EFFECT OF CONCENTRATE AND MINERAL BLOCK SUPPLEMENTATION ON DAIRY COW MILK PROTEIN

Bintang Senna Sakti Wiranegara\textsuperscript{1}, Tita Damayanti Lestari\textsuperscript{2}, Romziah Sidik\textsuperscript{3}
\textsuperscript{1}Student, \textsuperscript{2}, Department of Veterinary Reproduction, \textsuperscript{3} Department of Animal Husbandry
Faculty of Veterinary Medicine, Universitas Airlangga

ABSTRACT

The aim of this research is to know the effect of concentrate and mineral block supplementation on dairy cow milk protein. The research was conducted on eight Filial Friesian Holstein cows with ± 450 kg body weight and aged 2-4 years. The cows were divided into 2 groups, P0 and P1. P0 was fed by grass, tofu waste, concentrate A and P1 was fed by grass, tofu waste, formulation concentrate B, formulation mineral block. The data was analyzed using \textit{independent sample t test} and the software used to analyze the data is \textit{Statistical Program for Social Science} (SPSS) version 20 for Windows. The result showed that concentrate and mineral block supplementation did not significantly affect the total milk protein (p > 0.05). The mean total milk protein in the combination of feed P0 is 4.2100\%±0.4725 and in the combination of feed P1 is 4.2125\%±0.3650. There is no significant difference between P0 and P1 treatment in milk protein content. But, there is a difference in feed price which P1 is cheaper than P0.

Keyword(s): Formulation concentrate, Formulation mineral block, Total milk protein, Dairy cows, Feed price

Introduction

Dairy cows’ milk contains some nutrient such as fat (37.5 g/kg), protein (33 g/kg), lactose (47 g/kg) and ash (7.5 g/kg) (McDonald, 2010). Milk is able to fulfill the needs of vitamin which important for the body such as vitamin A, vitamin D, E and vitamin B12 (McDonald, 2010). Increasing milk demand to be consumed by the people, making dairy farmers keen to raise dairy cows to produce high quality milk. Feed is primary need to fulfill the requirement for reproduction, life, quality and quantity of milk production (Sudono, 2003). Giving good feed for livestock (quality or quantity) consist of forage and concentrate is the effort to increase milk production (Sidik, 2004).

Lack of feed in animal, especially dairy cows will lead to a decrease in production, health degrees, and adversely affect the reproduction (Saptahidayat, 2005). Good feed management is needed to produce good quality of milk. The production of good quality of milk is determined by the type of cow, age and lactation period (McDonald, 2010).

One of main problem in dairy cow is the low productivity.
Inadequate feeding is one of the main causes in decreasing of dairy cows productivity (Suwignyo, 2004). In the early days of lactation, nutritional deficiency often occurs. This is caused by relatively high milk production but lower feeding, resulting in excessive mobilization of body fat reserves (Clark and Davis, 1980).

The efforts to increase the production and the quality of milk is through adding feed. Dairy cows need more nutrients in the early period of lactation. This is because in the early days of lactation, cows need nutrients to produce milk, reproduce, and fulfill the basic need (Siregar, 2001). There are two kinds of feed given to dairy cows which is forage and concentrate (Frias, 2015). Concentrate added in feed ration serves to meet the needs of carbohydrates, proteins, fats, and minerals that can’t be fulfilled by forage (Eniza, 2004).

Dairy farmers mostly provide forage feed and additional feed such as tofu waste, rice bran, and others. Forage is defined as feed containing relatively high crude fiber or undigested material compared to concentrate (Prasetiyono, 2014). Additional feeding of concentrates and mineral blocks which have higher nutrients than forage, is intended to provide opportunities in maximizing growth and productivity. The addition of mineral block aims to complement the micro element such as minerals and vitamin in order to achieve high milk productivity (Prasetyono, 2014). According to Sudono (2003) and Ramelan (2001), concentrates can serve as an additional feed that complement the needs of protein and fat which has not been fulfilled only from forage. Concentrate expected to be one of the solutions in increasing productivity.

Based on this background, the addition of feed quality with the addition of concentrate and mineral blocks allows the nutritional content to be balanced and able to fulfill the needs of dairy cows during lactation period. The well-fulfilled nutrition during lactation period will affect positively to milk production. In case of price, addition of concentrate and mineral block is cheaper for feed formulation. Farmers prefer cheaper price of feed for their cattle. This research also includes the simple economic analysis of feed price.

Material and Method

The research was conducted in Teaching Farm, Faculty of Veterinary Medicine, Airlangga University. The proximate analysis was conducted at the Laboratory of Animal Feed, Faculty of Veterinary Medicine, Airlangga University. Examination of milk protein content was conducted at the Department of Veterinary Public Health Laboratory, Faculty of Veterinary Medicine, Airlangga University.
Animals used in this study were 8 Filial Friesian Holstein (FFH) dairy cows. Grouping of experimental animals using a random system by lottery. There were two treatments and each treatment was repeated four times.

This study consists of two stages, namely the preparation stage and the experimental stage. The preparation stage was done for one week for feed adaptation and one week for trial stage and data collection.

