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Hatching Performance of Indonesian Native Chicken Supplemented by L-Glutamine at Different Days of Incubation

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Abstract

The present study aimed to determine the hatching performance of native chicken subjected to the supplementation of L-Glutamine at different days of incubation. A total of 240 fertilized eggs native chicken eggs with an initial weight of 48.85 ± 3.3 g, were subjected to injection of glutamine on the 7th, 9th and 11th day of incubation, while the control group received no injection. A total of 1.5% glutamine was dissolved in 0.5 mL of saline solution and injected at the pointed part of the egg with the target into the albumen. Hatchability, incubation time, and chick weight at hatch were determined during the study. The hatchability of native chicken treated with an injection of glutamine amino acid on different incubation days was still lower than of the control group. However, hatches were generally more substantial in size. The incubation time of the injected chicks was longer than that of the control. Chicks from injected of glutamine on the 11th day of incubation were 12.31% heavier than controls and did not differ from injections on the day 7th and 9th of incubation. The results of this study indicated that the administration of glutamine to obtain more massive chicks at the time of hatching could be conducted on the 7th, 9th and 11th days of incubation, even with lower hatchability.

Keywords: glutamine, in ovo-administration, native chicken, hatching performance

A. Introduction

The efforts to increase the productivity of the native chickens that are widely studied and applied today are the utilization of essential nutrients to maximize the embryo potential that develops in the egg during the incubation period. Through this method, chickens are expected to hatch with more excellent performance conditions, and these improvements can be sustained on the post-hatching period or even on the next generation without altering the genetic.

The supplementation of various nutrients look like (amino acids, fatty acids, carbohydrates, minerals, and vitamins) or other substances (hormones, vaccines, drugs, and other metabolites) were into the hatching egg during the incubation period. It had been widely known for beneficial effects on the productive performance of commercial line chickens (broiler or layer type), although these types of chicken have better genetic as the results of the selection for a long time. Reports of performance improvements in the commercial chicken can be seen in several studies such as Uni, Ferket, Tako, & Kedar (2005); Santos, Corzo, McDaniel, Filho, & Araujo (2010); Kornasio, Halevy, Kedar, & Uni (2011); Shafey, Sami, & Abouheif (2013); and Salmanzadeh, Ebrahimneshad, Shahryar, & Ghaleh-Kandi (2016). However, there were few studies on in ovo feeding of amino acids in Indonesian native chicken. Studies conducted by Asmawati (2014) and Azhar, Rahardja, & Pakiding (2016) involving in ovo administration of lysine, methionine, and arginine, improved not only the chicks weight at hatch but also post-hatch performance.

The administration time of glutamine during incubation varies among study based on the objective of the study. Injection of glutamine was done few days before hatching consistently improved growth and development of a digestive tract of duck (Chen, Wang, Xiong, Wan, Xu, & Peng, 2010) and broiler breeder (Shafey et al., 2013). Similar results of broiler breeder digestive tract improvement have been reported by Salmanzadeh et al. (2016) who injected glutamine on day 7th of incubation. There is no information about the effect of glutamine administration time during incubation on the native chicken performance. Hence, this research aimed to determine the hatching performance of native chicken as the result of glutamine supplementation during different days of incubation.

B. Methodology

1. Incubation and in ovo injection procedures

A total of 300 local chicken eggs were obtained from the university farm and selected based on the uniformity of weight, shape, and color of the shell. Eggs were numbered, weighed individually, and set in a forced-draft incubator equipped with automatic turning. Incubation temperature and humidity were maintained at 37-38 ^{o}C and 50-55% respectively. On the 7th day of incubation, each egg was candled to determine the embryo development. The infertile eggs or the eggs containing dead embryos were removed, and the remaining of fertile eggs were randomly divided into four treatments of glutamine injection with three replications and 20 eggs per replicate. The procedures of glutamine supplementation were performed respectively on the 7th, 9th, and 11th-day incubation while the uninjected group was treated as a control.

Before injection, the selected eggs were candled to identify the albumen position as the injection target. The point of the inserted needle was marked, cleaned with alcohol, sealed with sticky tape, and a small hole was made using the pointed tip of scissor on the marked point. A 0.5 mL solution (1.5% Gln dissolved in sterilized NaCl 0.9%) was injected into the albumen using 24 G needle to a depth of 1 cm. The injection process was conducted under aseptic conditions to avoid contamination. Furthermore, the injection hole was sealed with a nail-paint as a substitute for paraffin. The injected eggs were placed back into the incubator, and the incubation process continues until hatch at the 21st day.

2. Chicks care and data collections

On the 20th day of incubation, the eggs were observed to determine the hatching time, weight of chicks, and hatchability. The hatching time was marked on the observed chicks that had successfully left the shell. Incubation time (hours) is the time needed for the egg incubation process to hatch, calculated from the time the egg sets until it succeeds in getting out of the eggshell. The chicks were marked based on the number of the eggs in each treatments group. Chicks were weighed three h post-hatch to determine the chick weight at hatch and shown as absolute (g) and relative (%) weight. Hatchability (%) was calculated according to the number of hatched chicks from the number of eggs in each group.

3. Data Analysis

Data were analyzed by analyses of variance according to the completely randomized design using the general linear model procedure (Gasperz, 1991). Difference between treatments group was compared by multiple range Duncan test following the ANOVA, and values were considered difference statistically at 5% ($P<0.05$).

C. Result and Discussion

1. Hatchability

The hatchability is the main indicator of the success of chicken eggs hatching. The Effectiveness of external nutrient administration treatment during incubation, including glutamine, when conducted in the early incubation period, showed lower hatchability value compared to control as reported by Salmanzadeh et al. (2016). In the present study, injection of glutamine at different incubation days also showed the same phenomenon (table 1).

Table 1. The hatching performance of the Native Chicken as the results of the supplementation of glutamine at different days of incubation.

Parameters	Supplementation time			
	control	Day-7th	Day-9th	Day-11st
Hatchability (%)	69,9 ± 16,2[b]	28,9 ± 20,6[a]	34,0 ± 13,0[a]	34,85 ± 17,2[a]
Incubation time (h)	490,4 ± 8,3	499,5 ± 3,3	495,7 ± 7,5	495,6 ± 6,6
Absolute hatching weight (g)	31,8 ± 1,0[a]	35,3 ± 2,2[ab]	34,1 ± 1,6[ab]	36,3 ± 2,0[b]
Relative hatching weight (%)	70,8 ± 2,6	72,6 ± 1,5	73,7 ± 0,6	73,0 ± 0,4

[abc]The difference superscript follows the value on the same row were significantly difference ($P < 0.05$).

The administration of glutamine at days 7th, 9th, and 11th of incubation showed hatchability value of treatments groups lower compared to the control group (32.5 vs. 70%). This low hatchability can occur, considering that the treatment applied is an invasive technique for embryos that develops in the first week of incubation. Risk of embryo death of in ovo administering of amino acids at the early of the incubation period is generally higher than the similar method at the end of incubation period as reported by some researchers (Foye, Uni, McMurtry, & Ferket, 2006; Kornasio et al., 2011; Asmawati, 2014).

Among the treatment of the supplementation of glutamine, the number of chicks hatched from the treatments on day 9th, and 11th of incubation groups tends to be higher than the injection that conducted on the day 7th. This condition indicated that embryos survived and have a better response to the glutamine additions, primarily when the injection was held on day 9th or 11th of incubation.

A similar trend of lower value of hatchability of broiler breeder eggs that injected glucose and magnesium on the day 7th of incubation was reported by Salmanzadeh, Ebrahimnezad, Shahryar, & Behesti (2012). This condition illustrated that any substance injected into the fertile eggs at the beginning of the incubation period may alter the internal environmental conditions of the egg and potentially harm the developing embryo's survival.

The albumen was absorbed in large quantities into the ectoderm embryo during the incubation period (Yoshizaki Ito, Hori, Saito, & Iwasawa, 2002). Interaction of albumen composition with exogenous amino acids can be destructive or protective through changes in the content of *Avidin* or *nuclease* (Lu, Killoran, & Riley, 2003). It can be a consideration in determining the proper of the injection day and take into the account that the albumen on the day 7th of incubation have a higher proportion compared to the following days.

2. Incubation Time

The incubation time required for a chick to hatch is averaged 504 hours with variations between 480 and 510 hours (Almeida, Vieira, Gallo, Conde, and Olmos, 2006; Kita, Ito, Sugahara, Kobayashi, Makino, Takahashi, Nakahara, Takahashi, & Nishimukai 2015). This value can be influenced by various factors such as breeder's age, storage factor, incubation temperature, egg weight, and poultry type (Wilson, 1991). Table 1 indicates that the time required by the embryo to develop in the injected eggs during the incubation period tends to be longer than in the control eggs, although statistically, these differences were negligible. The longer incubation time condition indicated that the developed embryos in the eggs from the injected group was better than embryo from the control group. The phenomenon of the long incubation time of larger

embryo has been shown earlier by some researchers (Almeida, Vieira, Reis, Berres, Barros, Ferreira, & Furtado, 2008; Shafey, Mahmoud, Alsobaye, & Abouheif, 2014).

Among the injected group, there were no differences observed in incubation time. Based on this result, it is known that the injection of the eggs in the early incubation period contributes relatively low to the length of incubation. Shafey et al. also reported similar results., (2013), who injects breeder broiler eggs with glutamine on day 16 incubation. However, another report suggests that the incubation process becomes shorter when supplemented glutamine amino acids on the day 16th of incubation (Pedroso, Chaves, de Almeida Martinez Lopes, Leandro, Cafe, & Stringhini, 2006).

3. Hatching Weight

In addition to hatchability parameter, the chick weight at hatch becomes an essential parameter in the effort to improve the performance of native chicken. The increase in initial weight will have an impact on achieving the ideal market weight economically, which is performed in a short time compared to the chicken that hatches with a lighter weight.

Table 1 indicated that the absolute chick weight of the injection of glutamine on different incubation days tends to be higher than the control group (not injected). The injection on the 11th day showed a significant increase of 12.31% over control, while the injection on the day 7th and 9th were respectively 9.9 and 6.52% heavier than the control. The relative chick weight data also shows similar results. Although not significant, chicks in the injected group have relative chick weight higher than the chicks in the control group.

