

# The Effect of Date Seed Flour (*Phoenix dactylifera* L.) Levels in Concentrate on the Digestibility and Blood Profile of Dairy Cow

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**Abstract**—The research was aimed to evaluate and analyze the effect of date seed flour levels in the concentrate on digestibility and blood profile of dairy cows. This research was conducted in the Laboratory of clinical pathology, Faculty of Medicine, University of Brawijaya, and dairy cows farmer in Bumiaji District, Batu City. The material used 9 cows in the lactation period, using the experimental design method with 3 treatments. T0= elephant grass + concentrate without date seed flour, T1= elephant grass + concentrate with 7.5% date seed flour, T2= elephant grass + concentrate with 15% date seed flour with 3 replications of each treatment. The variables measured included digestibility of dry matter and organic matter, dry matter intake, glucose, and urea blood profile. The design used was a randomized block design. Analysis with statistical analysis of covariance. The research results showed that date seed flour significantly affects ( $P>0.05$ ) the digestibility of dry matter and blood urea profile. This research indicates that the effect of date seed flour with different levels in dairy cow concentrates can be used as an alternative feed to replace other feed compositions. Adding date seed flour in concentrate can be given as much as 15% because it does not negatively affect dairy cows digestibility and blood profile.

**Keywords**— Date seed, Dairy Cows, Digestibility, Blood Urea, Blood Glucose.

## I. INTRODUCTION

A Dairy cow is one of the most dairy-producing livestock in Indonesia. Milk production produced by dairy cows as affected by feed consumption in the form of concentrate and forage. The main problem in dairy farming is the high price of feed. This problem is feed is the most significant component by livestock businesses with a considerable percentage, which reaches 70% of the total production costs. Management in determining nutritional needs, quality of feed produced, and availability of good feed for livestock can stimulate optimal production. For this reason, alternative feed ingredients can be the right choice for these problems, such as agro-industrial waste that does not compete with human needs and can be continuously available such as plantation waste such as date seeds. Date seeds can be a good alternative feed in the composition of concentrates on the efficiency of cattle (Ferreira et al., 2012). Date seed flour nutrients, as percentages of DM 69–78%, NDF 5–12%, ether extract 4–7%, CP 4–11%, and 1–3% ash (Rezaenia et al., 2016). Warnasih et al. (2020) stated that the flavonoid compounds contained in date seeds could

act as antioxidants. The demand for animal feed increases globally, and dates can be used as an alternative feed. Date seeds can be an alternative source of carbohydrates for livestock (Hossain et al., 2014). The method to evaluate the nutritional adequacy of livestock is to observe their physiological functions. Hove et al. (2001) the blood metabolite profile can determine physiological processes because blood metabolites indicate the value of energy, protein, and nutrient metabolism, including blood glucose and urea levels. Meanwhile, high digestibility in ruminants increases the level of nutrients digested by microbes in the rumen. The higher the percentage value of the feed ingredients digestibility, the better the quality. Based on this description, the research was conducted on the effect of adding date seed flour to dairy cows concentrate feed on digestibility, feed intake, and blood profile.

## II. MATERIAL AND METHODS

This research is from February 15, 2021, to July 26, 2021, at the Dairy Cattle Farm of Bumiaji Village, Bumiaji District, Batu City. Feed proximate analysis was carried out at the Nutrition and Animal Feed Laboratory, Faculty of Animal Science, University of Brawijaya, and blood profile analysis at the Laboratory of Clinical Pathology, Faculty of Medicine, University of Brawijaya. The dairy cows used in this study were 9th PFH cows with 2-6 months of lactation. The cage used in this study used a double pen consisting of two rows, and the direction of the cows was tail to tail.

The tool used in this research is a milk can, vacutainer tube, 10 ml syringe, needle, spectrophotometer, the cooler box, 150 kg scale, mixer, bucket, and plastic bags. The feed ingredients used in this study were DDGS, pollard, bran, copra, minerals, elephant grass, and date seed flour. Concentrate feed is the treatment in this study; concentrate without addition and addition of date seed flour arranged in the same protein (iso protein) with a CP content of about 18%.

The research method used in this study was an experiment using a randomized block design. The treatments used were 3 treatments, and each treatment consisted of 3 cows with a total of 16 cows.

The treatment given is as follows:

- T0: Elephant Grass + Concentrate without date seed flour.
- T1: Elephant Grass + Concentrate using 7.5% date seed flour.
- T2: Elephant Grass + concentrate using 15% date seed flour.

