growth and can be measured by the percentage of body weight gain and carcass produced (Hafid, 2002).

Livestock weight gain is influenced by the type of livestock (breeds), gender (sex), age (age), environmental factors (environment) and management (management) (Hafid et al., 2003). The cultivation of hybrid goats Ettawa is one commodity in Kolaka especially in Sub Toari, because people have a lot to feel the benefits of raising goats crossbreed Ettawa effort as an attempt to increase the income of livestock farmers' income. Based on the potential of natural resources such Toari the District, where there are also many natural foods available such as Gliricidia leaves and mulberry leaves so that doing business Ettawa crossbreed goat farm can be directed to the intensive rearing. On the basis of these ideas, the study aims to assess the effect of natural feed mulberry and Gliricidia the carcass percentage and non-carcass Ettawa male crossbreed goats.

B. Methodology

1. Materials

This study was conducted for 4 months starting in January to April 2016, located in the Village Ranomentaa District of Toari Kolaka. This study used 12 male goats crossbreed Ettawa age ranges of 4-6 months that were placed in 12 individual cages. The materials used are natural feed (Gliricidia leaves and mulberry leaves), water, salt, and medicine. The equipment used in this study is the enclosure of metabolic (individual cages), the feeding, drinking, machetes, digital scales, weight scales, spades, buckets, basins, meter tape, cutter, hacksaw, knife, machete, plastic bags, raffia and cutting table.

2. Method

This research was conducted with the two stages, the first stage and the second stage cutting maintenance. Before carrying out maintenance advance preparation including familiarized animals used for approximately 1 week in a row, because the goats come from farms that maintenance people and different feed given to those given at the time of the study. Natural feeding is done 3 times a day i.e. morning hours of 08.00 pm, during the 13:00 pm and the afternoon at 16.00 pm, while the drinking water and given adlibitum. Weight weighing performed every 2 weeks for 3 months to see the body weight of goats. How to calculate the weight gain, namely:

$$\text{Weight gain} = \frac{\text{Final Body Weight} - \text{Initial Body Weight}}{t}$$

Cutting procedure on this research can be seen in Figure 5 as follows:

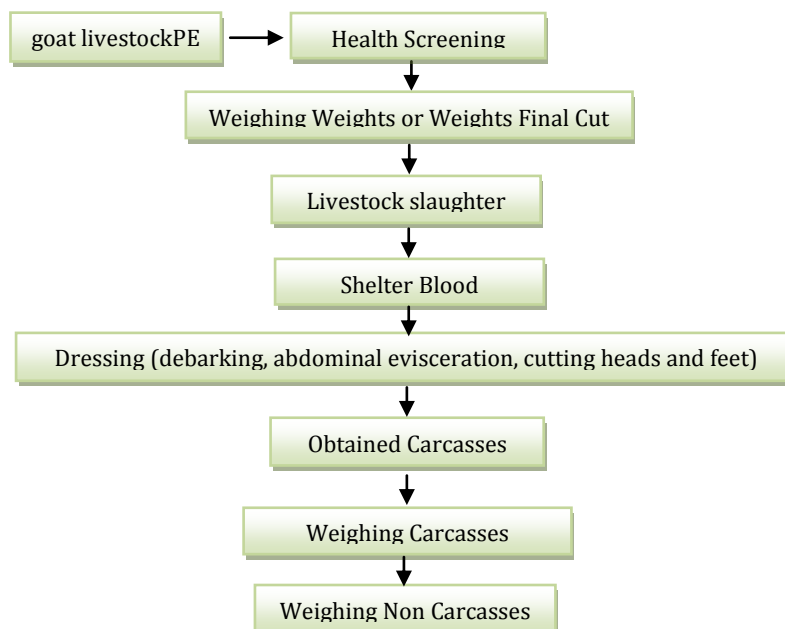


Figure 1. Flowchart Cutting

3. Research design

The design used in this study is completely randomized design (CRD) 3 treatments with 4 replications. Treatment 1 (T1) (100% mulberry leaf), T2 (50% of mulberry leaves, 50% Gliricidia leaves) and T3 (100% Gliricidia leaves). The parameters were observed in the study were: body weight, weight and percentage of carcass weight and the percentage of non-carcass