This result is still consistent with the report of Salmanzadeh et al. (2016) which showed that chicks hatched in the treatment of glutamine administration in the early incubation period were markedly heavier than chicks in the control group. The study also showed that in-ovo administration of glutamine in albumen could be a useful tool for increasing the weight of chickens not only at the time of hatching but also in the growth period. Another report (Chen, Wang, Wan, Xiong, Peng, & Peng, 2009), suggests that administering the glutamine does not affect the body weight of the newly hatch ducks, but improves the development of the intestine and body weight in the growing period.

D. Conclusion

The study showed that the injection of glutamine to obtain the more massive chicks at hatch, can be conducted on the day 7th, 9th and 11th of incubation, even with lower hatchability. Further studies are still needed, primarily to determine the long-term effects of differences in the time of *in ovo* administration of glutamine to native chickens.

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Use of Old Coconut Water with Various Skim Concentrations of Milk as a Diluent for Kampong Chicken Semen

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Abstract

This study aims to determine the level of skim milk in the best coconut water that can maintain the quality of spermatozoa of native chickens during storage at 5°C. Semen was divided into five tubes (without diluents, diluents with skim milk levels 0%, 6%, 8% and 12, liquid Semen was then stored at 5°C. Observations of motility and viability were carried out at 0, 12, 24 hours, 36, and 48 hours. The results showed that the use of various diluents had a very significant effect (P <0.01) on the motility and viability of chicken spermatozoa at 12 hours of storage. The highest motility of spermatozoa was found in coconut milk diluent treatment with milk level skim 6%, and skim milk level 9% at 0 o'clock, 12 o'clock and 48 o'clock storage, while the highest motility at 24 o'clock and 36 o'clock was at treatment with skim milk level 6% Viability of spermatozoa at 0 o'clock does not differ between treatments but during storage, in general, the viability of spermatozoa can survive better in diluents with skim milk levels of 6% and 9% Conclusion of this study is coconut water Diluent with skim milk level of 6% and 9% can maintain the quality of chicken spermatozoa better during storage 48 hours at a temperature of 5°C.

Keywords: skim milk, coconut water, Semen, native chicken

A. Introduction

The improvement of the genetic quality of chicken village needs to be done as germplasm owned by Indonesian people. Kampung chickens have long adapted to the Indonesian region and are relatively more resistant to the disease when compared to chicken races. Until now, the village chickens are more widely maintained using indulgence so that the control of marriage is difficult to do. Maintainance the village chickens in an individual cage as well as the use of artificial insemination technology (IB) is the right way to control the marriage to improve the

quality of its genetic. Also, the IB can increase the ratio of matrimony to streamline the maintenance of males.

Semen storage at low temperatures is one of the stages that can be done before the IB if it does not allow the implementation of the IB directly after Semen shelter. As long as the storage of Semen is important to maintain the quality of Semen to the implementation of the IB, therefore it takes the presence of Semen Diluent containing substances that are needed spermatozoa during storage. Coconut water is one of the diluents that were cheap and easy to obtain, coconut water has been used earlier researchers as a Semen Diluent such as on thin tail sheep (Kewilaa, Ondho, & Setiatin, 2013) and lamb Garut (Dwitarizki, Ismaya, & Asmarawati, 2015) with Combining that Diluent with egg yolks. According to the research results of Baba & Qistina (2015), The use of old coconut water is better used as a chicken Semen Diluent when compared to young coconut water.

Milk is an isotonic medium that contains several beneficial components to preserve the viability of spermatozoa and is used extensively by earlier researchers for cow Semen dilution (Feradis, 2010). Skim milk has a lower fat content so it can persist if it is stored in cold conditions with low humidity (Hoppe, Andersen, Jarobsen, Molgoard, Friis, Sangild, & Michaelsen, 2008). The use of skim milk in diluent has also been carried out on the Simmental cattle Semen (Yatusholikhah, Isnaini, & Ihsan, 2015), horse Semen (Azizah and Arifiantini, 2009) and Semen Entok (Hernawati, Fevianita, Hariadi, & Kurnijasanti, 2010)

Research on the use of a combination of coconut water and skim milk has never been done on local Indonesian chicken Semen so the study aims to determine the level of skim milk in the best coconut water that can maintain the quality Spermatozoa Chicken Kampong during storage at a temperature of 5^{o}C.

B. Methodology

1. The Material

The Semen used is derived from 5 Kampung chickens that are kept in an individual cage measuring 40 x 50 x 70 cm and fed with egg laying chickens as much as 150 gr/tail/day.

2. Research Procedures

a) Diluent making

The diluent is made by mixing skim milk (Tropicana Slim) with old coconut water. The percentage of skim milk used is 0%, 6%, 9% and 12% (table 1).

Table 1. Composition of Semen Diluent

Component	Treatments				
	P1	P2	P3	P4	P5
Coconut water (ml)	-	100	94	91	88
Skim Milk (GR)	-	-	6	9	12
Penicillin (IU/ml)	-	1000	1000	1000	1000
Streptomycin (mg/ml)	-	1	1	1	1

Diluent that has been made next added tris hydroxyl aminomethane to adjust the pH of diluent with chicken semen pH.

b) Semen collection

Collection or semen shelter is done using the method of sorting (masase). Sorting is done on the section of the cloaca until the papilla stands out and releases Semen. Furthermore, the Semen is accommodated using a spoit 1 ml.

c) Semen evaluation

Freshly collected Semen is evaluated macroscopic and microscopic in the laboratory. The macroscopic evaluation includes volume, pH, consistency, and color of Semen.

The microscopic evaluation involves the mass movements observed using a 10 x 10 magnification light microscope, with the assessment being excellent (+ + +), both (+ +), well (+), and bad (0). The motility of spermatozoa was observed using a light microscope with a magnification of 10 x 40. The percentage of motility was judged subjectively by comparing the living spermatozoa moving forward (progressive) with an unprogressive one. The rating is given from 0% (off all) to 100% (Motil all). The percentage of living spermatozoa (viability) is done using the dye of eosin-Negrosin, the review preparation is heated in the heating table for 10-15 sec, then examined under the light microscope with a magnification of 10 x 40 against ten

views. The concentration of spermatozoa is calculated using the Neubauer chamber with a 3% NaCl diluent. Percentage of spermatozoa which abnormalities; Observed using a light microscope with a magnification of 10 x 40.

d) Dilution, storage and evaluation of liquid Semen

Semen is divided into five tubes (without Diluent, Diluent with skim milk level 0%, 6%, 8%, and 12%), the ratio of Semen and Diluent used is 1:5, liquid Semen is then stored at a temperature of 5 oC. The observation of motility and viability was carried out at the 0, 12, 24, 36, and the 48 hours.

3. Data Analysis

The study used a complete randomized draft (CRD) with five treatments (Diluent) and three times repeated (Semen collection). If the treatment affects significantly, then proceed with the Duncan test.

C. Result and Discussion

1. Characteristics of fresh Semen chicken Village

Table 2. Characteristics of fresh Semen chicken Village

Parameters	Average ± SE
olume of Semen (ML)	0,09 ± 0,02
Semen color	Milky white
Semen consistency	Thick
Semen pH	7 ± 0,00
Concentration of spermatozoa (bn/ml)	2,65 ± 0,28
Concentration of spermatozoa per Ejakulat (BN)	0,24 ± 0,06
Spermatozoa mass Movement	+++
Motility of spermatozoa (%)	85,67 ± 5,81
Spermatozoa viability (%)	99,73 ± 0,13
Spermatozoa abnormalities (%)	13,84 ± 0,20

The results showed that the volume rate of Semen produced was 0.09 ± 0.02 ml/ejaculate, and the pH of Semen 7 (neutral), thick and white in milk. Previous research found that the volume of Semen chickens 0.19 ml (Murcahyana, Susilawati, & Isnaini, 2016) and 0.27 ml (Rahayu, Aji, Nurkhaffah, Fauziyah, & Annisa, 2017). Age and climate factors can cause a low amount of Semen in this research. According to (Zhang, Berry, McDaniel, Roland, Liu, Calvert, & Wil-hite, 1999), the amount of Semen and the concentration of chicken spermatozoa decreased with increasing age. The Semen pH produced in this study is classified as neutral (7) as reported by Rahayu et al., (2017); Wiyanti, Isnaini, & Trisunuwati (2013) and Danang, Isnaini, & Trisunuwati (2012).

The concentration of spermatozoa chickens produced in this study was 2.65 billion/ml of Semen, while 240 million spermatozoa were presented in a single ejaculation. This result is almost the same as the Semen concentration of Kampung chickens obtained by Murcahyana et al. (2012) namely 2.46 billion/ml and Tethool, Ollong, & Koibur (2017), 0.78-2.79 billion/ml, even higher than the obtained Lubis (2011) IE 1.6 billion/ml. Movement The resulting masses of spermatozoa are excellent (+ + +) indicating that spermatozoa had a massive wave of worship and rapidly shifting places.

The motility of spermatozoa acquired in this study included a typical category of 85.67 ± 5.81%. The motility of spermatozoa in this study is higher than that reported by Tethool et al. (2017), i.e., 68.13%, also higher than Lubis (2011), Danang (2012) and Wiyanti et al. (2013) which only get 77% motility. But it is almost the same as the one obtained by Indrawati, Bebas, & Trilaksana, (2013) and Murcahyana et al. (2016) which earned 89% and 83.7% respectively. Viability (percentage of life) of spermatozoa of Chicken Kampong obtained at the research is very high (99.73 ± 0.13%) Compared with previous analysis of 79.94% (Tethool et al., 2017), 83.87% (Lubis, 2011), 85.3% (Murcahyana et al., 2016) and 92% (Danang, 2012; Wiyanti et al., 2013; Indrawati et al., 2013).

The percentage of spermatozoa abnormalities in the research is quite high that is 13.84 ± 0.20% when compared with the results reported by Murcahyana et al. (2016), Lubis (2011) and Wiyanti et al. (2013), which each get 8.7%, 6.8%, and 5.1%. The type of abnormality seen in this study is generally a secondary abnormality, namely abnormalities in the tail. According to

Feradis (2010), secondary defects occur outside Tubuli seminiferous during ejaculation due to overheating or excessive cooling or contaminated water, urine, and antiseptic.

