

## CHAPTER 1 INTRODUCTION

### 1.1 Background of Research

Agribusiness is one of the sector in carrying out economic activities based on agricultural businesses or the other fields that supports it. Activities in the agribusiness includes one sector or total chain of the production, which includes the processing product and marketing in the farm (Kurniawan , 2013).

Quail eggs are the good source of nutrients for human health. Many people especially in Asian countries consume quail eggs. Even though quail eggs are small in size, their nutritional value is three to four times greater than chicken eggs and is packed with vitamins and minerals. Regular consumption of quail eggs helps fight against many diseases and strengthen the immune system. The nutritional values of quail eggs is much higher than other eggs and has rich sources of antioxidants, minerals, and vitamins, and give us a lot of nutrition than do other foods (Lalwani, 2011).

Quail (*Coturnix coturnix japonica*) is one type of poultry which is being developed and improved in production. Besides producing meat, quail also produce eggs with quite high productivity. Quail eggs are a potential source of animal protein. Seen from physical composition, Quail eggs consist of egg white (albumen) 47.4%, yellow eggs (yolk) 31.9% and eggshell and eggshell membrane 20.7%. Content quail egg protein is around 13.1%, while the fat content is 11.1%.

Quail egg yolk contains 15.7% -16.6% protein, 31.8% -35.5% fat 20.2% - 1.0% carbohydrate and 1.1% ash. Quail eggs contain vitamin A 543 µg (per 100g) (Stadelman & Cotterill, 1995).

The type of quail that is often cultivated is the Japanese quail (*Coturnix coturnix japonica*) because this quail starts laying eggs at 42 days old. Quail females can produce 250-300 eggs in a year. Egg weight about 10 g / item or 7-8% of body weight. Quail potential as contributors of animal origin food to meet consumption needs protein (Determined & Keswan, 2012).

In quail breeding, factors are also a problem for breeders because they are relatively expensive feed costs and their availability is not fixed throughout the year. Feed is one of the main factors which is very important in the growth of quails. The cost of feed in maintenance can be reaching 60-70% even more during the production period. Effort done to reduce these costs is to find alternative feed ingredients, where the material is cheaper, sufficiently available, and not competitive with human needs. One alternative solution is to utilization of the contents of the cow's rumen which has always only been livestock waste in slaughterhouse. With the development of livestock and business human needs for livestock products, the more waste produced increased.

In terms of nutrition, cattle rumen content contains nutrients that can used as an energy source because it contains metabolic energy of 2821.20 kcal / kg. According to Darsono (2011) the chemical composition of rumen contents (% dry materials): ash 11%, crude protein 17.6%, crude fat 2.1%, crude fibre 28%, NFE

41.40%, Ca 0.79%, P 0.67%. Crude fibre is part of a carbohydrate consists of cellulose and hemicellulose which, if degraded are usually obtained glucose which later can be used as an energy source. In the ruminants also have microbes, which consist of protozoa, bacteria and fungi (Sudaryanto, 2002). One very bacterial group important in the rumen are cellulolytic bacteria. Cellulase enzymes produced cellulolytic bacteria are able to break down cellulose so that ruminants can living with low-quality forage (Arora, 1992). Biodegradation process materials containing cellulose are largely determined by the ability of microbes cellulolytic to produce cellulose enzymes which have high activity (Asenjo, 1986). Inside the rumen there is a population of bacteria included in the family *Bacteriodes*, *Fusobacterium*, *Streptococcus*, *Eubacterium*, *Ruminococcus* and *Lactobacillus* (Omed, 2000).

Microbes in rumen contents function to degrade contents the rumen is not yet completely degraded, this can be done inside research drums. It is expected that the fermentation carried out in the research drums will be able to decrease crude fibre content, increase protein content which can later be used as an ingredient feed in the manufacture of quail feed.

Haugh units are one of the important criteria for determining egg quality. According to Keshavarz (2003) egg quality also refers to its weight. It also shows that the egg weight can affect the egg haugh unit value because the higher the egg weight, the haugh unit value is also higher. The haugh unit value is the determinant of the egg albumen quality. So it can be concluded that egg weight and haugh unit have a role to determine the egg quality.

Based on the research background, a study should be done on giving formulated feed with fermented content of cattle rumen to the quail birds with commercial formulated feed. It is expected that this research can potentially be an increase in protein content which enhance the egg quality to increase.

### **1.2 The Aims of Research**

The purpose of this research is to determine the production of egg weight and the haugh unit value with giving formulated feed with fermented content of cattle rumen.