C. Result and Discussion

Based on research that has been conducted on goats Crossbreed Ettawa (CE) male given natural feed mulberry and Gliricidia showed significant ($P < 0.05$) weight gain, daily slaughter weight and carcass weight but had no effect ($P > 0.05$) on carcass percentage, Non Carcass Weight and Percentage Non Carcass (Table 1).

Table 1. Average Added Weight Loss, Weight Cut, Carcass Weight, Percentage Carcass, Non Carcass Weight and Percentage Non Carcass Goat Feeding PE Males with Natural Mulberry and Gliricidia

Parameter	Treatment			Sig.	Ket.
	T 1	T2	T 3		
WG (g / day)	22.83 ^b	22.42 ^b	26.98 ^a	0,021	*
Slaughter weight (kg)	10.37 ^b	11.21 ^b	13.29 ^a	0,041	*
Carcass Weights (Kg)	4.17 ^b	4.24 ^b	5.38 ^a	0.028	*
Carcass percentage (%)	39.07	38.43	39.43	0.958	tn
Non Carcass Weights (Kg)	5.76	6.20	7.50	0.079	tn
Non Carcass Percentage (%)	50.73	55.09	54.39	.810	tn

Description: Different superscript on the same line indicate significant difference ($P < 0.05$), * = Influential significantly ($P < 0.05$), tn = not significant ($P > 0.05$)

Based on the analysis of variance showed that the WGited Nations a significant effect ($P < 0.05$) as a result of treatment (Table 1). On average the WGited Nations showed that T3 (26.98 g / day) was significantly different ($P < 0.05$) with T2 (22.83 g / day) and T1 (22.42 g / day), but T2 and T1 not significantly different. WG differences are caused by the consumption levels BK different, but it also can be influenced by the quality and quantity of feed. This is in accordance with the opinion of Parakkasi (1999), that one of the factors that influence weight gain is feed, the higher the amoWGt of feed consumed, the higher the growth rate of livestock. Added by (Nurasih, 2005) that the body weight gain is strongly influenced by the quality and quantity of feed, this question is a cattle weight gain votes in proportion to the ration consumed.

Average daily waight gain (WG) ranged from 22.42 to 26.98 g / day lower than research Purbowati et al. (2006), that the appearance of PE goat by feeding forage gliricidia, written by other green feed produce weight gain 188.10 g / head / day. The WG is low may be caused by

the availability of nutrients that can be converted into meat. Perry et. al. (2003) explains that the feed ingredients that contain high fiber will reduce the value of digestibility of nutrients other as to digest crude fiber required a lot of energy.

The average slaughter weight gained during research, namely T1 (100% mulberry) 10.37 Kg, T2 (50% and 50% mulberry Gliricidia) amounted to 11.21 Kg, and T3 (100% Gliricidia) amounted to 13.29 Kg. The mean weight of the highest cut on the T3 treatment by feeding 100% gliricidia and averaging the lowest in treatment T1 administering 100% mulberry. This indicates that the addition of different types of natural food to the extent of 100% real impact on the increase in slaughter weight Ettawa male goats Crossbreed.

One of the factors that affect the weight piece is feed intake. The existence of significant effect ($P < 0.05$) among the three treatments, presumably because the feed has a different quality. Slaughter weight also influenced by the growth of the goat during maintenance. One that affects growth is the dry matter intake. Good growth also resulted in weight cut is good too, and vice versa. These results are consistent with the statement Agnihorti et al. (2006) that the animal by administering only green fodder without addition of complete feed, it will affect the weight cut.

