The Potency of Sugar Cane Waste Product for Supporting Sustainable Beef Cattle Feed Resouces at Integrated Farming Center in Solok Regency, West Sumatra

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Abstract

The research was intended to study the availability and nutrient content of waste product of sugar cane (bagasse, molasse and sugar cane top) in integrated beef cattle with sugar mill and sugar cane farming. Based on the data, it was formulated the ration for beef cattle, and known the carrying capacity of the sugar cane area for supporting feedstuff for beef cattle. The methodology of research was survey, proximate analysis and linear programming. Based on the survey, it was found that the production of bagasse was 27.60 ton/Ha/year (46% of sugar cane production); molasse was 1.27 ton/ha/year (1.99% of sugar cane production); and sugar cane top was 10.57 ton/ha/year (43.42% of sugar can production). Nutrient contents of bagasse were 79.01%, 2.15%, 40.45%, 1,44%, and 50.33% for dry matter (DM), crude protein (CP), crude fiber (CF), fat (F) and nitrogen free extract (NFE) respectively. Dry matter, CP, CF, F and NFE contents of molasses were 13.29 %, 12.33%, 0.63%, 17.83% and 63.98%, respectively. The content of sugar cane top was 27.29%, 7.59%, 40.39%, 1.51% and 40.67% for those parameters, respectively. The result of ration formulation based on the nutrition content for beef cattle (CP 11 %, and TDN 62.5%) was sugar cane top 25%, bagasse 30%, molasses 5 %, and other feedstuffs 40 %. The other feed stuffs were rice brain 15 % and coconut meal 15 %, and waste of tofu 10%. The area could support fodder for 1,478, 8,403 and 398 beef cattles every year, based on availability of sugar cane top, bagasse, and molasses respectively.

Keywords: bagasse, molasses, sugar cane top, beef cattle

Introduction

The sustainable feed resource is the important factor to support Indonesian Government Program to self supply of beef cattle in 2014. Forage may constitute an important fodder component to meet the maintenance requirements of ruminants, especially for farmers who practice intensive farming. Nowadays, the farmers

began to face the difficulties to get the fodder because of limitation of area to plant the forage. Most of the land is used for others; e.g.; plantations, agricultures, horticultures, buildings, etc.

In Solok Regency, West Sumatra, There is a center of traditional sugar plantation that is located in Talang Babungo Village. It has 415 hectare area of sugar plantation that is owned by 530 farmers. The farmers resulted 3280 ton traditional sugar every year. Besides that, there are by- products of plantation that is potential for the source of fodder; namely sugar cane top, bagasse and molasses. Unfortunately; the potency is still wasted, whereas there are about 500 beef cattles that are depend on traditionally fed with grass by the farmers.

Based on the problem, it is needed to study the potency of the by-products as source of fodder of beef cattle. As the preliminary studies, we want to know the production and the nutrient content of the byproducts. Besides that, we tried to formulate the ration of beef cattle with using the products. Based on the formula, we could calculate the carrying capacity of the by-products to support availability of fodder for beef cattle in the integrated farming.

Materials and Methods

The materials used in the present research were sugar cane top, bagasse, molasses and chemical materials for proximate analysis. The device was measuring tape, GPS, scale (capacity 550 kg) and a set of proximate analysis instrument. Besides that, it was used sugar cane mill (3 rollers type) with a 24 HP engine.

The data of availability of byproducts were obtained by survey where sampling was collected by stratified random sampling. Strata of the samples were based on altitude of the area; i.e.; 1000-1100 m and 1100-1200 m above the sea level. The nutrition content of the products was be determined by proximate analysis. Linear programming was applied for ration formulation with sugar cane byproducts as main fodder. Based on the availability and ration formula could be determined the carrying capacity.