2. *Motility and viability of Spermatozoa chicken village with various levels of milk Skim in Diluent*

Table 3. Motility Spermatozoa Chicken Village During Storage with Various Levels of Skim Milk in Semen Diluent

ST	Skim Milk Level				
(Hour)[a]	WD[b]	0%	6%	9%	12%
		.....(%).....			
0	86,96±2,12[bc]	60,60±4,70[a]	93,16±2,38[c]	93,36±1,81[c]	78,57±1,87[b]
12	29,83±1,48[a]	22,33±3,71[a]	83,53±2,77[c]	76,9±1,57[c]	48,85±1,79[b]
24	0,00±0,00[a]	10,33±2,02[b]	79,41±3,60[e]	69,87±2,07[d]	36,59±1,63[c]
36	0,00±0,00[a]	1,66±1,66[a]	64,06±3,46[d]	52,61±1,20[c]	25,95±2,61[b]
48	0,00±0,00[a]	0,00±0,00[a]	49,70±6,02[c]	43,73±4,48[c]	15,57±3,90[b]

Description: The numbers followed by different letters on the same line state the genuine difference ($P < 0.01$). ST[a]: Storage Long, WT[b]: without Diluent.

Table 4. Viability of Spermatozoa Chicken Village during Storage with Various Levels of Skim Milk in Semen Diluent

ST	Skim Milk Level				
(Hour)[a]	WD[b]	0%	WD[b]	9%	WD[b]
		.....(%).....			
0	95,79±4,02[a]	87,83±10,58[a]	99,07±0,86[a]	98,71±1,26[a]	90,36±4,56[a]
12	36,46±1,81[a]	33,25±8,72[a]	88,09±2,07[c]	87,53±3,95[c]	56,67±3,08[b]
24	0,00±0,00[a]	21,34±4,46[b]	83,28±4,86[d]	79,90±3,44[d]	45,68±2,24[c]
36	0,00±0,00[a]	2,83±2,48[a]	64,06±3,46[d]	52,61±1,20[c]	25,95±2,61[b]
48	0,00±0,00[a]	0,00±0,00[a]	49,70±6,02[c]	43,73±4,48[c]	15,57±3,90[b]

Description: The numbers followed by different letters on the same line state the genuine difference ($P < 0.01$). ST[a]: Storage Long, WT[b]: without Diluent.

The results showed that the use of various diluent Diluent was very noticeable ($P < 0.01$) against the motility and viability of the Kampong Chicken spermatozoa at every 12 hours of storage (table 3 and table 4). At the 24th hour shows that without diluent all spermatozoa have experienced death whereas with the use of Diluent containing 100% of the spermatozoa coconut water can still last a little longer although not as good as milk Diluent Skim. It was due to the presence of several nutrients in coconut water that support the life of spermatozoa during storage.

According to Reddy & Lakhsmi (2014), coconut water contains 95% of the water, 5% sugar consisting of glucose, fructose, and sugars. The content of glucose, fructose, and sucrose can be utilized as an energy source for spermatozoa during storage. Coconut water is rich in minerals (electrolytes) such as potassium, calcium, magnesium, manganese, and small amounts of sodium (Reddy & Lakhsmi, 2014). Potassium and sodium function to maintain the electrolyte balance in Semen.

Spermatozoa cells are very quickly exposed to lipid peroxidation by free radicals consisting of hydrogen peroxide, superoxide anions, and hydroxyl radicals that can cause damage to the membrane of spermatozoa during anaerobic storage (Sinha, Sinha, & Singh, 1996). The occurrence of cold shock in spermatozoa during cold storage is associated with oxidative stress caused by free radicals (Sanocka & Kurpisz, 2004; and Thuwanuta, Chatdarongb, & Berqvista, 2011). Azawi & Hussein (2013) stated that free radicals could largely be eliminated by the presence of antioxidants.

Coconut water contains antioxidants such as phenol and ascorbic acid (vitamin C) (Santos, Vanderson, Bispo, Adriano, Filho, Isabella, Pinto, Lucas, Danta, Daiane, Vasconcelos, Fabíula, Abreu, Danilo, Isaac, Florêncio, Osmar, Marisa, Medeiros, & Humberto, 2013) so that it can protect the cells of spermatozoa from free radicals. According to Santos et al. (2013), coconut water is better able to reduce the concentration of ROS when compared to vitamin C and coconut water also effectively protects the fibroblast from the adverse effects of hydrogen peroxide.

The high motility of spermatozoa is found in the treatment of coconut water thinning with a skim milk level of 6%, and a skim milk level of 9% is 93,16-93,36% in the hour storage of the 0, 76,9-83,53% in the 12th hour, and 30,84-36,87% in the hour of 48. While the highest motility in the 24th hour and the 36 hours are in the treatment with skim milk level 6% (79.41%), the viability of spermatozoa in hour 0 does not differ between treatments, but during the general storage of spermatozoa, viability can withstand better on Diluent with skim milk level 6% and 9%.

The high motility and viability of spermatozoa on the treatment with the addition of skim milk were suspected because of the protein content of casein and lactose in milk that keeps the survival of spermatozoa during storage. Naturally, there are binder proteins (binders) that have particular functions. According to Manjunath (2012) that BSP protein (Binder of Sperm) could harm spermatozoa during storage. It was due to the BSP protein able to manage the spermatozoa by releasing lipid compounds in the cell membrane of spermatozoa while the presence of casein on milk Diluent can interact with BSP to decrease the BSP strap on the cell membrane, thus preventing the loss of lipid compounds from the cell membrane of spermatozoa.

The presence of lactose in skim milk is allegedly a source of energy for the movement of spermatozoa during storage. Movement activity (motility) of spermatozoa requires energy derived from changes in ATP (Adenosine Triphosphate) to ADP (Adenosine in Phosphate) and AMP (Adenosine monophosphate) (Garner & Hafez, 2000). Also, lactose plays a role in protecting spermatozoa. It was by the opinion of Watson (1990), stating that lactose has low cellular permeability and is believed to preserve spermatozoa by acting extracellular.

Skim milk has been regarded as a non-enzymatic antioxidant due to the presence of sulphydryl clusters (Bustamante-Filho, Pederzolli, Sgaravatti, Gregory, Dutra-Filho, Jobim, & Mattos, 2009). During storage, spermatozoa consume oxygen and oxygen metabolism; the result of the metabolism is ROS (Radical Oxygen Scavenging) (Agarwal, Saleh, & Bedaiwy, 2003). The accumulation of ROS can occur during storage of Semen when there is no antioxidant in Semen Diluent. ROS caused the occurrence of oxidative stress (Michael, Alexopoulos, Pontiki, Hadjipavlou-Litina, Saratsis, Ververidis, & Boscos, 2008). Generally, antioxidants prevent damage by intermediates of oxidants by free radicals or the reactive metabolites of the antioxidant itself. It can reduce the impact of oxidative stress on spermatozoa during storage and improve the quality of spermatozoa in liquid Semen (Storey, 1997).

The use of skim milk level 12% into diluent significantly shows the motility and lower spermatozoa viability when compared to 6% and 9%, this may be caused by skim milk concentrations too high that cause Disturbances in spermatozoa. It was by the opinion of Songsasen, Murton, Paccamonti, Eilts, Godke, & Leibo (2002) stating that the level of skim milk that is too high can cause hypertonicity in Diluent by removing water from the cells and lowering motility and viability.

Skim milk 6% and 8% in this research were suspected to be better able to meet the needs of spermatozoa nutrients and antioxidant needs during storage for up to 48 hours. So if applied to the field, the Diluent deserve to be used as a Semen Diluent stored at a temperature of 5^{o}C for 36-48 hours before being inseminated to the female chickens.

D. Conclusion

The Diluent of coconut water with skim milk level 6% and 9% can maintain the quality of the Kampong Chicken spermatozoa better during storage of 48 hours at a temperature of 5^{o}C.

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Reproductive Performance of The Female Peranakan Ettawa in Tandebura Village

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Abstract

This research aims to know the performance of the reproduction of a female Peranakan Ettawa that is held in Tandebura village. This research was conducted in October to November 2018 in Tandebura subdistrict Watubangga District Kolaka Regency. Population Data of goat's cattle Ettawa (PE) is obtained from direct observation and Resort Livestock Village The Tandebura. Subsequent data is treated descriptively using the CR and NRR formulas followed by correlation analysis. The observed variables are the Conception Rate (CR0 and the Non-Return Rate (NRR). The results of the study showed the success of natural wedding in Tandebura sub-district Watubangga Kolaka District is a good value of CR (76.05%) and the NRR (83.09%). The amount of the collapse of CR-NRR + 1, can be concluded that the success of the natural Wedding Goat breeds Ettawa (PE) females with the number of goat cattle PE as much as 71 tails in the category of right according to the CR and NRR standards and have a solid coloration.

Keywords: Reproductive performance, reproductive efficiency, village Tandebura

A. Introduction

Goats are observed by the rural population of Indonesia (Mulyono, 2003) because its maintenance is easier to do compared with large ruminants. Goats quickly breed, and the growth of their children is also relatively fast. The Etawa goat originated in the Jamnapari region of India. This goat is most popular in Southeast Asia, including the type of Biuse that is the producer of milk and meat producers. Its healthy posture, long hanging ears, convex face shape, thigh fur is very dense; the male weight reaches 90 kg, females weight 60 kg. Milk production

reaches 235 kg/lactation. In Indonesia for quality improvement, the local goat is fated with the Etawa goat to produce goat PE (Peranakan Etawa).

PE Goat is double-functioning livestock that can produce meat and milk, but its utilization for meat producers still felt less. It is due to the productivity level of PE goat, always low in Indonesia. Therefore, the effort to increase productivity needs to be done.

Etawa Peranakan Goat is dual-use livestock, which is a producer of milk and as a producer of meat (Williamson & Payne, 1993). PE Goat is the most famous goat nation and is widely preserved in India and southeast Asia (Devendra & Burns, 1994). The characteristics of PE goat is the color of black and white or red and white brown stripes, curved nose, the lower jaw is more prominent, both males and females have horns; Long ears hang down, have long legs and feathers (Sastroamidjojo & Soeradji, 1978).

Goat Cattle PE is one quite promising effort. First, it does not require extensive land. Secondly, goats have a high level of adaptation to the environment so that they are easy to maintain. Thirdly, for breeding, goats do not take a long time. Fourth, goat meat is a high nutritional source of animal protein (Rara, Wenny, Suyadi, & Nasich, 2011). For dairy goats, the removal should be done early, without disrupting the growth of the child, so that the excess parent production can be utilized by farmers to increase the income or nutritional needs of families (Atabani, 2013). Sarwono (1999), when the governance of the breeding of goats that are being bunting or breastfeeding and the child is good, the weight of the goat can reach 10-14 kg/tail when watted at the age of 90-120 days. Williamson & Payne (1993) said for the grill; there was a likelihood of delaying the bribe to give the goat a chance to gain maximum profit from his mother's milk.