Goats Ettawa Crossbreed with different natural feeding significant effect ($P < 0.05$) on carcass weight in each treatment. The average carcass weight gained during the research T1 (100% mulberry) of 4.17 Kg, T2 (50% and 50% mulberry Gliricidia) of 4.24 Kg and T3 (100% Gliricidia) of 5.38 Kg. The average of the highest carcass weight at the T3 treatment by feeding 100% Gliricidia and averaging the lowest in treatment T1 administering 100% mulberry. The difference of feeding natural to treatment group, which can cause an influence on the increase in slaughter weight where the weight potoong is one of the factors that influence differences in carcass weight. This allegation in accordance with the opinion of Rianto et al., (2006) that one of the factors that influence carcass weight is the weight cut, the higher the weight cut, the higher the carcass weight gained

Soeparno (2009) states that the variation of carcass weight and carcass composition is largely dominated by the weight of the body. Added by Nusi (2011), any increase in slaughter weight is always followed by an increase in carcass weight, which means that the increase in slaughter weight associated with the growth and development of body parts or carcasses.

The average of the percentage of carcasses obtained during the research T1 (100% mulberry) amoWGted to 39.07%, T2 (50% and 50% mulberry Gliricidia) by 38.43% and T3 (100% Gliricidia) amoWGted to 39.43%. The average percentage of carcasses in this study is lower than research Agnihorti et al. (2006), which earned an average carcass percentage of 43-46% in goats given complete feed, but in this study only treated using green feed without the addition of concentrate. This fact shows the provision of green fodder based locally despite having levels of protein and energy feed different major influence on slaughter weight, and no effect on the percentage of carcasses so that they can be maximized with additional feed more economically so as to meet the needs of livestock and improve carcass quality. Based on the analysis of variance the three treatments were not significantly different ($P > 0.05$) allegedly as a result of anti-nutrients foWGd in Gliricidia leaves and mulberry leaves that inhibit and degradation feed digestibility in the rumen. Perry et. al. (2003) explains that the feed ingredients that contain high fiber digestibility will lower the value of other food substances due to digest crude fiber required a lot of energy so that it can affect the percentage of carcasses.

Feeding naturally different in Ettawa male crossbreed goats, showed no effect ($P > 0.05$) to the non-carcass weight for each treatment. Non carcass weights were obtained in line with the weight cut is generated, i.e. the higher slaughter weight, then the non-carcass weight produced is also likely to increase. As for the average non carcass weight can be obtained with weight distribution of non carcass (skin, head, feet, liver, spleen, IWGgs, trachea, heart, testis, omental fat, tail and innards).

Factors affecting non carcass weight at Ettawa male goat hybrid is a different feed consumption feed dry matter. This is reinforced by the statement (Berg and Butterfield, 2005) that the factors that can affect the production of non-carcass an animal is growth and nutrition.

Based on Table 1. Shows the percentage of non-carcass weights and the male PE goat that fed natural mulberry and Gliricidia are not significant ($P > 0.05$) with an average range of 50.73 to 55.09%. The results are consistent with the results of research Hudallah et al. (2007) that the non carcass percentage ranged from 53.05 to 55.58%. Added by Adiwinarti et al. (1999) which states that non carcass percentage is 57% of the overall percentage.

D. Conclusion

Based on these results it can be concluded that the natural feeding mulberry and *Gliricidia* real effect on body weight gain, slaughter weight and carcass weight but had no effect on carcass percentage, non carcass weight and carcass percentage.