Results and Discussion

Productions of bagasse, sugar cane top and molasses

The production of bagasse, sugar cane top and molasses in Talang Babungo village, Solok regency, West Sumatra is presented in Table 1. On the table show that the total production of sugar cane was influenced by the altitude of the land; the higher the location, the higher the production. The average of production was 63.69 Ton/Ha/year. The production of bagasse was 27.70/ha/year (43.42% of total production). The production of sugar cane top was 10.57 ton/ha/year (16.79 % of total production); meanwhile the production of molasses was 1.17 ton/ha/year

(1.19% of total production). The production is equivalent with 19.4 ton/ha/year, 2.9 ton/ha/year, and 0.2 ton/ha/year dry matters of bagasse, sugar cane top and molasses accordingly. There were 415 Ha area of sugar cane plantation in location of the research, so it can be predicted that the availability of bagasse, sugar cane top and molasses in Talang Babungo village were 8069, 1197, and 65 ton of dry matters/ year.

Nutrient content of the by-products

The nutrient content of the by-products is presented in Table 2. The bagasse contains highly dry matter (DM) and crude fiber (CF), but lower in crude protein (CP) and fat. Sugar cane top contains DM and CP relatively the same as grass, so it can be used for substituting the grass, but CF is relatively higher. The molasses is

Table 1. The production of bagasse, sugar cane top and molasses in Talang Babungo Village, Solok Regency, West Sumatra

Criterion	Production		
	Altitude 1000-1100 masl*	Altitude 1100-1200 masl*	Average
Total sugar cane production (ton/ha/year)	53.88	73.50	63.69
Bagasse production			
ton/ha/year	23.11	32.30	27.70
% of total production	42.89	43.95	43.42
Sugar cane top production			
ton/ha/year	9.68	11.47	10.57
% of total production	17.97	15.61	16.79
Molasses production			
ton/ha/year	1.20	1.15	1.17
% of total production	2.23	1.56	1.90

Note: *meter above the sea level

Table 2. Nutrient content of the by-products of sugar cane plantation

Kind of the by-products	Nutrient content (%)				
	DM	CP	CF	Fat	NFE
Bagasse	79.01	2.15	40.45	1.44	50.33
Sugar cane top	27.29	7.59	40.39	1.51	40.67
Molasses	13.29	12.33	0.63	17.83	63.98

the best fodder as source of energy because contains the highest nitrogen free extract (NFE) of those by-products. Based on the nutrient content of those by-products, it was need to add other fodder to formulate the ration for beef cattle.

Formulation of Ration

Ration formulation of beef cattle used bagasse, sugar cane top, molasses and others fodder generate formula as being shown in Table 3. In the table show that 60 % of the ration consists the by-products of sugar cane, and the remaining comprise other feedstuffs. The rice brain, coconut meal and waste of tofu function to cover insufficiency of the nutrient requirement derived from those by-products. Thus; the by-products mainly serves as substitution of grass that main component of forage resource in Talang Babungo.

Carrying Capacity

Based on the ration formula, it can be calculated the carrying capacity of the by-products that produced in Talang Babungo to support the nutrient requirement of

Table 3. The ration formula of beef cattle based on by-products of sugar cane as main component*

Kind of fodder	Percentage (%) of DM
Sugar cane top	25
Bagasse	30
Molasses	5
Rice brain	15
Coconut meal	15
Waste of tofu	10
Total	100

Note: *The requirement of CP = 11% and TDN 62.5%.

Table 3. The ration formula of beef cattle based on by-products of sugar cane as main component*

The kind of by products	Production (ton/year)	The requirement (ton/cattle/year)	Carrying capacity
Sugar cane top	4,387	2.968	1,478
Bagasse	11,496	1.368	8,403
Molasses	486	1.219	398

The assumptions: The total area of the sugar cane plantation is 415 Ha. The average of beef cattle weight is 300 kg. The requirement of dry matter is 3% of live weight.

beef cattle. The carrying capacity based on availability of the by-products presented in Table 4. In the table, it can be seen that based on availability of bagasse, sugar cane top and molasses can cover the needs of feed for 8 403, 1 478, and 398 cattles respectively. Thus; the availability of molasses was the limiting factor of exploiting the by-products as the feed resource of beef cattle in Talang Babungo.

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