The potential for the development of PE goat cattle in Watubangga is quite good because many farmers choose to keep this kind of goat. Watubangga District Kolaka District has a population of PE dairy goats that is quite a lot of about 400 tails for the parent. The village has a farmer group of PE dairy farmers, but the livestock reproduction Performances are less concerned. It is seen from many breeders who do not have a reproduction record of the parent of the full PE goat, but unisex has it, and the low number of births in the Goat farmer group.

The need for breeders in Goat Farmer Group Tandebura Village has a complete parent reproductive record meant to know a master reproductive performance which is useful as a data source of information for farmers and based on the results. The information can then be done selection program. The knowledge of ranchers around the reproductive performance of the PE goat's mother in Tandebura village is essential to know. Knowing the performance of the reproduction of the PE goat mother in the area can help the community to evaluate the maintenance management of PE goat so that livestock productivity can be continuously improved.

B. Methodology

1. The Material

The material used is recording the reproduction of Peranakan Ettawa goat-owned cattle in the village Tandebura District Watubangga Kolaka District with the provision of samples taken from the recording breeder that has been cattle at least two years and goats Who have been children at least two times.

2. Research Procedures

The research was carried out by capturing and recording all the data of the female cattle breeding with the intensive system of goats. The research procedure is done in two stages. First took two weeks of observation of the Peranakan female Ettawa by noting the recording of its reproduction consisting of a married date, and a breeder's name. Second, by doing the data of the next one month to get information about the Peranakan goat Ettawa females after being married.

3. Parameters of Research

Parameters of this study were (1) Conception Rate (CR), Partodihardjo (1992) states that the CR is ideal for 70% but generally amounted to 40%. Achjadi (2007) that good CR value reaches 60%-70%, while that can be maximized for the size of Indonesia with the consideration of natural conditions, management and distribution of livestock spread are considered good if the value of CR reaches 40%-50%. (2) Non Return Rate value (NRR), Toelihere (1981) and Feradis (2014) assessments with the NRR are not necessarily correct because females who do

not re-show the likelihood of jizz, are sold, disappear, calm, birthing, Corpus Luteum persistence (CLP) and do not bunting. Malik, Tasripin, & Salman, (2016) that Good NRR value is 79.53%.

4. Data Analysis

The data analysis used in this study is a descriptive analysis. As for how to calculate

a) Conception Rate (CR)

The conception rate is the best measure in the assessment of the insemination result of the percentage of the female goat that is bunting on the first insemination. The conception figures are determined based on the results diagnose ovulation through rectal (rectal exploration) examination by veterinarians within 40 to 60 days after the Insemination (Feradis, 2014).

$$\text{CR} = \frac{\text{Number of females conception at first IB}}{\text{Number of all females in IB}} \text{ x } 100\%$$

b) Non-Return Rate (NR)

A Non-Return Rate (NR) is a percentage of an animal that does not return or if there is no further insemination request within 28 to 35 or 60 to 90 days. Where Non-Return formulas are used.

$$NRR = \frac{\text{Number of females in the IB} - \text{Number of females returning in IB}}{\text{The total number of females in the IB}} \; x \; 100\%$$

Correlation is a data collection action to determine whether there are a relationship and level of relationship between two or more variables. This research is done when we want to know about the presence, and muscular weakness of the associated variable relationships in an object or subject studied and in which the relationship (positive/negative), and how far the relationship exists Between two or more variables.

$$r = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{\{n\Sigma x^2 - (\Sigma x)^2\}\{n\Sigma y^2 - (\Sigma y)^2\}}}$$

Description:
r = Correlation coefficient
N = number of Nations
X = variable 1
Y = variable 2

C. Result and Discussion

Reproductive efficiency is the measure of a PE goat's ability to bunting and produces decent breeds. Table of reproduction efficiency PE female goat in the village Tandebura Watubangga District can be seen in table 1.

Table 1. Efesiensi reproduction of PE goats in Kelurahan Tandebura

Breed of Goat	Number of goats (tails)	Number of marries (natural)	CR (%)	NRR (%)
Peranakan Ettawa	71	83	83.09	90.14

Sources: results of data analysis

Based on the results of the study, there were 71 Peranakan goats Ettawa (PE) which were married naturally by the Peranakan goat farmer Ettawa (PE) in Tandebura Sub-district Watubangga. The number of natural marries that is done is 83 times, where 59 goats experience ovulation, and 64 goats do not experience a passionate return after a natural marriage.

1. Conception Rate (CR)

Conception Rate (CR) is the percentage of female PE goats that are bunting in the first natural marriage. Based on the results of the study obtained on table 4, the CR value of the natural union of female PE goats in Tandebura village is 83.09%, this value is a good value. It is by Achjadi (2007) which states the good CR value for goat PE is 60-70%. The higher the value of

CR then the better the efficiency of its reproduction and the low high CR is influenced by parent fertility, and males.

2. Non-Return Rate (NRR)

The Non-Return Rate (NRR) is the percentage of goats in an Ettawa (PE) that does not return within 30-60 days after the marriage. Based on the results of the study that can be seen in table 2, the value of NRR goat breeds Ettawa (PE), which is married naturally in Tandebura village of 90.14%. This value is a good NRR value by Malik, Tasripin, & Salman, (2016) Good NRR value is 79.53%, the higher the NRR than, the better the efficiency of the female livestock.

3. Correlation

Correlation is the data analysis used to determine whether there is a relationship between two variables and the direction of the relationship. The correlation value between variables can be seen in table 2.

Table 2. The value of the correlation

Correlation between variables	coefficients correlation	description
CR-NRR	1	very strong

In table 2, shows that the value of the collation of CR-NRR is + 1 which means that it is the perfect positive coefficient where the higher the value of CR then the higher the NRR value (proportional). For more clarity, the direction of the CR-NRR coloration relationship can be seen in Figure 1.

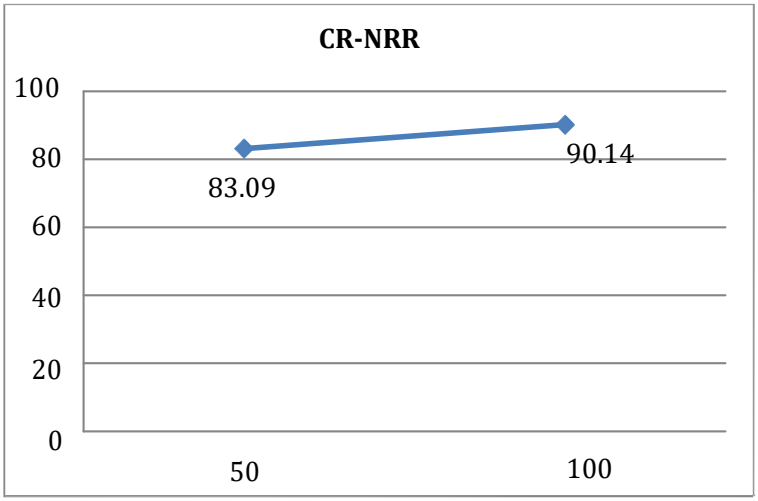

Figure 1. The direction of CR-NRR correlation relationship

The direction of the coloration is also according to the opinion of Atabany (2013) where +1 means a perfect positive correlation where the higher X value is the higher the value of Y (relative to the straight). The relationship between the CR-NRR is with the opinion of Achjadi (2007) that the amount of CR has a connection with the NRR, if there is a high CR, then the value of NRR will be high. Achjadi (2007) the optimal S/C value in goats ranged from 1.1 to 1.3. The smaller the S/C value, the higher the fertility rate of the female animals in the group; optimal value of CR in goats 50-80%.

D. Conclusion

The success of the natural marries of Peranakan goat Ettawa (PE) in Tandebura Sub-district Watubangga Kolaka District with the number of breeds of Peranakan Ettawa (PE) Females are naturally categorized as well according to the CR and NRR standards. CR and NRR have a positive correlation with the direction of a positive relationship or directly proportional.

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Total of *Escherichia coli* Excreta Broiler Given *Enterococcus* sp. as Probiotics Candidate of Poultry

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Abstract

The purpose of this study was to see the effect of giving *Enterococcus* sp. bacteria at *Escherichia coli* of excreta broiler. The research design used was a completely randomized design consisting of four treatments, three replications, and each replication had four broilers. The treatment given consisted of T1 (0 mL/L), T2 (1 mL/L), T3 (3 mL/L), and T4 (5 mL/L) control treatments. The number of colonies of *Enterococcus* sp. given through drinking water every day, namely 10^7 CFU / mL. The results of the study respectively showed the number of *Escherichia coli* in the treatment of T1 (Log 7.54 CFU/g), T2 (Log 7.53 CFU/g), T3 (Log 7.48 CFU/g), and T4 (Log 6.78 CFU/g). The colony total of *Escherichia coli* of broiler excreta decreases with increasing doses of *Enterococcus* sp. It is shown that *Enterococcus* sp. has an antimicrobial compound activity which can inhibit pathogen growth in broiler digestive tract so that it has the potential to be developed as a probiotic.

Keywords: *Enterococcus* sp., *Escherichia coli*, probiotic, Excreta of Broiler

A. Introduction

The digestive tract of the broiler is a habitat for various living microorganisms. Some organisms had beneficial and detrimental the productivity of broilers. Among groups of microbes that live in the digestive tract of broiler chickens, namely the *Escherichia coli* bacteria. These bacteria have been reported to have the potential of pathogens in the gastrointestinal tract of livestock if the population continues to grow. According to Kumar, Jindal, Shukla, Asrani, Ledoux, & Rottinghaus (2004) and Alonso, Padola, Parma, & Lucchesi (2011) colibacillosis, caused by enterotoxigenic *Escherichia coli*, results in considerable economic losses in poultry production. It will provide a financial decline in broiler cultivation.

Various serotypes of *Escherichia coli* can infect most mammals and poultry. Especially for chickens called Avian Pathogenic *Escherichia coli* (Arne, Marc, Bree, Scholer, & Moulin, 2000). Young birds, in which the protective immune system is not fully developed, are more vulnerable. *Escherichia coli* serotypes O78: K80, O1: K1, and O2: K1 is the most commonly found in domestic breeds with colibacillosis (Sharma, Jakhar, & Dahiya, 2016).

An approach that can be done to control the development of *Escherichia coli* in the digestive tract, namely maintaining a balance between beneficial and harmful bacteria. Probiotic giving of bacteria is an alternative that can be done to maintain beneficial bacterial populations to remain stable in the digestive tract of broilers.