Factors tested are (P0) which is forage, tofu waste, and concentrate A. And (P1) consist of forage, tofu waste, concentrate B and mineral block supplementation. From these factors obtained treatments as much as 2x2 with each treatments repeated twice and obtained eight (2x2x2).

Data obtained was analyzed using T-test and the calculation of feed price and economic analysis using formulated calculation of feed price between treatment and the consumption per days.

**Result and Discussion**

Research was done on 2 groups P0 and P1 which each group consist of 4 head of cows of 2-4 years old. The result of the research based on the combination of concentrate and mineral block formulation toward the experimental group of animals: P0 and P1 to the total protein of Filial Friesian Holstein (FFH) dairy milk is showed in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>P0</th>
<th>P1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>4.03</td>
<td>4.03</td>
</tr>
<tr>
<td>3.66</td>
<td>4.03</td>
<td></td>
</tr>
<tr>
<td>4.76</td>
<td>4.76</td>
<td></td>
</tr>
<tr>
<td>4.39</td>
<td>4.03</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>4.2100±0.4725</td>
<td>4.2125±0.3650</td>
</tr>
</tbody>
</table>

Description:
P0 = Forage + Tofu Waste + Concentrate A
P1 = Forage + Tofu Waste + Mineral Block + Concentrate B

The results of research based on Concentrate B and mineral block feeding did not significantly affect the total milk protein. The average of total milk protein in the combination of feed P0 is 4.2100 and in combination of feed P1 contained Concentrate B and mineral block formulation is 4.2125. The total protein on treatment P1 is higher than P0 although it is not give a significant difference. This may be due to the supplementation of concentrate B and mineral block administration P1 treatment may increase the production of total protein in milk although not significantly.

Concentrates containing high nutrients such as protein will increase milk production on dairy cows. The protein content of the concentrate will be digested and
absorbed by the cow in the form of amino acids, then the amino acids will be circulated throughout the body including the mammary glands cells for the process of milk protein formation (McDonald, 2010). Proteins in the feed also play a role in the formation of lactase synthase enzyme that serves to form milk lactose, where lactose is a component that affect the amount of milk production (Prihatminingsih et al, 2015).

In addition, the mineral content found in mineral block supplementation can increase cow productivity by increasing the process of protein synthesis by microbes in the rumen. Mineral blocks are beneficial to increase livestock productivity by increasing protein synthesis by microbes in the rumen, increasing the digestibility of feed and increasing feed intake. This increases the population of rumen microorganisms that cause the need for crude fiber to increase, thus stimulating livestock to consume more feed ingredients than their normal condition and impacting on increased milk production as well (Hatmono and Indriyadi, 1997).

Farhandani (2006) stated that giving mineral block which especially contains urea will help fermentation process by rumen bacteria and secrete urease enzyme into NH3 and CO2, then NH3 will be used to form amino acid. The feed supplementation with mineral block containing urea will increase the NH3 composition. NH3 is one of the components used to form an amino acid. Feeding with additional mineral block will increase the NH3 concentration so that the amino acids formed will also increase. The more amino acids are formed, the higher the protein content in milk. In line with research conducted by Wahyudi (2006) showed mineral block supplementation can increase the production and quality of cow’s milk, especially protein content from 3.63% to 4.09%.

Although there is no significant difference in total milk protein content, in protein consumption treatment P1 is higher than treatment P0. By using formulation on calculating protein consumption, it is known that protein consumption on P0 is 0.933 kg while in P1 is 1.091 kg. The difference of protein consumption between treatment P0 and P1 approximately 0.158 kg. While, the economy analysis result is serve in Table 2.

<table>
<thead>
<tr>
<th></th>
<th>P0 (Rp)</th>
<th>P1 (Rp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tofu</td>
<td>16.000</td>
<td>8.000</td>
</tr>
<tr>
<td>Forage</td>
<td>9.000</td>
<td>13.500</td>
</tr>
<tr>
<td>Concentrate A</td>
<td>13.500</td>
<td>-</td>
</tr>
<tr>
<td>Concentrate B</td>
<td>-</td>
<td>14.000</td>
</tr>
<tr>
<td>Mineral Block</td>
<td>-</td>
<td>250</td>
</tr>
<tr>
<td>Total</td>
<td>38.500</td>
<td>35.750</td>
</tr>
</tbody>
</table>

Based on the table above, the feed price per day on treatment P1 is
cheaper than treatment P0 with the difference of Rp 2,750,00.

The results showed that there was an increase in total milk protein although not significant. However, there is a significant difference in feed prices at each treatment of Rp 2,750,00 per day. Differences in feed prices can be utilized by farmers as a cheaper alternative feed.

Conclusion

There is no significant difference between protein content in milk derived from cows fed by treatment P0 consist of forage, tofu waste, and Concentrate A and P1 consist of forage, tofu waste, Concentrate B, Mineral Block. But, there is a significant difference on feed price between treatments.

Bibliography


Stensig, T., P.H Robinson. 1997. Digestion and Passage Kinetics of Forage Fiber In Dairy Cows as Affected by Fiber-free Concentrate In The Diet.