TABLE 1. Nutrient Content of Feed Treatment

| Nutrient        | Treatment |        |        |
|-----------------|-----------|--------|--------|
|                 | T0 (%)    | T1 (%) | T2 (%) |
| Dry matter      | 89.39     | 90.11  | 90.12  |
| Organic matter* | 90.08     | 91.16  | 90.38  |
| Crude protein*  | 18.23     | 18.00  | 18.34  |
| Crude fiber*    | 3.73      | 3.63   | 3.73   |
| Crude Fat*      | 13.87     | 13.78  | 11.92  |

Source: The result of the Laboratory of Nutrition and Animal Feed analysis, Faculty of Animal Science, University of Brawijaya, Malang (2021).

Mixing of feed worked with a feed mixer machine with a capacity of 150 kg. The mixing of each treatment is 100 kg so that it mixed evenly and homogeneously. Feeding was done twice in the morning and evening before the milking process. The ratio of giving concentrate and forage is 50:50.

The study's data collection was blood samples analyzed by the Clinical Pathology Laboratory, Faculty of Medicine, University of Brawijaya Malang. For in vivo digestibility observation with a fecal collection. The excreted feces are accommodated and weighed every day for 7 days and don't mix with urine, then sprayed with formalin. Stool samples were taken as much as 200 g as samples for proximate analysis. After the proximate analysis was carried out, the digestible dry matter and digested organic matter values were calculated.

*Observed Variables*

Dry matter and organic matter digestibility, consumption of dry matter, blood glucose and blood urea.

*Data Analysis*

The data obtained in this study will be tabulated and processed using a Randomized Block Design with ANCOVA using the Microsoft Excel program. If there is a significant difference, continue using the DMRT test (Duncan Multiple Range Test).

III. RESULT AND DISCUSSION

1. Effect of Treatment on Digestibility

TABLE 2. Digestibility of Nutrient

| Variable             | Treatment    |              |              |
|----------------------|--------------|--------------|--------------|
|                      | T0           | T1           | T2           |
| DM Digestibility (%) | 65.18 ± 0.78 | 61.73 ± 3.74 | 67.14 ± 2.12 |
| OM Digestibility (%) | 65.78 ± 2.18 | 62.72 ± 3.28 | 66.64 ± 3.63 |
| DM Intake (kg/day)   | 15.36 ± 0.04 | 15.50 ± 0.04 | 15.46 ± 0.11 |

a) Dry Matter Digestibility

The results of this research had no significant difference (The results of this research had a significant effect (P>0.05) on the dry matter digestibility of the treatments. Dry matter digestibility in ruminants is closely related to rumen capacity and microbes activity in the rumen. This is different from the opinion of Khezri et al. (2017) observed that feeding sheep with 9, 18, and 27% date seed flour did not affect dry matter digestibility. There was no significant difference between this

research and the previous one due to the nutritional content of date seed flour as a substitute material

The average dry matter digestibility in each treatment was T0: 65.18 ± 0.78, T1: 61.73 ± 3.74, and T2: 67.14 ± 2.12. This result is higher than the previous study by Rezaenia et al. (2018) that giving date seed flour to dairy cow feed with a feeding level of 0-6% resulted in 57.7-58.4% digestibility. High dry matter digestibility in dairy cows indicates rumen microbes digest the nutrients. Other factors that cause low dry matter digestibility caused by the number of microbes in the rumen, the age of livestock, and genetics. The highest digestibility in this study was in the T2 treatment compared to other treatments. The highest digestibility is because the crude protein content in T2 is more significant than in the other treatments. Setiyaningsih et al. (2012) showed that the high dry matter digestibility in ruminants indicates the high levels of digested, especially crude protein, by rumen microbes. The higher percentage value of the digestibility showed good quality.

b) Organic Matter Digestibility

The statistical analysis results had no significant difference (P>0.05) on organic matter digestibility between the treated feeds. The result is affected by dry matter digestibility which shows the results are not significantly different. The result of ODM had no significant effect because the value was closely related to DMD. Munasik (2007) stated that feed composition with the same nutrient content allows the ODM to follow the DMD. Digestibility of dairy cows is affected by several factors, including the chemical composition of feed formulation, ration composition, physical form of the ration, feeding and factors originating from the farm itself (McDonald et al. 2010)

The average value of organic matter digestibility in each treatment was T0: 65.78 ± 2.18, T1: 62.72 ± 3.28, and T2: 66.64 ± 3.63. The high crude protein content influences the digestibility of organic matter. The results of the crude protein content of each treatment were T0, T1, T2, and T3, respectively, 18.23%, 18.00%, and 18.34. The same crude protein content resulted in no significant difference in organic matter digestibility. Widodo et al. (2012) showed that crude protein in the rumen is essential because it will be hydrolyzed into peptides by proteolysis enzymes produced by microbes. These peptides are further degraded into amino acids and then deaminated into ammonia to become microbial proteins. An increase in crude protein causes rumen microbial activity on organic matter.