Lactic acid bacteria are one group of bacteria that have long been used as probiotics. Lactic acid bacteria are useful groups of microorganisms because they do not have toxic properties for the host and are known as microorganisms that are not at risk for health. The potential of lactic acid bacteria to be used as probiotics because it produces compounds that can inhibit the growth of pathogenic bacteria (Klaenhammaer, 2001).

Enterococcus sp. is one of the lactic acid bacteria that can be developed as a probiotic in broiler cultivation. One of the criteria for bacteria to be used as a candidate for probiotics, which could inhibit the growth of pathogenic bacteria in the digestive tract. According to Bednorz, Guenther, Oelgeschager, Kinnemam, Pieper, Hartmann, Tedin, Semmler, Neumann, Schierack, Bethe, & Wieler (2013), various strains of bacteria have been used as probiotics, and the most commonly used species include Bacillus, yeast and lactic acid-producing bacteria such as Lactobacillus, Streptococcus, Bifidobacterium, and Enterococcus. Therefore, in this study, we will look at the effectiveness of giving *Enterococcus* sp. which has been isolated from the digestive tract Day-Old Chicken (DOC) broiler on the number of *Escherichia coli* colonies in broiler excreta.

B. Methodology

1. *The Material*

A total of 48 DOC broiler strain Cobb 500 mixed sex (male and female) were placed randomly in the experimental unit according to complete randomized design. The cages used were 12 experimental units with a size of 75 cm x 100 cm x 50 cm. The floor of the cage was given with rice husk with a thickness of 1.7 cm. Each cage of the experimental unit is equipped with a 40-watt lamp as a heater for a week. The research chickens were treated with *Enterococcus* sp from the age of 1 to 35 days and given feed ad-libitum.

2. *Research Procedures*

Four treatments were consisting of 3 replications, each replication containing four DOC broiler. Probiotics were used as treatments, namely *Enterococcus* sp (10^7 CFU/mL). The dose of probiotic treatment consists of T1 (0 mL/L/day), T2 (1 mL/L/day), T3 (3 mL /L / day), and T4 (5 mL/L /day). The treatment of probiotics was given for 35. The composition of the ration is presented in Table 1.

Table 1. Composition of basal rations during research.

Feed ingredients	Amount (%)
Corn	58
Pollard	6
Fish flour	10
Soybean Meal	9
Rice Bran	4
Coconut cake	3
Meat and Bone mash	9
Premix	0.5
	100
Crude protein	20.27
Energy Metabolism (kcal / kg)	3026
Fat	6.90
Coarse fiber	3.49
Phosphor	1.05
Calcium	1.65

Source: Composition of rations based on calculation results

3. Calculation of the number of Escherichia coli colonies

At the end of the stud, 2 grams of broiler chicken manure was taken for each repetition in the treatment put in a plastic bottle and taken to the laboratory as a research sample to calculate the amount of *Escherichia coli*. The tools and media used were sterilized by autoclave at 121 ^{0}C for 20 minutes.

Eosin Methylene Blue Agar (EMBA) media, weighed 9.5 grams then dissolved with 250 mL distilled water in Erlenmeyer. Furthermore, it is homogenized by heating with a magnetic stirrer. After being homogenized then sterilized in an autoclave for 15 minutes at 121 ^{0}C. Moreover, the temperature of the EMBA media and BPW is cooled to about 40-45 ^{0}C in the water bath, after the cold, the EMBA media is poured into a petri dish of 15 mL. While the BPW media is poured into a test tube 10 mL each. As much as 1 gram of broiler excreta is weighed from each treatment T0 (0 mL/L/day), T2 (1 mL/L/day), T3 (3 mL/L/day), and T4(5 mL/L/day) inserted into the test tube and in the stomacher until homogeneous. Calculation of the number of *Escherichia coli* colonies was carried out in the last two dilutions in duplicate. Each one ml piped into a petri dish, then poured sterilized EMBA media. Next, the Petri plates were incubated at 37 ^{0}C for 18-24 hours in reverse. Counter colonies calculate the number of Escherichia coli by calculating the number of colonies that grow between 30-300 CFU/gram.

4. Data Analysis

The results of the study were analyzed using variance analysis according to the design of a completely randomized design. Duncan's multiple region tests will identify the effect of treatment differences at the level of 5% (P<0.05).

C. Result and Discussion

The media used to grow *Escherichia coli* bacteria in this study, namely Eosin Methylene Blue Agar (EMBA), which is a selective medium for these bacteria. Colonies that grow were round, smooth, convex, red-black, or shiny green or blackish blue to brown with a metallic sheen on EMBA media (Quinn, Markey, Carter, Donnelly, & Leonard, 2002). The results of the study of the number of *Escherichia coli* in broiler excreta given the treatment of *Enterococcus* sp. are presented in Table 1 illustration 1.

Table 1. The average number of *Escherichia coli* colonies in broiler excreta at 35 days of age

Variable	Treatment			
	T1	T2	T3	T4
E.coli (Log CFU/mL)	7.54^a	7.53^a	7.48^a	6.78^b

^{a,b} Mean value on the same row with different superscripts shows significantly different (P<0.05). T1 (*Enterococcus* sp. 0 mL/L/day), T2 (*Enterococcus* sp. 1 mL/L/day), T3 (*Enterococcus* sp. 3 mL/L/ day), and T4 (*Enterococcus* sp. 5 mL/L /day).

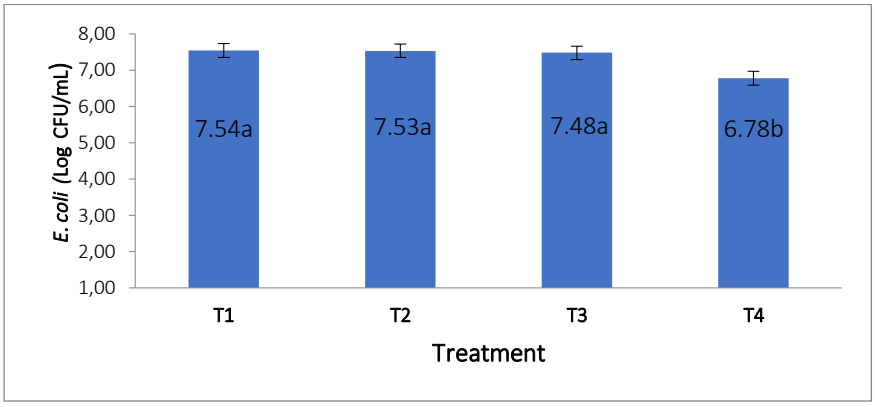

Figure 1. The colony total of Escherichia coli on broiler excreta at the age of 35 days. Mean value^{a,b} with different superscripts shows significant differences (P<0.05).

The results of variance showed that the treatment had a significant effect (P>0.05) on the number of *Escherichia coli* in broiler excreta maintained for 35 days. There is a tendency for the amount of *Escherichia coli* to decrease with increasing administration dose of *Enterococcus* sp. in broiler drinking water. The highest number of *Escherichia coli* in control treatment (0 mL/L) was not given *Enterococcus* sp. (Log 7.54 CFU/g) and the lowest in the treatment of *Enterococcus* sp. 5mL/L of drinking water per day (Log 6.78 CFU/g). According to Kabir (2010), In chickens, there are about 10^9 colony forming units (CFU) of bacteria per gram of excreta, and these, 10^6 CFU is *Escherichia coli*.

In this study, the treatment of 5 mL/L of drinking water per day was a treatment that gave an optimum response to the amount of *Escherichia coli* excreta broiler. The ability of *Enterococcus* sp., decreasing the amount of *Escherichia coli* excreta broiler in this study will have a good impact on the health conditions of the broiler digestive tract. The health of the digestive system is an important thing that must always be maintained. It was because the gastrointestinal tract is the place to pass and the entry of various nutrients needed for the survival of the body. In addition to increasing the absorption of food substances, the large surface of the digestive tract is also often exposed to various foreign elements or materials, including pathogenic agents. The presence of pathogens in the gastrointestinal tract can cause different disease, including diarrhea. According to Savkovic, Villanueva, Turner, Mathowskyj, & Hecht (2005), pathogens that often cause interference in the digestive tract, especially in the small intestine, namely Enteropathogenic *Escherichia coli* (EPEC). EPEC, which is found in the gastrointestinal tract, can potentially damage the mucosa of the digestive tract.

The digestive tract of chickens is known to be one of the principal reservoirs of the *Escherichia coli* bacteria that need to be watched out for besides cattle as the main reservoir (Heuvelink, Zwartkruis, Beumer, & Boer, 1999). Avian pathogenic *Escherichia coli* (APEC) causes various diseases, collectively termed colibacillosis, in chickens, and these diseases are responsible for significant economic loss in the chicken industry (Hammerum & Heuer, 2009 and Mohamed, Shehata, & Rafeek, 2014). Moreover, poultry products contaminated with APEC are potential sources of foodborne extraintestinal pathogenic *Escherichia coli* infections for humans, posing a threat to human health (Bergeron, Prussing, Boerlin, Daignault, Dutil, Reid-Smith, Zhanel, & Manges, 2012)

The results of this study indicated that *Enterococcus* sp. can inhibit the development of *Escherichia coli* found in the digestive tract of broilers. The ability of *Enterococcus* sp. in inhibiting the growth of *Escherichia coli* in the broiler digestive tract because it is caused, these bacteria have antimicrobial compounds. One of the metabolites produced by *Enterococcus* sp., which is lactic acid, can reduce the pH conditions of the digestive tract of broilers. At low pH conditions, some pathogenic bacteria can be inhibited of growth. The research Peng, Zeng, Zhu, Wang, Liu, Hou, Thacker & Qiao (2016) had shown that lactic acid bacteria (*Lactobacillus Plantarum* B1) decreased the number of fecal *Escherichia coli* in broilers due to its ability to produce lactic acid and short chain fatty acids. Furthermore, the study of Hidayat, Malaka, Agustina, & Pakiding (2018) showed the strength of lactic acid bacteria Lactobacillus in inhibiting the growth of pathogenic bacteria *Escherichia coli* on excreta of the broiler.

The group of lactic acid bacteria can inhibit the growth of pathogenic bacteria, through several antimicrobial compounds produced, such as organic acids, hydrogen peroxide, diacetyl and bacteriocin (Abdelbasset & Djamila, 2008). Enterococci may produce antimicrobial peptides named bacteriocins (enterocins) capable of inhibiting the growth of specific pathogens and spoilage microorganisms, with great potential for food preservation (Franz, van Belkum, Holzapfel, Abriouel, & Gálvez, 2007). Bacteriocins are ribosomally synthesized peptides produced as a defense mechanism against closely related bacteria Drider, Fimland, Héchard, McMullen, & Prévost (2006).

