CHAPTER I INTRODUCTION

1.1 Background Research

Public awareness of how vital protein needs is increasing. It evidenced by the increasingly high demand for livestock products that are a source of protein. Based on the Badan Statistika Nasional, the average per capita consumption of a week of chicken eggs in 2017 is 2.12, while in 2018, the number increased to 2.15. To meet the increasing community demand, this is necessary to diversify the consumption of protein from animals, one of them is quail eggs.

Quail or *Coturnix coturnix japonica* is one of the poultry producing eggs that began to be attracted by Indonesian people—seen from the increased production of quail eggs from year to year (Dirjen Peternakan dan Kesehatan Hewan, 2018). The superiority of quail is the maintenance that is not too difficult, fast producing, and a high immune system against disease (Maknun *et al.,* 2016). Quail can start production at the age of 42 days, with the number of eggs as much as 200-300 eggs per year (Listiyowati and Roospitasari, 2007). Quail eggs have good nutrient content. The protein contained in quail eggs is 13.6%, higher than the protein level in chicken eggs containing 12.8% protein (Maknun *et al.,* 2016). Also, quail eggs have a water content of 74.26% and crude fat as much as 11.91% (Thomas *et al*., 2016). Judging from the physical composition, quail eggs weight 13.71 g, length 34.12 mm, as well as the egg width of 26.98 mm, while from the structure of contents, quail eggs consist of 56.83% albumen, egg yolks 34.61% and shells 8.56% of the egg weight (Tserveni-Goussi and Fortomaris, 2011).

Quail (*Coturnix coturnix japonica*) is a type of quail that commonly cultivated in Asian countries (Tserveni-Goussi and Fortomaris, 2011). This type of quail can start laying eggs at the age of 42 days (Antonio, 2012). In the first year, Japanese quail can lay up to 200 eggs. The quail egg weighs about 10 grams (Randall and Bolla, 2008). Quail have the potential as an alternative food source of animal origin as a source of protein.

Humans consume food for various reasons. The most obvious and logical goal is to get optimal nutrition for a healthy life. However, the modern world has a variety of foods that can be chosen by consumers. It has led to the need to understand what drives consumers to accept and reject certain types of food. One crucial factor that determines food acceptance but is usually ignored by producers is consumers prefer foods they like (Murang, 2018). The quality of eggs, such as bad taste and fishy aroma, can reduce the level of consumer preference for eggs. Eggs with excellent quality will increase the flavor and high selling price, so that is more profitable for the breeder.

One of the factors that affect the flavor and aroma of the egg is from feeding (Leke *et al.,* 2015). According to Dawson and Bouwkamp 1969, the addition of feed ingredients such as fish oil, dry milk, and also garlic to the poultry diet can affect the yield of meat and eggs in poultry. To find out the level of preference and acceptance of consumers from a product can be done by an organoleptic test. The organoleptic test is a test based on the human sensing process. Testing can be base on observations of the texture, color, shape, aroma, and taste of a food ingredient (Ayustaningwarno, 2014).

Other factors that can be a problem are relatively expensive feed and limited food supply that is unstable throughout the year. A feed is a critical factor in livestock growth. Various causes become an obstacle in the provision of feed, including climate conditions and soil conditions. One of the efforts that can do to overcome these problems is with the search of alternative feed sources that are cheaper and easier to obtain. Livestock waste products are currently a product that has not used optimally. Among them is the utilization of the contents of rumen cattle waste from the livestock industry of slaughterhouses.

The cattle's rumen contents in terms of nutrients contain high crude fiber, also contains essential amino acids (Heryani *et al.,* 2015). Nutrient composition contained in the rumen contents is a dry material by 80.5%, crude protein 8.1%, crude fiber 38.02%, calcium 0.37%, phosphorus 0.26%, and 2.361 kcal/kg metabolism energy (Moningkey *et al.,* 2016). Crude fiber is a part of carbohydrate consisting of cellulose and hemicellulose, which, if in the general degradation, glucose used as a source of energy from livestock.

