CHAPTER I INTRODUCTION

1.1 Background Research

Cattle waste is defined as unconsumed feed and associated bedding materials and animal carcasses from normal mortalities of livestock on a farm and it is major source of noxious gases, harmful pathogens and odor (New Jersey, 2000.). Hence, it has public health and environmental concern. The waste involved in animal husbandry industry is waste collected from slaughterhouses and cattle product processing industry. It includes solid and liquid such as feces, urine, feed leftover, embryio, egg shells, fat, blood, hooves, bones, horns, and ruminal content (Simamora and Salundik, 2006). Ruminal content is one of slaughterhouse waste that has not been utilized optimally, in fact there are cases where ruminal content are thrown away haphazardly, causing environmental pollution (Darsono, 2011). Ruminal content is slowly becoming an environmental problem due to its large quantity in which its production in 2012 alone reaches 240 million liters in Indonesia, coupled with sharp smell and high moisture content, which remained an obstacle in the effort of processing them (Marjuki and Wahyuni, 2013).

The liquid portion of ruminal content as well as cattle feces still consist of high organic matter content (Manendar, 2010). Ruminal content can be defined as unprocessed cattle feed in a ruminant's first stomach and it contained saliva, anaerobic microbes, cellulose, hemi-cellulose, protein, fat, carbohydrate, vitamin and mineral (Van Soest, 1994).

The nutritional value of ruminal content is relatively high which is caused by the imperfect nutrition absorption do not have much difference with the original nutritional value coming from the cattle feed itself (Soepranianondo, 2012). (Widodo, 2012) found that the nutritional value in ruminal content is 8.86% of protein, 2.6% of fat, 28.78% of fiber, 0.55% of phosphor, 18.54% of ash and 10.92% of water content. A ruminant's first stomach contains different kind of microorganisms, including protoza, bacteria and fungi (Sudaryanto, 2012). One of the most vital bacterial compound inside a cattle's rumen is the cellulotic bacteria. All biodegradation process involving cellulose inside a rumen is highly determined by the cellulotic bacteria's ability to produce highly active cellulose enzyme (Asenjo, 1986).

Ruminal content contains high fiber content and it cannot be digested by poultry, thus in order to use ruminal content as poultry feed, additional fermentation process is done using the naturally occuring microbes inside the rumen itself. The microbes in ruminal content can be used to further biodegrades the undigested matter in the ruminal content.The method used to process ruminal content can be done by substrate enriching process (fortification) and fermentation process (Marjuki and Wahyuni, 2013). These additional processing is done in order make dehydration process easier, fixing the texture and smell, as well as maintaining or even fortfying the nutritional content (Marjuki and Wahyuni, 2013). Fermentation process can be done in an anaerobic container. Fermentation is done in order to reduce the fiber content and to increase its protein content that can be further processed as feed material in quail's feed ransom. According to

(Soepranianodo, 2006), the utilization of ruminal content as animal feed is limited to 10 – 15 percent of total feed formulation to prevent unwanted side effects.

Quails (*Coturnix coturnix japonica*) is quite a popular livestock commodity in Indonesia. One main strength of quail farming is its relatively fast growth (Usman *et al*.,2008).

Quails also produce eggs with a relatively high productivity. Quail's egg is a potential source for animal protein. Looking at its physical features, a quail's egg consist of 31.9% yolk, 47.4% albumen and 20.7% shell (Nugroho and Mayan, 1986). The protein content in a quail's egg is around 13.1% while its fat content is around 11.1%. Its yolk contains 15.7 – 16.6% protein, 31.8 – 35.5% fat, 0.2 – 1% carbohydrate and 1.1% ash.

Considering all these informations, author is interested in using cattle's ruminal content as the source of protein of quail's feed formulation. The ruminal content will then be added to quail's feed. Author conjects that ruminal content can be used as feed material that will improve the overall protein content in quail's egg, both in its yolk and albumens.

1.2 Problem statement

According to the background stated previously, the problem statement in this research are thus:

1.2.1 Is the usage of cattle ruminal content in quail's feed ransom can influence the protein content inside the egg yolk?

1.2.2 Is the usage of cattle ruminal content in quail's feed ransom can influence the protein content inside the egg albumen?

1.3 Research Objective

1.3.1 To find out whether the usage of fermentation cattle ruminal content in quail's feed ransom can influence the protein content inside the egg yolk.

1.3.2 To find out whether the usage of fermentation cattle ruminal content in quail's feed ransom can influence the protein content inside the egg albumen.

1.4 Research Benefit

This research is hoped to benefit quail farmer to find a cheap alternative to commonly used protein source feed material and enables farmer to produce a much cheaper feed ransom that has similar impact, protein-wise, to the quail's egg yolk and albumen quality.

1.5 Theoritical Base

Ruminal content is categorized as a slaughterhouse waste that has not been optimally utilized and is causing environmental problem instead due to careless dumping and such (Darsono, 2011). A ruminant's first stomach contains different kind of microorganisms, including protoza, bacteria and fungi (Sudaryanto, 2012). One of the most vital bacterial compound inside a cattle's rumen is the cellulotic bacteria. All biodegradation process involving cellulose inside a rumen is highly determined by the cellulotic bacteria's ability to produce highly active cellulose enzyme (Asenjo, 1986).

The method used to process ruminal content can be done by substrate enriching process (fortification) and fermentation process (Marjuki and Wahyuni,

2013). These additional processing is done in order make dehydration process easier, fixing the texture and smell, as well as maintaining or even fortfying the nutritional content (Marjuki and Wahyuni, 2013). Fermentation is done in order to reduce the crude fiber content and to increase its protein content that can be further processed as feed material in quail's feed ransom.

Quail's egg is a potential source for animal protein. Looking at its physical features, a quail's egg consist of 31.9% yolk, 47.4% albumen and 20.7% shell (Nugroho and Mayan, 1986). The protein content in a quail's egg is around 13.1% while its fat content is around 11.1%. Its yolk contains 15.7 – 16.6% protein, 31.8 – 35.5% fat, 0.2 – 1% carbohydrate and 1.1% ash while its egg white cointains 88% water, 10% protein and 1% ash (Horbanczuk 2002, Dudusola 2010)

According to (Pamungkas, 2012), nutritional value contained inside ruminal content is 9.29% water, 8.45% protein, 1.23% fat, 33.53% fiber, 16.19% ash, 0.2% calcium and 0.45% phosphor. Ruminal content contains high fiber content and it cannot be digested by poultry, thus in order to use ruminal content as poultry feed, additional fermentation process is done using the naturally occuring microbes inside the rumen itself. The microbes in ruminal content can be used to further biodegrades the undigested matter in the ruminal content (Marjuki and Wahyuni, 2013).

The fermentation process in rumen content can increase protein because the crude fiber content will be drop (Marjuki and Wahyuni, 2013). While fermentation rumen content mixed in feed ransom of quail, it will increase protein so quail egg protein will increase. According to (Soepranianodo, 2006), the

utilization of ruminal content as animal feed is limited to 10 – 15 percent of total feed formulation to prevent unwanted side effects.

1.6 Hypothesis

The hypotheses presented in this research are as follows:

1.6.1 Uses of fermentation cattle's ruminal content into quail's feed formulation can influence the protein content of the egg yolk.

1.6.2 Uses of fermentation cattle's ruminal content into quail's feed formulation can influence the protein content of the egg albumen

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