The ability of bacteria *Enterococcus* sp. in reducing the population of *Escherichia coli* in broiler excreta in this study could be the reason that they could be used as one of the candidates for probiotics in broilers. Several previous studies have shown the results of using a group of Enterococcus bacteria as probiotics in poultry. These results research Cao, Zeng, Chen, Zhou, Zhang, Xiao, & Yang (2013) suggest that *Enterococcus faecium* can promote growth performance, improve intestinal morphology, and beneficially manipulate the cecal microflora in broilers challenged with *Escherichia coli* K88. However, to ensure that the *Enterococcus* sp bacteria can be used as probiotics, it is still necessary to test several criteria for a bacterium to be used as a probiotic.

Enterococci are extensively studied as potential candidate probiotics. Considerations for strain selection include several criteria such as molecular identification using genetic typing techniques, safety, capacity to survive intestinal transit, manufacturing, distribution, and the targeted application. The functional requirements of probiotics include tolerance to gastric juice and bile, adherence to epithelial surfaces, persistence in the gastrointestinal tract (GIT), immune stimulation, antagonistic activity toward intestinal pathogens and the capacity to stabilize and modulate the intestinal microbiota (Hanchi, Mottawea, Sebei, & Hammami, 2018)

D. Conclusion

The results showed that administration of *Enterococcus* sp. bacteria could reduce the number of *Escherichia coli* colonies in Broiler excretions, especially at doses of 5 mL/L of drinking water per day. This shows that *Enterococcus* sp. used in this study can be developed as one of the probiotic candidates.

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Effect of Adding Feed Fermentation of Sago Pulp on The Palatability of The Peranakan Etawa

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Abstract

The purpose of this research is to know the effect of adding feed fermentation of sago pulp to the palatability level of the breeds of Etawa. In this study used 9 goat cattle PE age 6 months with an average initial body weight of 17 kg. Materials used include sago pulp, probion, bran, urea and molasses. Complete feed prepared from the material is sago pulp 75%, bran 20%, urea 0.25%, molasses 3% and minerals 1.25%. While the probion is added as much as 0.5% of the total feed ingredients. All feed ingredients are mixed and then fermented anaerobic for 21 days. Feeding is done according to the treatment of (100% natural grass + 0% fermented feed, 70% natural grass + 30% fermentation feed, 50% natural grass + 50% fermented feed). The observed variable is palatability. The research draft uses complete random design. Feeding with the addition of fermentation of sago pulp 30%, the consumable level 859.56 grams/day higher ($P<0.01$) from the fermentation of sago pulp 50% (773.38 gram/tail/day) and without the feeding of sago pulp (697.62 gram/tail/day.

Keywords: sago pulp, fermentation, Peranakan Etawa goat, Feed

A. Introduction

Goat cattle was one type of livestock that was familiar with the farming system in rural areas and is a component of the people's farms (Soebandriyo, Setiadi, Pwyanto, Rangkuti, Sejati, Anggraeni, Sianturi, Hastono, and Butar-Butar, 1995). PE Goat was the result of a cross between the local Indonesian goat and the local goat from India, which was between the nuts and goat Etawah, so that the character between the two elders of the goat (Atabany, 2001). PE Goat is a dual-type goat that can produce milk and can produce meat.

The optimal utilization of local resources is a strategic step in the effort to achieve the efficiency of goat cattle production business in Indonesia. This will be more obvious, if the resource is not a direct need for competitors, such as humans or other types of livestock.

Because the feed is very closely related to productivity and production costs, then the utilization of local raw materials efficiently will have a noticeable effect on the development of livestock. Sago Pulp is a waste that is obtained in the processing of sago flour, in which the process obtained flour and sago pulp in comparison 1:6 (Rumalatu, 1981). The amount of waste that many, until now untapped as should only be allowed to accumulate in the areas of sago flour processing so as to cause environmental pollution

Based on the availability and quality, the potential sago pulp is used as a forage to be preserved. One way of preservation is by fermentation. With this method, the utilization of sago pulp supplementary abundant throughout the season can be fermented and can be used when farmers do not have time to browse or in certain seasons with long storage period. In addition, the function of the nutritisi contained in the sago pulp is expected to be maintained through the fermentation process so that when the season of famine fermentation of sago pulp can be used as a forage livestock that has a nutritisi content With good quality. Therefore, the utilization of forage feed processing technology with fermentation is expected to maintain even improve the quality of nutrients and improve palatability so that it can be a barn feed for farmers.

Utilization of waste or sago pulp as alternative feed is a good thing, although it is realized that the utilization need to get a touch of technology, because sago pulp has a limitation to be used as feed that is fiber content The case is high and the protein is low. Therefore it is necessary to do preliminary processing before given to livestock. The known processing of waste is physical, chemical and biological processing.

Many studies had been conducted in looking at the utilization of sago pulp as a feed component, both in ruminant and monogastric rations. Pantjawidjaja, Pongsapan, & Tandilinting, (1984) using Sago pulp (Metroxylon sp) up to the level of 45% with urea 3%; Nurkurnia (1989) the use of 40% sago waste in rations. Hangewa (1992) stated that with the use of complexes-NPN-carbohydrates made from urea and sago pulp with the cooking time of 116 minutes and urea dose 5.4% from dry material of sago pulp achieved optimal protein synthesis of 890 mg/g/4jam. The use of sago pulp up to 50% gives good results in Broiler chickens (Nawal 1995). In other studies, the sago pulp can be used with balanced nutrient composition of 12.5% in broiler rations and in village chicken rations up to 25% (Kompiang, Zainuddin, & Supriyati, 1995). The results of the research reported by Ralahalu (1998) explained that the use of sago pulp with Aspergillus Niger to 15% status in pig rations gives good results. Biyatmoko (2002) stated that the use of sago pulp in a duck ration alabio males up to about 10.6% proved to be able to improve cellulolytic activity without causing damage to the digestive organs of the Ducks.

Palatability is defined as a response given by livestock to the feed given and this is not only done by ruminants but also done by other mammal animals especially in selecting the given feed (Chruch & Pond, 1988). Pond, Sanchez, Horne, Merkel, Batubara, Ibrahim, & Ralahalu (1995) defines palatability as the attraction of a feed or feed material to cause appetite and directly eaten by livestock. Rate of consumption of feed to digest the approach of the palatability of feed, so desire and delight of livestock against a feed. Based on the background, conducted research to know the effect of adding feed fermentation of sago pulp to the palatability level of the Peranakan goat Etawa.

B. Methodology

1. The Material

In this study used 9 goat cattle PE age 6 months with an average initial body weight of 17 kg. Materials used include sago pulp, probion, bran, urea and molasses. Complete feed prepared from the material is sago pulp 75%, bran 20%, urea 0.25%, molasses 3% and minerals 1.25%. While the probion is added as much as 0.5% of the total feed ingredients.

2. Research Procedures

Sago pulp used in the sun until dry (water content ± 20%) In order not to moldy, finely cut according to the desired particle size (±3 mm). All feed ingredients are mixed and then fermented anaerobic for 21 days.

Etawa goat cattle were allowed to adapt to feed treatment for 2 weeks (up to stable consumption) before data collection was conducted. This study was conducted for three months. Feeding is done according to the following treatment:

A: 100% natural grass + 0% fermentation feed

B: 70% natural grass + 30% fermentation feed

C: 50% natural grass + 50% fermentation feed.

3. Parameters of Research

Parameters of this study were egg weight (gram), number of eggs per period, the age of first parent egg-laying (weeks), and importance of fresh parent egg (gram).

4. Data Analysis

Experiments were analyzed using the complete random design with mathematical models (Steel and Torrie, 1991) as follows:

$$\mathbf{Yij = \mu + Pi + \epsilon ij}$$

Description:

i = 1, 2, 3.4, p

j = 1, 2, 3.4, U

Yij = Observations of the I-Treatment and Ulagan Ke-j

M = General average

Pi = Effect of the I-treat

Єij = A to-I treatment error and A to-J replay

If there is a noticeable effect (P<0.05) of the treatment of a measured map, it will be followed by a double distance test Duncan (Kaps and Lamberson, 2004).

C. Result and Discussion

Palatability is the interest rate of livestock to a feed given to livestock. To know the level of palatability of a feed, can be observed with the amount of feed consumed by livestock against the type of feed. The average number of daily feed consumption on PE goat cattle per treatment is presented in Table 1. Statistical analysis results showed that different feed consumption was very noticeable (P<0.01) of each treatment. Feeding with the addition of fermentation of sago pulp 30%, the consumable level 859.56 grams/day higher (P<0.01) from the fermentation of sago pulp 50% (773.38 gram/tail/day) and without the feeding of sago pulp (697.62 gram/tail/ Day). The difference in feed consumption is also caused by feed nutritional content, especially the protein content and feed energy (Negesse, Rodehutscord, & Pfeffer, 2001), the physiological Status of cattle (Fedele, Clapsa, Rubino, Calandrelli, & Pilla, 2002), The Sex of cattle and the feed material constituent Ration (Aregheore, 2006). The large number of rations consumed by a cattle can depict the palatability of the Ration (Lawrence, 1990). It is in accordance with the opinion (Van-Soest, 1994) that the feed consumption depends on the palatability, the amount of feed and environmental influence.

Tabel 1.

No	Feed material composition	Repetition 1 (gram/day)	Repetition 2 (gram/day)	Repetition 3 (gram/day)	Averages (gram/day)
1	100% natural grass + 0% fermentation of sago pulp	700,26	697,34	695,26	697,62[a]
2	70% natural grass + 30% fermentation of sago pulp	859,19	862,59	856,89	859,56[b]
3	50% natural grass + 50% fermentation of sago pulp	766,68	782,55	770,92	773,38[c]

[abc]Different aHuruf that follow the numbers in the same column indicate a noticeable difference (P<0.01).