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The Role of Diluents in Maintaining Quality of Bull Sperm During Freezing

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Abstract

This study aimed to determine the effect of diluent in maintaining the quality of bull sperm during freezing and physiological processes of bull sperm that occur during freezing. This research was conducted by observing samples of frozen bull sperm that uses diluents, as well as through the assessment of data research with assessment parameters such as macroscopic and microscopic assessment of cattle semen. Data were analyzed using descriptive statistical analysis. The results of this study indicate that the ratings fresh semen is done in two ways, namely macroscopically and microscopically. Grossly obtained volume of average ejaculate of 6 ml with a beige color and acidity levels on average 5.8. The concentration used is 'medium' which is a category of consistency and decent for further processing until the stage of freezing to rethawing. Microscopic assessment that includes an average frequency of motility in the fourth shelter is 70% with 3+ mass motility, percentage of live of fresh semen was obtained in this study was 80%. This value is the percentage of normal life. Based on these results it was concluded that the addition of diluents can reduce the rate of loss of quality (motility and percentage of survival) of bull sperm during the stages of preservation. Andromed diluent best in reducing the rate of decline in the quality of bull sperm during the stages of preservation.

Keywords: Diluent of sperm, freezing of bull sperm, processing of sperm

A. Introduction

In Indonesia, the beef cattle business requires special attention in connection with efforts to maintain and support the increase in population, where appropriate technology, especially in the field of reproduction can be implemented easily and efficiently. Optimizing the use of artificial insemination (IB) of whom are to pursue any bulls to be able to produce a calf every year with gender as desired, i.e. male or female. Male animals of choice given the ability of farmers to maintain the growth and development of body cells faster than the female so it is very appropriate if male animals farmed for the purpose of fattening (fattening); while female animals reared for its ability to produce children, and milk (Pratiwi, et al., 2006).

In the frozen storage, despite the fertility of bull semen frozen until thawed normally be used to IB, but the technique of frozen storage at that time resulted in loss of life percentage is still 40-50% for sperm during the freezing process until melting back (Prathalingam et al., 2006). During the production of bull sperm frozen, sperm cells can undergo a number of risks that could potentially degrade the quality of sperm. Sperm freezing techniques, for example the use

of diluents, incubation, observation for color DNA and freezing can affect the durability of the viability and ability of sperm fertility. Nonetheless, Johnson, et al., (2000) reported that the danger of freezing sperm induced by freezing to thawing back can be minimized by optimizing the cooling rates and freezing material.

One of the ingredients have been used are chicken egg yolk which has become a common component of a diluent for freezing sperm from different types of livestock over 60 years ago. It has been shown that egg yolks can help in the resistance to the cold stress and improving the ability of sperm fertility (Lamia, et al., 2004). In addition, protective action yolk is widely identified with the content of low-density lipoprotein (LDL) (Hu et al., 2009; Moussa et al., 2002).

The diluent containing LDL (tris yolk) may improve / enhance sperm motility, acrosome reaction and plasma membrane integrity, DNA integrity Boer after freezing to thawing back and can be used as a freeze protection medium (Hu, et al., 2009). Bergeron et al. (2004) suggest that the possible components LDF (low-densityfraction) -lipoprotein of diluent yolk protein contaminated with seminal plasma (BSP proteins) and this may represent a common mechanism of protection of sperm with egg yolk. Given this research are expected to evaluate the effect of diluent on motility, percentage of sperm bulls during freezing until thawed. Addition of diluent in sperm processed until a freeze is expected to provide better results. With the addition of the diluent in the process of pickling liquid semen can maintain the quality of sperm during freezing to thawing back. As a source of scientific information that the effort to address the decline in the quality of sperm bulls during the freezing process or preservation of sperm.

B. Methodology

Research materials

The material in this study is a microscope, glass object and glass deck, semen / sperm Cattle were accommodated by using an artificial vagina (VB), frozen sperm, egg yolk diluent, and diluent andromed.