In the rumen, microbial communities are consisting of bacteria, protozoa, and fungi. Microbes in rumen function to initiate the conversion of plant feed polymer into monomer and lead to the formation of VFA (*Volatile fatty acids*) that serve to meet the needs of carbon and become a source of energy for ruminant (Fitri Sari, 2017). One of the bacteria that play a role in this process is cellulolytic bacteria. These bacteria produce cellulolityc enzymes to hydrolysis the complex cellulose from forage feed into glucose (Yogyaswari *et al.,* 2016). These cellulolytic bacteria, such as *Fibrobacter succinogenes, Clostridium lochheadii*

(Castillo-González *et al.,* 2014) and *Enterobacter sp* (Lokapirnasari *et al*., 2015; Lokapirnasari *et al*., 2018).

The microbes contained in the rumen contents function to degrade cellulose from the rumen content that has not finished degraded utterly. It hoped that the fermentation could increase the nutritional value and reduce the putrid aroma of the rumen contents so that the content of rumen can use as alternative feed material in the making of quail ration.

1.2 Problem Statement

Can the feed formulation with the addition of fermented rumen content affect the organoleptic quality of quail eggs?

1.3 Research Purpose

To find out whether a quail feed formulation using the cattle's rumen content in the feed can affect the organoleptic of quail eggs.

1.4 Benefits of Research

1.4.1 Theoretical Benefits

The results of this research can use as the development of knowledge about the use of cattle's rumen content waste as an alternative to quail rations compilers.

1.4.2 Practical Benefits

The benefit of this research is to provide education to the public, especially breeders, about the use of cattle's rumen content waste as an alternative to quail feed.

1.5 Theoretical Base

The rumen content is one of the debris from the livestock industry sector. This waste is relatively much waste. The rumen content derived from the feed consumed by livestock animals but not digested completely into feces in the rumen. The rumen content has nutrients that are sufficiently high according to the ingredients consumed by livestock, also contains essential amino acids (Heryani *et al.,* 2016). Ruminants consume structural carbohydrates derived from crops such as lignin, cellulose, and hemicellulose. However, ruminants cannot process them into energy due to the inability to produce hydrolytic enzymes. Therefore, there are microorganisms in the gastrointestinal tract that can hydrolyze these compounds to produce energy (Puniya *et al.,* 2015).

In the rumen, there is various kind of microbes consisting of rumen bacteria, protozoa, and fungi (Castillo-González *et al.,* 2014). Microorganisms in rumen play a role in the digestion of feed against the fermentation of carbohydrates and proteins (Chaucheyras-Durand and Ossa, 2014). The quality and quantity of fermented rumen products depend on the digestive interactions with the amount and quality of digestible feed as well as the type and activity of microbial rumen, which in the end, has a massive impact on nutrient output and performance of ruminants (Mcsweeney and Mackie, 2012).

According to Moningkey *et al.*, the nutrients composition contained in the rumen content is a dry matter of 80.5%, crude protein 8.1%, crude fiber 38.02%, calcium 0.37%, phosphorus 0.26%, and 2.361 kcal/kg of energy metabolism. But unfortunately, the rumen contents have a soft texture and bad aroma. Therefore, if

it does not go through processing first, it is feared that quails do not like the rumen contents. In processing, it can be by fermentation and fortification (Marjuki and Wahyuni, 2012). In the fermentation process, microflora contributes to the development of aromas by synthesizing carboxylic acids and alcohol compounds during fermentation, or by synthesizing other aromatic compounds such as esters. Aroma formation is the result of the activity of proteolytic, lipolytic, or amylolytic enzymes from microorganisms (Özdemir *et al.*, 2018).

Fermentation processing expected to reduce the bad aroma of the rumen content so that the fermentation of cattle's rumen content can be an alternative in the feeding of the quail without overriding the organoleptic of the quail egg itself.

1.6 Hypothesis

With fermentation, it expected that the rumen content no longer smells so quail that consumes the rumen content produces eggs that not fishy, delicious, and also preferred by consumers.