Data from the results of this study showed that the palatability of the feeding of the highest feed is feeding with the addition of 30% fermentation of sago pulp. Low palatability with the provision of sago fermented pulp 50% compared to 30% due to the result of fermentation is too thick to cause acid odor that reduces the love of goat to consumption the feed. Likewise the lowest level of palatability of the treatment is without the feeding of fermented feed. This is due to the absence of aroma that stimulates the senses of smell in the goat, so that the appeal to consumption of feed without fermentation of sago pulp is reduced. This is in line with the statements of Devendra & Burns (1994), stating that the goat is generally a type of livestock that has the habit of choosing the feed that will be consumed. In ruminant stimulation of the smell (smell/aroma) is very important to find and choose food (Dukes, 1995). Similarly, the

stimulation (flavor) will determine whether the feed will be consumed by livestock or not (Hafez, 1962). Goats generally reject the feed that has been touched by other livestock and can not consume one type of feed alone in a long time. Goats can distinguish the taste of bitter, sweet, salty and sour and have a high tolerance to bitter taste (Devendra and Burns, 1994).

The amount of dried ingredients consumed is influenced by several factors i.e. palatability, fiber digestibility, feed flow rate, protein status (Wallace & Newbold, 1992). Physical and chemical properties of feed, production, life and development of digestive tract (Parakkasi, 1983). Palatability is a description of the nature of feed material (physical and chemical) reflected by organoleptic such as appearance, smell, flavor (bland, salty, sweet, bitter), texture and temperatment so as to cause stimulation and attraction of livestock to Consumption.

In addition to the feed has good nutritional quality, which should be considered also the level of the feed palatability. The feed that has high palatality will spur livestock to consume it more. So that expected livestock nutrient substances can be digested well. Use of feed fermentation of sago pulp 30% can increase the palatability of goat cattle PE. Use of sago pulp as feed goat PE is very good. As long as this sago pulp becomes a waste or part that is not utilized by the company's processing sago is worth high economical, but should be managed by innovating. The use of sago pulp in the fermentation feed of 30% is one of the innovations to increase the value of waste to economical and reduce the level of pollution.

Differences in the feed palatability of fermented and without fermentation are very noticeable. This is due to the physical and chemical properties of the sago fermented pulp is better to be liked by livestock. In addition, this condition is also strongly influenced by the nutritional quality of the resulting fermentation feed, especially cellulose that has increased. It is according to the opinion of Parakkasi (1995) which states that the factors affecting the consumption of feedstuffs include physical properties and chemical feed. Consumption of feed with the addition of sago pulp indicates that the use of the mids and Sago and sago pulp can still be consumed by goat cattle PE well. Whereas during this time the potential feed derived from plantation waste and sago industry is wasted free and polluting the environment.

High palatability is also influenced by feed composition. Fermentation process will change the composition of feed feed. Feed composition will undergo improved nutrition after fermentation so that there is increased palatability. This is in line with the opinion of Beever & Mould (2000) which states that the fermented feed will increase the consumption of feed caused by the composition of feed, nutrient content and digestive processes in the rumen. Meanwhile, Arbi, Rivai, Syarif, Anwar, & Anam (1977) states that the factors that affect consumption are the content of food substances and the rate of food in the gastrointestinal tract. Fermentation process is also proven to increase the nutritional value of its original ingredients because in addition to the reshuffle of complex materials becomes simpler, in the process of fermentation also formed some vitamins eg riboflavin, vitamin B12 and Provitamin A. Fermented substrates usually have a higher nutritional value than their original ingredients. This is due to the catabolic nature and anabolic microorganisms so that it is able to break down more complex components into easily digestible. The biofermentation process is expected to overhaul the structure of the cell wall chemical tissues, disconnection of lignosellulose bonds and decreased levels of lignin.

Feed consumption is the amount of feed eaten by livestock or cattle group in a certain period of time. The rate of consumption (Voluntary Feed Intake/VFI) was the amount of feed consumed by livestock when the feed material is given by Adlibitum (Parakkasi, 1995). While Tillman, Hartadi, Reksohadiprodjo, Prawirobisono, & Lebdosubodjo (1991) added that livestock will consume feed to fulfill its energy needs, so that the amount of feed that is consumed tend to cored tightly with its energy level. The amount of feed consumption is one of the best signs of animal productivity. The amount of feed consumption is the most important determining factor that determines the food substances obtained by the livestock further affects the production rate. But the feed consumption factor in ruminants is very complex and many factors are involved such as feed properties, livestock factors, and environmental factors (Wodzicka, Tomaszewska, Mastika, Djajanegara, Gardiner, Wiradarya, 1993). Ruminant feed consumption is controlled by factors that are not the same as it does on non ruminants.

Ruminant is able to digest ingredients that are rich in coarse fibre and break them into a product that can be fermented inside the rumen. The fermentation products are then absorbed and circulated in the blood that will further affect feed consumption (Arora, 1989). Kartadisastra (1997) states, ruminants in normal conditions (not in the condition of illness or being reproducing) consume a limited amount of feed according to its needs to suffice the basic

needs. Then in line with the growth, development conditions and the production rate produced by feed consumption will also increase. High low feed consumption in ruminants strongly influenced by external factors (environmental).

D. Conclusion

Feeding with the addition of fermentation of sago pulp 30%, the level of palatability is higher than the feeding of the additional feeding of sago pulp 50% and without the feeding of sago pulp sago. The addition of a fermented sago feed 50% higher levels of palatability than without the feeding of the fermentation pulp.

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Fattening Management of Independent Broiler Chicken Business (case study in a ranch owned by Mr. Andi Mukri in Anaiwoi Neighborhoods of Tanggetada District)

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Abstract

The research was conducted to find out maintenance management at the farms of Mr. Andi Mukri. The research was conducted in July 2018. Data were analyzed quantitatively and descriptively. The parameters observed included feed consumption, harvest age, body weight gain, feed conversion ratio, and mortality. The results showed that the broiler chicken farm business of Andi Mukri was an individual household business which kept as many as 500 birds with a cage size of 15 meters x 8 meters. The average body weight on the 22nd days is 956,5 grams, and on the 42nd day, it reaches 4231,4 grams whereas, on the 35th day it is 175,4 grams/week and the 42nd day is 1115,8 grams/week. FCR of 0,7 %, mortality 0,8 %, age of harvest begins on day 24 to day 42.

Keywords: Broiler chicken, FCR, mortality, United Nations

A. Introduction

Broiler chicken was one of the commodities of poultry that contributes significantly to the needs of the protein of animal origin for the people of Indonesia. The needs of chicken meat annually increase, because the price is affordable by all people. The advantages of animal proteins make the industry or livestock business a great potential to thrive. The role of Broiler chickens is significant in fulfilling the needs of the people of meat as nutritious food; this is given that the chicken population is large enough and its maintenance is almost all corners of the homeland (Amrullah, 2004).

Broiler chicken is a type of poultry that has a fast growth rate because it can be harvested at the age of 3 to 5 weeks. Chicken Farm Business is the most appropriate choice because Broiler chickens have efficient feed conversion that and cut at a relatively young age so that the circulation of maintenance is faster and efficient and produce good quality meat (Sulfanita, Roisu, Utami, 2011).

Business Broiler Poultry in Indonesia consists of two types of business that is a pattern of partnership that cooperates with the poultry companies in Indonesia, with the system of business contracts between the company and the farmers. The second pattern of Broiler chickens is an independent business pattern whose management and marketing are self-managed by Broiler chicken farmers. The business of Broiler Poultry self-reliant pattern typical by people in Kolaka District, South East Sulawesi, Indonesia consists of two business management namely maintenance business from DOC to harvest and business fattening Broiler chickens (Maintenance From age three weeks to harvest). Mr. Andi Mukri is one of the Broiler chicken farmers who applied the pattern of fattening Broiler chickens with the maintenance of Broiler chickens from the age of three weeks until harvest. Based on the background, researched case studies in a farm owned by Mr. Andi Mukri, who aims to know the management of chicken feeders Broiler.

B. Methodology

1. The Material

Mr. Andi Mukri's Broiler chicken farm in the village of Anaiwoi district of Tanggetada district of Kolaka.

2. Research Procedures

Observe general observation about the prevailing situation in the farm is the condition of the farm Mr. Andi Mukri. Views examine explicitly the procedure of feedlot management Broiler chickens on the farm, Mr. Andi Mukri.

3. Parameters of Research

The parameters observed in this study include:

a) Feed consumption. The amount of feed consumed by broiler chickens during maintenance to the harvest.

$$\textbf{Feed consumption} = \frac{\textbf{feed given}}{\textbf{Rest of the Feed}}$$

b) Harvest Age. The harvest age is obtained during maintenance until the harvest.

c) Weight gain (UN)

$$\textbf{Weight gain} = \frac{\textbf{Final weight} - \textbf{Initial weight}}{\textbf{Maintenance time}}$$

d) Feed Conversion Ratio (FCR)
FCR is a number that indicates the amount of feed spent to produce 1 kg of body weight.

$$\textbf{FCR} = \frac{\textbf{Feed consumption}}{\textbf{Increase body weight}}$$

e) Mortality. Mortality is a mortality rate in maintenance for a single product that is usually calculated in percentages.

f) Average Harvest Age

4. Data Analysis

Data is analyzed quantitatively with measurements and calculates the average value of each research variable. Also, data is analyzed descriptively.

C. Result and Discussion

1. Business Overview of Fattening Broiler Chickens

Broiler Farms located in the village of Anaiwoi district of Tanggetada District of Kolaka which is located near the market complex Anaiwoi. The owner of the farm is Mr. Andi Mukri, who started raising it in 2008. The business is a personal household business, no human resources

working on the farm. Location of Broiler chicken cage is very close to the house owner of the farm business precisely located in front of the owner's house farmer. The front of the cage faces the Rising sun, for the rear side of the enclosure facing the sundown. The cage area is 15 x 8 meters, the cage length is 15 meters, and the cage width is 8 meters. Type of cage that used a kind of stage cage model made of wood. Mr. Andi Mukri's ranch belongs to People's farms. The business pattern of Broiler chickens applied by Mr. Andi Mukri is a standalone pattern with a feedlot system. Mr. Andi Mukri fattens Broiler chickens at the age of 22 days. On the 22nd day the Broiler chickens are kept until it is harvested (sold out).

2. Feeding and drinking water

The method of feeding on the farm is Mr. Andi Mukri performed two times a day IE morning hours 09.00 WITA and afternoon at 15.00 WITA. Type of feed given in the form of granules, for additional feed usually Mr. Andi Mukri give feed mixture of various types of feed such as tofu pulp and other food remnants. For daily feed adjusted to the age of chickens and the number of chickens available. The feed acts as such a growth, described by Suprijatna, Atmomarsono, & Ruhyat (2005).