Type and Data Resource

To obtain the required data in this study required primary data and secondary data, i.e.:

1. Primary data is data obtained directly from observations until freezing fresh sperm were used yolk and Andromed diluents.
2. Secondary data is data obtained by reviewing the literature data (books and journals)

Research design

a. Making solution of Diluent

Diluent solution used in this study consisted of 2.42 g Tris, 1.48 gr of citric acid, 1.00 grams of fructose, 6.6 ml glycerol, 25 mg of gentamicin, 50,000 IU penicillin to 100 ml of water non-pyrogenicsteril. One by one the ingredients put into distilled water while stirring with a magnetic stirrer for 20 minutes. After the diluent provided, then stored at a temperature of 5 ° C

b. Semen reservoirs

Semen from ejaculation results obtained from cattle using artificial vagina. The semen used in this study for preservation process assessment volume, sperm concentration and percentage of motile sperm and have requirements with motility > 70% and normal sperm morphology > 85%. Then semen ejaculation results are used equally divided between different diluent solutions.

c. Semen processing

(1) Dilution of semen

After the evaluation of the quality of fresh semen completed, the semen is divided into two same fractions, a fraction diluted with diluent solution to the yolk, and the other with the diluent solution treated with Tris and andromed, which is diluted in the ratio 1 semen: 4 diluent and then homogenized. Providing two pieces of test tubes, wherein each tube contains each medium Tris and Andromed. Semen diluted, sucked up as much as 1 ml is then inserted into the tube containing the diluent medium and left for 20 minutes at a temperature of 28°C.

(2) Processing to Packaging in straw

After the sperm of dilution available, further sperm cooled from 37°C into 4°C for 1.5 hours. Then fill Straw Polyvinyl chloride (PVC) (0.25 ml) (Biovet, France) using a filling sealing machine and the temperature is maintained at 4°C for 2.5 hours.

(3) The freezing of sperm

Straw containing sperm has been stored at a temperature of 4°C subsequently placed 3 cm above the surface of liquid nitrogen, which is approximately -120°C temperature for 15 minutes. After 15 minutes, the straw directly immersed in liquid nitrogen (-196°C) for storage in containers.

(4) Reimbursement of sperm

Bull thawed sperm by placing a straw in a water bath at 37 ° C for 45 seconds for further quality assessment.

(5) Ratings for Motility

Semen dropped on object glass and covered with a glass deck is then observed under a microscope with a magnification of 40 x 10. Penilaian mass movement set with a score of 0; 1; 1+; 2; 2+; 3; 3+ (Wahjuningsih, et al., 1998). This assessment is carried out as many as four stages, namely the fresh semen, sperm after the addition of diluents, sperm after the addition of diluents pre filling sealing and sperm after melting back.

(6) Calculation of Percentage of Life

Calculation of percentage of survival using a pillowcase preparations were observed under a microscope with a magnification of 40 x 10. Preparations pillowcase made by dripping a drop of semen on a glass object plus a drop of dye eosin and homogenized. After it reviews the use of glass deck is then dried and evaluated. Red sperm counted dead and sperm which do not absorb colors or slight color absorbing countless lives. The assessment was performed as many as four stages, namely the fresh semen, sperm after the addition of a diluent, sperm after the addition of diluents pre filling sealing and sperm after rethaw.

Assessment parameters

Parameter assessment in this study is:

1. Ratings for macroscopic. This assessment includes semen volume, pH, color and consistency. This assessment is performed on fresh sperm and did not get any treatment.
2. Microscopic Ratings for. This assessment includes assessing motility and the percentage of life lived four times. The first assessment on fresh semen covering mass motility, individual motility, concentration and percentage of life. The second assessment in sperm processed. The third Ratings for in sperm pre filling sealing. The fourth assessment in sperm after melting back

Technique of Data Analysis

Data were analyzed by analysis of variance with treatment that shows the real effect, then tested using Significant Difference test (LSD) and qualitative analysis of data obtained.

C. Result and Discussion

The Characteristics of Fresh Semen

Based on research conducted on fresh semen cattle, obtained results are shown in Table 1.

Table 1. Characteristics of fresh bull semen

Parameter	Average
A. macroscopic	
▪ Volume (cc)	6
▪ Color	Beige
▪ Consistency	moderate
▪ pH	5.8
B. microscopic	
▪ motility	70
▪ Movement mass	3 +
▪ Viability Percentage (%)	80

Source: Results of Measurement, 2016

Table 1 shows that the assessment of fresh semen is done in two ways, namely macroscopically and microscopically. This is in accordance with the opinion raised by Toelihere (1985) that the semen quality assessment carried out macroscopically (pH, color, consistency) and microscopic (motility, percentage of survival, concentration and morphology of sperm).

