

CHAPTER 1 INTRODUCTION

1.1 Background

Feed is very important for growing process, development, reproduction, and production of livestock. Feed is also a successful key of farm beside genetic, health management, and farming system. In many animal production system feed is the biggest single cost and profitability can depend on relative cost and nutritive value of the feeds available (Bedford and Partridge, 2003). In poultry farm, the cost of feed is about 60-70% from total cost (Agus, 2010). Large amount of feed cost can be reduced by feed efficiency and substituting with alternative feed material which is cheapest and not competitive with human.

Alternative feed material can be from farm byproduct which is cheap also many in Indonesia. Rice bran is byproduct of rice milling which can be used as poultry feed. The stock of rice bran in Indonesia is abundance because in 2013 national rice production reached 71.279.709 tons of dried rice (Biro Pusat Statistik, 2014). Based on Rachmat *et al.* (2004) the rice milling process which contains 14% water can produce 57-60% rice, 18-20% chaff, and 8-10% rice bran. Potency of rice bran in Indonesia in 2013 was about 7 million tons which is very potential and should be processed become useful products.

Nutrition contents of rice bran with 92,68% dry matter contains metabolism energy 3536 kcal/kg, 9,55 % crude protein, 23,55 % crude fiber, 85,1% organic matter, so it is possible to use it as feed (Hardini, 2010). Rice bran also liked by animal but in poultry commercial feed the using of it was very limited about 10-20 % because of it contains high crude fiber and phytate acid as anti nutrition. In

other side, rice bran is easy to rancid or oxidative stale because the fat content is high (Amrullah, 2002). Since rice bran in Indonesia is abundantly available, if we could not process it so becomes a useless. So rice bran must be processed to increase the quality as poultry feed effeciently.

One of innovation to increase the quality of rice bran as poultry feed is fermentation with fermentation starter microorganism. *Actinobacillus sp.* ML-08 is a cellulosic bacteria which can be used as fermentation starter or starter of fermentation. Howard *et al.* (2003) said that cellulosic bacteria have endocellulolace and exocellulolace enzymes which can break crude fiber become soluble carbohydrate. With fermentation process, crude fiber becomes broken and easy to digest by livestock.

According to Setyono *et al.* (2004) fermentation starter microorganism produce enzymes which can break materials like cellulose, protein, amylum, and xylan that difficult to digest because it tight with anti nutrition substance. Enzyme is complex protein which produced by living cells to help specific biochemistry process. The development of feed fermentation microorganism in increase the production of enzymes also the content of crude protein. As long as bacteria growth in feed fermentation which can increase the content of crude protein it also increases the content of organic matter (Firansyah, 2013).

Based on literacy, there is no former research about using *Actinobacillus sp.* ML-08 in rice bran fermentation. The former research which has done by Firansyah (2013) using *Actinobacillus sp.* ML-08 in water hyacinth shows the increasing content of crude protein from 9,6 % (0% *Actinobacillus sp.* ML-08) become 12,51% (15% *Actinobacillus sp.* ML-08). Based on above background,

the research about using *Actinobacillus sp.* ML-08 in rice bran fermentation is needed to make a good quality poultry feed. So in this research, we conduct rice bran fermentation to know the potency of *Actinobacillus sp.* ML-08 in increasing the content of crude protein and organic matter.

1.2 The Problem Statement

Based on the background described so the problem can be stated as follows:

1. Can the addition of *Actinobacillus sp.* ML-08 in rice bran fermentation increase level of crude protein?
2. Can the addition of *Actinobacillus sp.* ML-08 in rice bran fermentation can increase level of organic matter?

1.3 Theoretical Base

Rice bran is byproduct of rice milling which can be used as livestock feed whether in poultry commercial feed using of it was very limited about 10-20 %. It caused by rice bran contain high crude fiber and phytate acid as anti nutrition (Amrullah, 2002). To increase the nutrition value and decrease the ante nutrition substrate in feed it can through by fermentation. Fermentation is breaking process of organic compound which hard to digest become a simple compound which easy to digest with using microorganism.

Using *Actinobacillus sp.* ML-08 as cellulosic bacteria in fermentation can break lignocelluloses and lignohemicelluloses bonds which can decrease the content of crude fiber. Cellulosic bacteria produce cellulose enzyme which is a complex enzyme of endo-(1,4)- β -gluconase, exo-(1,4)- β -gluconase, β -(1,4)-

glucosidase working gradually to decompose cellulose into glucose (Howard *et al.*, 2003). Glucose can be used as carbon and energy source for the growth and development stage of bacteria (Cahya and Sumarsih, 2010).

The presentation of *Actinobacillus sp.* ML-08 should be balanced with the proper nutrition content for the growth of cellulosic bacteria. Less nutrition can cause bacteria cannot grow and develop well. Cellulosic bacteria need carbohydrate as energy source, nitrogen, phosphorus, minerals, amino acids, vitamins, sterols, etc. to supply cell necessities (Campbell, 2002). To fulfill the energy requirement of *Actinobacillus sp.* ML-08 in rice bran fermentation, it needs molasses added. Molasses is a byproduct of sugar cane manufacture which contains 50-60% sugar, it also contains amino acids, minerals, biotin, pantoic acid, thiamine, phosphorus, and sulfur. High content of carbohydrate and minerals in molasses can stimulate the growth and development of *Actinobacillus sp.* ML-08 so it can well develop and increase the content of crude protein of rice bran (Irawan and Utama, 2012).

The increasing of crude protein is caused by increasing activity of *Actinobacillus sp.* ML-08 that contains nitrogen which produces single protein cell and 60% protein (Moran, 2005). The increasing nitrogen is also beneficial for bacteria to optimally active and increase crude protein content. The increasing crude protein content is also followed by increasing content of organic matter (Al Arif and Lamid, 2014).

1.4 The Aims of Research

The aims of this research are:

1. To prove the addition of *Actinobacillus sp.* ML-08 in rice bran fermentation can increase level of crude protein by proximate analysis method.
2. To prove the addition of *Actinobacillus sp.* ML-08 in rice bran fermentation can increase level of organic matter by proximate analysis method.

1.5 The Benefit of Research

This research result hoped that it can give information to the society especially farmers about fermented rice bran by *Actinobacillus sp.* ML-08 which expected can increase the level of crude protein and organic matter so it can be used as cheap and easy to make quality poultry feed effeciently.

1.6 Hypothesis

Based on the problem statement and aims of research listed above, it can be proposed hypothesis as follows:

1. The addition of *Actinobacillus sp.* ML-08 in rice bran fermentation can increase the level of crude protein.
2. The addition of *Actinobacillus sp.* ML-08 in rice bran fermentation can increase the level of organic matter