Drinking water intake is done in full feed (adlibitum) because water is an essential compound in life. Two-thirds of the animal's body is water with various roles for life. The amount of water had consumed by chickens who associated with the temperature in the cage, the more heat the temperature in the enclosure, the more water consumption. The amount of water consumed by chickens will affect the reduction of feed consumption. Water consumed must be free of toxic materials and heavy metals, clean, non-gross and odorless, do not contain chemicals and bacteria on a set threshold, and meet the standard standards for drinking water, both physically, chemically, and biology (Fadillah, 2005).

Chicken that is kept at low-temperature consumption of water is less than the broiler that is maintained at high temperatures. It was due to the high temperature of the chickens having hot heat that causes heat-filling in the body. To reduce heart-filling, chickens try to reduce feed consumption and increase consumption of drinking water (Wijayanti, Busono, & Indrati, 2011).

Figure 1. Feeding

3. A primer system

The home ground of Mr. Andi Mukri is facing the front of the sun to the back of the cage facing the sun setting. The inside of the pen consists of 4 partitions, the enclosure is 15 x 8 meters, while the cage length is 15 meters and the cage width is 8 meters. The type of cage used is the stage enclosure model.

4. Vitamin Feeding

Type of vitamin given in the Broiler chickens that belong to Mr. Andi Mukri is a type of vitamin Fortevit. Mr. Andi Mukri always gives the vitamin by mixing in livestock drinking water. The intake of vitamins combined in livestock drinking water is given 2 or 3 times in one week. Fortevit has three functions for poultry, including:

1. To accelerate the growth, reduce the mortality rate, overcome stress, improve the quality of ration, improve the conversion of quota and, increase production, the use rule given the 10 grams of forever for 60 liters of drinking water.
2. To Preventing disease due to vitamin deficiency, the rule of use for 10 grams forte it per 15 liters of drinking water.
3. To Maintaining high production, the rules of use for 10 grams of forever per 15 liters of drinking water.

Vitamin is an active substance and is indispensable for both humans and animals. Vitamin content is needed to achieve optimal health, as well as normal physiological functions such as growing, developing, sustaining life, and producing. Most vitamins cannot be formed naturally by poultry in adequate quantities for their physiologically needed so that this vitamin should be available in its packaging. The vitamins are contained in the feed ingredients in small amounts. If there is vitamin deficiency in the feed, due to not perfusion the absorption process, it can result in health and production becomes not optimal.

5. Weight loss and weight increase

The weight of chickens should be weighed every week. However, not all chickens have to be considered; quite a few samples are taken. Weighing is done to determine weekly weight gain

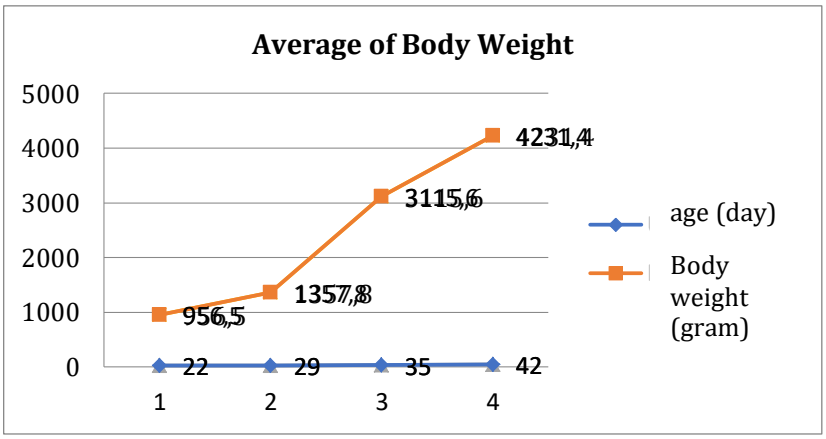

Figure 2. Body Weight of Broiler chickens during research

Graph 1 indicates that the rate of weight on the 22nd day is 956.5 grams and continues to increase until the 42 is 4231.4 grams. It can be seen in the picture that the importance of Broiler chickens during research is always expanding every week. It is according to the Lesson & Summers (2001) that the older the chicken age, the more feed consumed and used for basic living and growth.

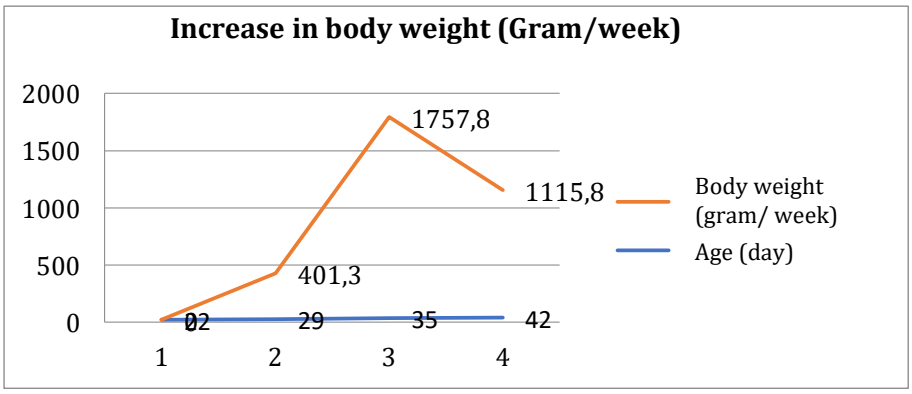

Figure 3. Broiler Chicken weight Increase during research

Graph 2 shows that the body weight of Broiler chickens on the 29th day amounted to 401.3 grams/week and on the 35 days of 1757.8 grams/week and on the day of 42 which stood to 1115.8 grams/week. Based on Graph 2, it can be known that the maintenance efficiency of Broiler chickens is ideal only up to the age of 35 days. After 35 days of raising maintenance, the UN will experience a decrease from 1757.8 grams/week to 1115.8 grams/week. Chicken weight gain is influenced by many factors, one of which is the rate of chicken consumption. Increase in body weight is influenced by feed consumption; if the feed consumption is good, then the increase in body weight will also be useful. It is by the opinion of Abidin (2002) stating that the factors that affect the weight gain are feed consumption. This opinion is also supported by Ichwan (2003) saying that, generally, weight gain will be influenced by the amount of feed consumed and nutrient content contained in the feed.

6. Conversion Feed

The feed conversion of the research results is 0.7. The value of FCR is a comparison of feed consumption with the increase in body weight gained within a certain period; FCR can be used to measure livestock productivity. Allama, Sofyan, Widodo, & Prayogi (2012) that low feed conversion value indicates that the efficiency of the use of functional feed because the more efficient the chickens consume feed to produce meat.

Conversion of feed or feed conversion ratio (FCR) is a comparison between the amount of feed (Kg) consumed with the weight of life (Kg) until the chicken is sold. Ideally, one kilogram of feed can produce a weight of 1 kg or even more. In Broiler chickens usually, target FCR = 1 maximum can be achieved before the chicken is two weeks old (FCR two weeks ± 1,047-1,071). After that, FCR will increase according to the age of chickens. FCR values are equal or smaller than standard, signifying the occurrence of feed efficiency supported by good maintenance governance. But if the value of the FCR is higher than the norm, then it indicates that there is a waste of feed as a result of the maximum feed benefits to the weight increase chickens

7. Mortality

Recording of activity reports every day has to be done since the DOC came. The report contains the number of dead chickens, the number of feeding, medicines, vaccines, and weekly weight.

Table 1. Number of chicken mortality for maintenance of 500 tails

No	age (days)	Total (tail)
1	22	1
2	29	1
3	35	2
4	42	_
	Total	4 ekor
	Mortalitas 0,8%	

Source: Chicken Farm Mr. Andi Mukri

Table 1 shows that at the age of 22 to 29 days the number of chickens that die is two tails, while at the age of 35 chickens die as much as two tails, the total number of chickens that died during the maintenance amounted to 4 tails — mortality percentage (mortality) of 0.8%. Mortality or mortality is a number that indicates the name of chickens that die during maintenance. Dying is an essential factor and should be considered in chicken farming development.

8. Harvest Age

The harvest of the Broiler chickens belonging to the Pak Andi Mukri starts from day 24 until day 42. The harvest is faster than the results obtained by (Kartasudjana & Suprijatna, 2010) stating that Broiler chickens are young male or female chickens that are generally harvested at the age of 5-6 weeks to be Producing meat. Broiler chickens are usually marketed at a live weight of 1.3-1.6 kg per tail with a 5-6 Week Harvest Age (Rasyaf,2012).

From table 2 shows the sale of chickens on the farm, Mr. Andi Mukri as much as 500 tails. Harvesting process on farms Mr. Andi Mukri is done every day when the buyer comes and at the time of booking. Chicken is harvested at the age of 24 days up or around the period of 3 weeks with a body weight of 956.5 grams/tail – 4231.4 grams/tail. The harvesting that belongs to this parameter is harvesting healthy chicken at certain body weight. So, the rejects chickens do not enter into this calculation.

The harvest period is the final stage of maintenance of Broiler chickens. Successor absence of commercial Broiler chickens can be known after all the chickens are harvested. The first schedule of the harvest is usually determined when the chickens will be preserved. However, it can change due to certain conditions such as sick chicken or because of the selling price factor. The post-harvest activity is collecting all cage equipment and cleaning it. Next, weigh the residual feed and record it and calculate the total chicken and the total weight of the chickens sold. Last evaluated the calculation of chicken production achievement (Fadillah, 2005).

Table 2. Harvest Age

No	Umur (Hari)	Panen (Ekor)
1	22	0
2	23	0
3	24	2
4	25	5
5	26	0
6	27	15
7	28	0
8	29	20
9	30	200
10	31	50
11	32	100
12	33	50
13	34	35
14	35	2
15	36	3
16	37	6
17	38	1
18	39	0
19	40	4
20	41	0
21	42	3

Source: Broiler Poultry, Mr. Andi Mukri

D. Conclusion

The conclusion this research were broiler Chicken Farms was a personal household effort maintained as many as 500 tails with a cage size of 15 meters x 8 meters; business Pattern Broiler Chicken Mr. Andi Mukri is a pattern of self-catering system funder; the weight rate on the 22nd day is 956.5 grams and on the day of the 42 is reaching 4231.4 grams. While on the day to 35 ie 1754 grams/week and day 42 of 1115.8 grams/week; FCR of 0.7, mortality of 0.8%, Harvest age starts on day 24 to day 42; and Feed done 2 times daily that morning and evening, while the drinking water is done by adlibitum so that the chicken will not lack drinking.

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