The volume of the ejaculate obtained an average of 6 ml. This indicates the excellent quality of the assessment and normal volume, as the opinion of Pratiwi et al. (2006) suggested that the volume of the ejaculate cattle 6-10 ml.

Assessment of color on fresh semen veal was obtained by beige. Beige on cattle semen is quite normal and is of good quality. As Pratiwi et al. (2006) that the color of the fresh semen good beef is yellowish white to cream color.

The level of consistency of fresh semen cattle used in this study was moderate. This assessment category was also a category of good consistency and feasible for further processing until the stage of freezing to thawing back. This is in line with the opinion of Pratiwi et al. (2006) which states that the consistency of semen bull is medium to thick.

The degree of acidity (pH) of cattle semen was observed in this study was an average of 5.8. Although the pH value is not in accordance with that raised by the Pratiwi et al. (2006) which states that cattle semen pH is 7, but the value of 5.8 is still considered good and still worth further processed to the point of freezing to rethawing.

For microscopic assessment that includes an average frequency of motility in the fourth shelter is 70% by mass motility 3+. This is in accordance with the opinion of Pratiwi et al. (2006) that the standard of fresh semen bull that must be met for the processing of > 70% (range 70-90%) with a mass movement 2+ to 3+. Similarly, the opinion raised by Arifiantini & Yusuf (2006), which classifies the mass motility in 3 criteria and criterion 3+ is the most excellent mass motility. Further suggests that the criteria +++ is a mass movement of the most well characterized by big waves, fast moving dark, and on the move. In general, the concentration of fresh semen of cattle presented by the Pratiwi et al. (2006) that the fresh bull semen concentration ranges 800-1160 million / ml.

The percentage of live fresh semen obtained in this study was 80%. This value is the percentage of life that is in line with the normal. This is stated by Hafez (1993) that the normal sperm 80-95%. The percentage of sperm was obtained by observation of sperm after staining the preparations pillowcase. Mixture pillowcase obtained by adding dye eosin staining, so as to facilitate the calculation of the live of sperm,

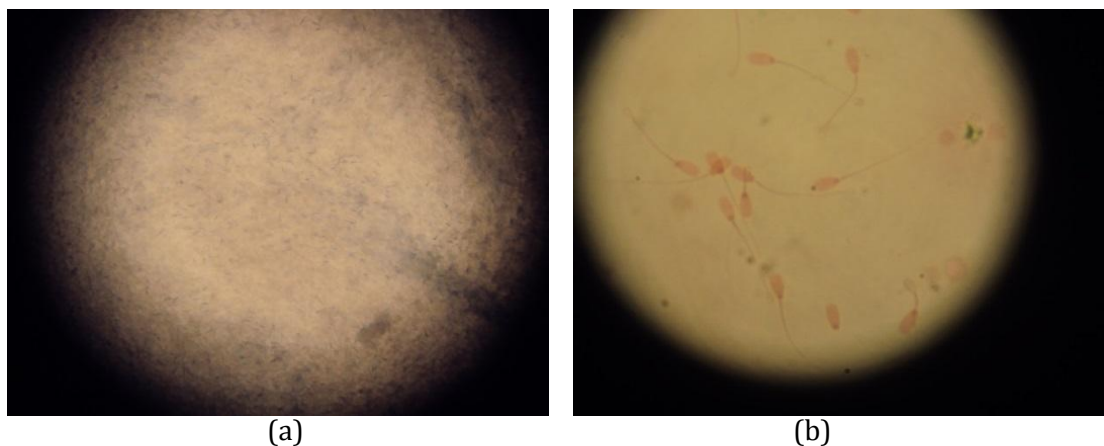


Figure 1. (a) The appearance of mass Motility of Fresh Semen; (B) sperm in eosin staining (viability Percentage of sperm)

Motility of Sperm

Based on observations of sperm motility using Tris and Andromed during processing sperm can be seen in Figure 2.