c) Dry Matter Intake

The statistical analysis results showed no significant difference (P>0.05) between dry matter consumption among the treatment feeds. This result is because the nutritional content in each treatment has almost the same value. According to Setianingtyas et al. (2016) stated that the feed with the same physical form and the quality of the feed given had almost the same protein and TDN content between treatments, which could cause the palatability of the feed to be no different so that the consumption of dry matter was also not different. The dairy cows used in the study consumed DM

15.36-15.50 Kg in a row, which fulfilled the DM requirement from body weight. With an average body weight of 450 kg and dry matter consumption of 15.36-15.50 Kg (at least 3% of body weight), the need for dry matter has been fulfilled 15.36-15.50 Kg. This shows that the treatment feeds have a palatability level that is preferred by livestock. Imran et al. (2012) palatability is also a factor in determining the value of ration consumption. According to Boufennara et al. (2016), date seed waste has high palatability and is easily digested due to its nutrient composition rich in glucose and fructose.

2. Effect of Treatment on Blood Profile

TABLE 3. Blood Profile

| Variable      | Treatment    |              |              |
|---------------|--------------|--------------|--------------|
|               | T0           | T1           | T2           |
| Blood Urea    | 26.50 ± 4.07 | 23.70 ± 4.32 | 32.24 ± 4.36 |
| Blood Glucose | 50.33 ± 3.51 | 48.58 ± 1.03 | 48.17 ± 2.15 |

a) Blood Urea

The statistical analysis showed that adding date seed flour on blood urea levels had a significant effect ( $P > 0.05$ ). Al-Suwaiegh (2016) showed no effect of adding date seed flour to blood urea levels in lactating goats. Blood urea results from nitrogen metabolism in ruminants by rumen microbial activity on feed protein and non-protein nitrogen into ammonia which then enters the blood circulation to the liver for urea formation. Dairy cows' blood urea levels ranged from 23.70-32.24 mg/dl, which could be in the normal range. Meyer, (2004) observed that blood urea levels in lactating cows ranged from 6-27 Mg/dL, supported by Widhyari et al. (2016) that blood urea levels in dairy cows ranged from 8-24 mg/dl. Normal blood urea levels can indicate that dairy cows can use protein in feed efficiently. Because the ammonia formed from the protein degradation process is appropriately utilized in developing microbial protein, there is no spike in high blood urea levels in the blood circulation of livestock. The value of urea content observed in this study indicated that dairy cows fed date seed flour had sufficient protein requirements for maintenance and production because blood urea was a suitable parameter of protein deficiency.

The results of the research, the blood urea in dairy cows that were given various levels of date seed flour in concentrate was T0: 26.50 ± 4.07, T1: 23.70 ± 4.32, and T2: 32.24 ± 4.36. Blood urea levels at T2 were higher than the other treatment feeds. High and low urea levels in the blood also affect the efficiency of utilizing ammonia in the rumen. Elevated blood urea levels are sometimes a benchmark for good livestock production performance, but high blood urea content can also be a problem. Consumption of CP rations will affect the number of amino acids in the rumen, and if utilization by rumen microbes is low, it will cause ammonia and urea production. Blood in the liver increases (Krisnan et al., 2009).

b) Blood Glucose

The statistical analysis results showed that the effect of adding date seed flour in the concentrate on blood glucose levels had no significant difference ( $P > 0.05$ ). Sharifi et al. (2017) showed that the addition of date seed flour with levels of 6%, 12%, and 18% in the feed did not give a significant difference in the blood glucose levels of Saanen goats. This

result is because the nutrition content in the treatment concentrate given date seed flour is not much different. Suyasa et al. (2016) observed if the content in the feed-in each treatment has almost the same value, then the response given by the livestock will also be practically the same. This result is because the content of nutrition that the livestock body will metabolize is also the same.

Based on the research results, the blood glucose in dairy cows that were given various levels of date seed flour in concentrate was T0: 50.33 ± 3.51, T1: 48.58 ± 1.03, and T2: 48.17 ± 2.15. Blood glucose levels at T0 were higher than the other treatment feeds. Blood glucose levels in treated cows decreased due to the use of date seed flour compared to blood glucose levels of T0. The blood glucose values in the cows ranged from 48.17 to 50.33 mg/dl, which means that the glucose levels in the cows were at the normal level. Follows Weiss, and Wardrop, (2010) statement that normal blood glucose content in dairy cows is between 40-100 mg/dl. Blood glucose is a nutritional status in livestock to describe normal physiological functions in dairy cows. Glucose is needed in significant quantities by ruminants for basic living needs, body growth and fetal growth, growth of body tissues, and milk production (Tahuk et al., 2017)

IV. CONCLUSION

This research concludes that the date seed flour can be used as an alternative to mixed concentrate feed composition in dairy cows had a significant effect. Even though adding date seed flour in concentrate can be given as much as 15%, it does not negatively affect dairy cows digestibility and blood profile.

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