### **1.3 Theoretical Framework**

Eggs represents the (ovum) that grow from stem cells (oogonium) in the ovary. Basically the structure of an egg is built based on the cells of living (for fertile eggs) surrounded by egg yolks as a reserve . Both components are surrounded by egg whites which has a high water content, is elastic and can absorb shock that might happen to the egg. These three parts are inside the egg that is protected by the eggshell and functions to reduce physical and biological damage (Kurtini, 2011).

The contents of the rumen are ruminant animal slaughterhouse waste quite a lot of numbers. The contents of the rumen come from the feed consumed and has not become a stool contained in the rumen. Nutrient content the rumen is quite high because it has not absorbed the food substances contained inside it. The nutritional value contained in the contents of the rumen varies greatly depending on the quality of feed consumed (Murni, 2008). Inside the contents the rumen is rumen microbes. The rumen microbes themselves are organisms that live in the

rumens of ruminants (cattle, buffalo, goats, sheep, etc.) which play an important role in the degradation of polysaccharides in plant cell walls and crude fiber. Based on the opinion of Ali (2012), feed forage will be fermented by rumen microbes as a source of energy for livestock the ruminant. The same thing was expressed by Das and Qin (2012), who said that rumen microbes can utilize feed nutrients more efficient as a source of livestock energy. The presence of rumen microbes is due because in ruminants ruminants cannot produce enzymes for degrades polysaccharides in plant cell walls, resulting in existence of rumen microbes are very important in it. This is an opinion from Jakober and McAllister (2009), who also mentioned that 3 types microbes in the rumen are bacteria, protozoa and fungi.

The fermentation process on the contents of the rumen causes an increase in protein. This increase in protein is caused by microbial action, i.e. its proliferation and protein contribution from microbes during the growth, the more number of microbes contained in the contents of the rumen the higher the protein content will be due to most the constituent component of microbes is protein (Sandi. 2011). As stated by Soejono (1995), that rumen microbes are the only thing which is able to convert NPN (Non Protein Nitrogen) into protein high quality of feed. So that more and more rumen contents are used then the protein being degraded and NPN utilization increased. Furthermore Widyawati (1995) explains, differences in crude protein due to aging caused by the activity of microorganisms from the contents of the rumen, the longer the more the job opportunities are greater. Crude protein differences due to the use of rumen

contents contains nutrients and is a source of microbes, so the more contents of the rumen will give levels of crude protein that the higher too. And at the level of crude fiber decreases because it has degraded.

The potential for nutrient-rich rumen contents where the rumen is one a place of digestion of food (fermentation) by microbes in the body of ruminants. According to Suhermiyati's research (1984), the nutrient content contained in the contents of cattle rumen includes water (8.8%), crude protein (9.63%), fat(1.81%), crude fibre (24.60%), NFE (38.40%), ash (16.76%), calcium (1.22%) and phosphorus (0.29%). High and low consumption of protein and energy are physiologically influential to the number of eggs produced. Highest protein requirement needed at the beginning of production to meet growing, adult needs and egg production (Leeson and Summers 2001). The best protein needs for quail layer ration contains 17-20% (Permentan, 2008).

According to Muharlien (2015) many things can be done to get good quality eggs, one of them by adding forage feed which affects it. One of them uses forage of papaya leaves, papaya leaves have high nutritional content and can be used as additional forage feed on quail. Sriyani. (2014) mentions that the nutritional content of papaya leaves namely 50.74% dry ingredients consisting of 10.71% crude protein, 12.03% crude fat, 22.57% crude fiber, ash 17.84%, NFE 48.82% and TDN 47.51%. According to Advice and Ravish (2013) papaya leaves in 100 grams of material containing vitamin A in the form of carotene with a total of 28,900 IU.

#### **1.4 Identification of Problem**

1. Does giving formulated feed with fermented content of cattle rumen effects the egg weight of eggs laid by the quail birds ?
2. Does giving formulated feed with fermented content of cattle rumen effects the haugh unit value of eggs laid by the quail birds ?

#### **1.5 Outcome of Research**

1. To determine the potential of giving formulated feed with fermented content of cattle rumen, to produce healthy eggs with good egg weight.
2. To inform the farmers the difference of the egg quality produced by giving normal formulated feed and of giving formulated feed with fermented content of cattle rumen.
3. To inform the poultry owners and farmers that the formulated feed mixed with fermented content of cattle rumen can increase the egg quality in the quail birds by increasing the egg weight and haugh unit value.

#### **1.6 Hypothesis**

1. The higher the concentration of formulated feed mixed with fermented content of cattle rumen given to the quail birds, the higher the egg weight of eggs laid by the quail birds.
2. The higher the concentration of formulated feed mixed with fermented content of cattle rumen given to the quail birds, the higher the albumen height of eggs laid by the quail birds.

3. The higher the concentration of formulated feed mixed with fermented content of cattle rumen given to the quail birds, the higher the haugh unit value of eggs laid by the quail birds.