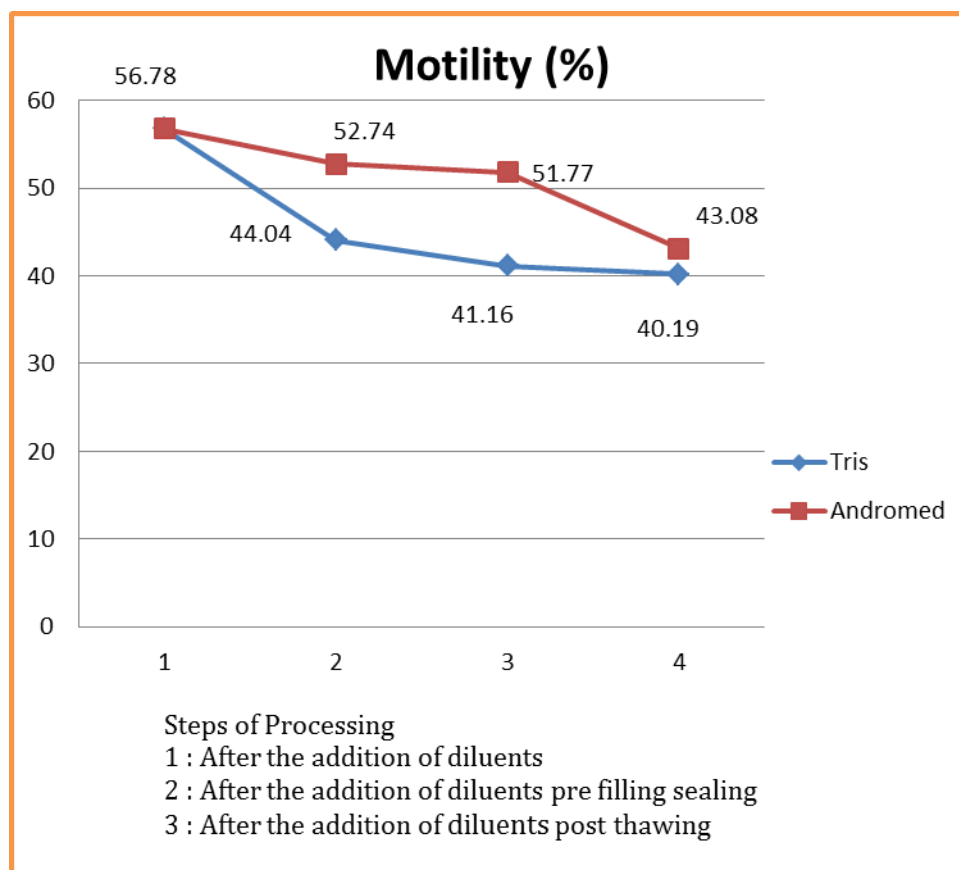


Figure 2. Sperm Motility by using Tris and Andromed

Figure 2 shows that the second diluent (Tris and Andromed) both decreased motility of sperm during freezing. Diluent andromed be able to maintain the quality of sperm during freezing. This is most likely caused by the content of diluent Andromed are better able to minimize the adverse impacts of stress (cold shock) during the stages of freezing sperm until thawing stages (reliquefaction for frozen sperm).

The occurrence of a significant reduction in treatment by using Tris yolk compared diluent andromed allow sperm decreased motility caused by the content of the diluent tris that trigger the use of energy is maximized, so that sperm undergo more moves that ultimately lead to the motility of dwindling over storage process stages of sperm.

The use of diluent in the processing stages of sperm from the provision of a diluent, freezing, thawing to stage must contain critical components. As stated by Mitchell & Doak (2004) that a diluent for freezing must contain the following components: (1) egg yolk or milk, (2) glycerol on the initial concentration of approximately 7%, (3) a simple sugar, (4) Sodium citrate dehydrate or tris (hydroxymethyl) amminomethane, and (5) antibiotic.

