

## Production and Quality of 15 Days Ages of Corn Herbage as an Alternative Concentrate Ingredient for Young Calves Diet

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### ABSTRACT

Feed takes 60% of production cost. Corn herbage can give high quality feed especially young forage because it contains high protein and it low lignification content. The objectives of this research are to get a methods of high quality forage production to increase cost feed efficiency, and to get an alternative concentrate for calves. This research is divided into three steps of experiment. The first experiment, analyzing production and nutrient corn herbage in 15 days ages; in the second, production of corn herbage and observe the effect of corn herbage on the calves; and third, analyzing forage production cost and compared it to concentrate cost. The Factorial Randomized Complete Design was selected for these experiments. The parameter including dry matter, nutrient contains, organic matter coefficient, palatability, and economic analyzis. The results showed that corn herbage production can did in small box. A tretment by soil medium and hydroponic nutrient give dry matter production is 136 g DM/m<sup>2</sup>, protein contained i.e: 18,30% and organic matter coefficient is 68%, fresh forage is very palatable and feed cost is Rp 858,-. It makes the corn herbage available to use as alternative concentrate.

*Key words: herbage, corn, calves, concetrate, alternative*

### INTRODUCTION

Forage is important ruminant feed, since it contains fibre that is very usefull for rumen health. Ruminant animals consume forage about 10% of body weight a day. Tropical forages are characterized by low quality. Fluctuation of biomass production is dominated by season. The peak of legume and grasses production are recorded in early dry season, and the lowest is in early rainy season (Hidayati, 2001). Low forage quality affects concentrate requirement by ruminant, particularly on dairy intensive farm. This is to maintain productivity and life spend of cows. Use of concentrate in dairy cattle diet leads to increase of ration cost. It is therefore use of high availability, such as 15 days corn herbage is one alternative to reduce diet cost.

Corn herbage can give high quality feed especially young forage because it contains high protein and it harvested before lignification. Corn production is fluctuative, it impacts on price. Corn get lower price when it gain higher production in rainy season since it high water contain. It be a problem for farmer to save the product. Young corn herbage is an alternative product to reduce farmer losses by cultivate corn,

harvest on young age and save it for feed in dry season. As concentrate, corn will get a higher price. It can be concentrate alternative since it crude protein contains more than 16% and low fibre.

This research analyzed productivity 15 days age corn herbage and its nutrient contains to get the best feed formulation for young calves to gain cost efficiency, especially from feed. Aim of the research are to obtain appropriate method of corn herbage production in short time, has high quality, applicable for farmer to increasing efficiency of feed cost and to evaluate nutrition value of corn herbage as concentrate alternative

### MATERIALS AND METHODS

This research was conducted at Animal Science Faculty, Bogor Agricultural University from May until November 2008.

#### 1. Corn Herbage Production

Local corn seeds were grown on soil and water media. In this stage observation on plant growth, biomass production, and optimum harvest time were conducted. This step was conducted at Laboratory of

Agrostology. The herbage production then used to estimate the requirement of calves.

**2. Nutrient Content of Trial Feeds**

Nutrient content of corn herbage including: crude protein, crude fiber, crude fat, calcium and phosphor content were analysed. Nutrient analysis of concentrate was also analysed before used.

**3. Corn herbage Production**

**4. In Vivo Test**

In vivo test was done by involving 6 calves with 100 live weight kg. The calves were reared on metabolic stable. Two weeks before feces collecting, pre condition was conducted at the third week samples were collected. This research done at Ruminant Nutrition Laboratory

**5. Cost Analysis**

Cost including feed production cost, processing cost, and transportation were calculated. The result can be a recommendation for farmer in order to increase efficiency of calves feed.

**Data Analysis**

This research use Factorial Completely Randomized Design consisting of two treatments:

1. Fertilizer, contained 3 level : without fertilizer (F0), phonska fertilizer (F1) and complete fertilizer (macro and micro) (F2)
2. Growing media, 2 level : soil (M1) and husk charcoal (M2)

The interaction of two factors result four combinations of treatments with three replicates.

**RESULTS AND DISCUSSION**

**Corn Herbage Production And Nutrient Contents**

Phonska fertilizer is a common fertilizer in used Indonesia, it can be purchased from agricultural shop. Complete fertilizer can be composed by farmer or bought. Fertilizer usage be diluted to efficiency.