The viability percentage of sperm

Based on observations using the percentage of sperm with Tris and Andromed during processing of sperm can be seen in Figure 3.

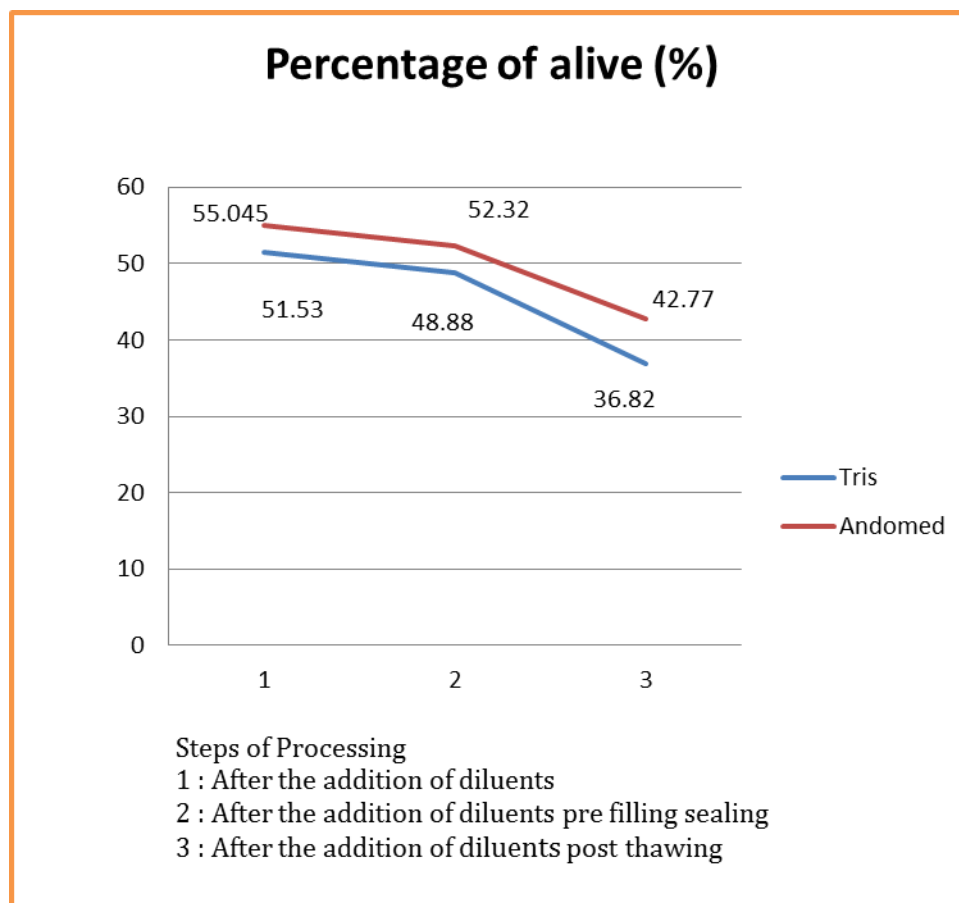


Figure 3. Percentage of sperm life by using Tris and Andromed.

Based on Figure 3, it appears that the second diluent (Tris and Andromed) both decreased quality of sperm during freezing. However, the diluent andromed better able to prevent loss of quality faster than the tris diluent during freezing sperm until thawing stages (liquefaction back for frozen sperm).

D. Conclusion

The addition of diluents can reduce the rate of loss of quality (motility and the percentage living) cattle sperm sexing results during the stages of preservation. Diluent Andromed is the best in reducing the rate of decline in the quality of sperm bulls during the stages of preservation.

To support the success of the preservation process sperm bull aiming for long term storage, then the diluent of sperm can use the egg yolk tris and the Andromed.

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