Treatment of media showed a significant effect on the average value of the leaves lengths and crown dry matter. Corn herbage planted in the soil media with a complete nutrient (macro and micro) produced a higher average value of leave length than the husk charcoal medium. This is possible because the beginning of plant grown

stunted in plant roots to absorb nutrients because of the influence of the media structure husk charcoal and soil itself has contain nutrient. Schwarz (1995) suggested that the plant will have a deficiency if the essential nutrients are not available in sufficient numbers or not in a form that can be absorbed by plants, and consequently the plants will not grow well and have the abnormal structure and colour.

Table 1. Corn herbage Nutrient Analysis (15 days age)

Treatments	Parameters		
	Fat	Crude Protein %	Crude Fiber
Soil Media			
Without Fertilizer	3.70	11.90 <sup>b</sup>	21.59
Phonska Fertilizer	4.07	16.34 <sup>a</sup>	21.59
Complete Fertilizer	3.10	18.30 <sup>A</sup>	22.35
Husk Charcoal Media			
Without Fertilizer	2.98	8.41 <sup>c</sup>	22.78
Phonska Fertilizer	3.60	12.80 <sup>b</sup>	23.18
Complete Fertilizer	3.53	13.48 <sup>b</sup>	21.34

Table 2. Corn herbage Production Analysis (15 days age)

Treatments	Parameters		
	Leaves length (cm)	Crown dry matter (g)	Root dry matter (g)
Soil Media			
Without Fertilizer	43.8 <sup>A</sup>	10.0 <sup>B</sup>	11.1
Phonska Fertilizer	41.8 <sup>B</sup>	12.1 <sup>B</sup>	9.3
Complete Fertilizer	50.5 <sup>A</sup>	15.6 <sup>A</sup>	10.5
Husk Charcoal Media			
Without Fertilizer	40.0 <sup>b</sup>	9.8 <sup>B</sup>	12.1
Phonska Fertilizer	41.4 <sup>B</sup>	9.5 <sup>B</sup>	10.3
Complete Fertilizer	42.3 <sup>B</sup>	11.2 <sup>B</sup>	11.1

Nutrient analysis of corn herbage result the best value on complete fertilizer and soil media. It contained crude protein i.e.: 18.24%. Crude fiber contained in these researches was not different significantly, but on complete fertilizer treatment showed NDF gained 65%. It means that crude fiber was digestible energy by animal (Jung, 1989). Therefore, forages containing high NDF can potentially be included in finishing diets at lower concentrations, ultimately

providing finishing diets with greater NE values while preventing digestive disorders (Peters, Montgomery, Bierman, 2009).

Vegetative phase of plant growth are closely related to three processes there are cell division, elongation and the first stage of differentiation (Harjadi, 1989). In this phase of nutrient absorption occurs more rapidly, so availability is absolutely necessary for optimal growth occurs. Nutrient availability of N, P and K is the element most absorbed in the vegetative phase, but with the addition of micro elements in a complete nutrient (macro and micro) can increase the protein content is very significant compared with other treatments.

In the noon observation, the corn herbage on husk charcoal medium looked stress especially in the first week after planting. The plants looked wilted, while the media remain fresh. Inhibition of nutrient absorption in the husk charcoal medium in the early phase of growth led to the slow-growing and small plant.

#### Effect on Animal

Fresh corn herbage has high palatability. In the palatability test for two days, the calves ate all the green corn, including the roots. This is because the roots of the corn herbage were still young. Feeding in the dry form caused decreased the palatability shown by the remained feed to the average of 40 g for 2 days as a part of the livestock adaptation (Morrison, 1986).

Table 3. Dry Matter and Organic Matter Digestibility Coefficient Analysis By In Vivo Test

Treatments	Parameter	
	DMDC (%)	OMDC (%)
Concentrate: Elephant Grasses= 80: 20	30.12 <sup>a</sup>	83.39 <sup>c</sup>
Concentrate: Elephant Grasses: Corn herbage= 80:10:10	22.04 <sup>b</sup>	88.92 <sup>b</sup>
Concentrate: Corn herbage = 80: 20	20.68 <sup>b</sup>	95.47 <sup>a</sup>

Forage digestibility is generally considered to be a very useful integrated measurement of forage quality. Dry matter and organic matter digestibility analysis by in vivo test showed that corn herbage fed give significant

effect compared with elephant grasses (Table 3). Corn herbage feed decreased dry matter digestibility coefficient significantly compared elephant grasses due to dry matter of corn herbage very low (8% fresh matter). Corn herbage increases organic matter digestibility coefficient (OMDC) significantly, gained 95% on 20% calves feed. It was because the crude fiber contained in corn herbage still not lignified (Jung, 1989). On this research, corn herbage was fed as a part of introduction to forage because calves digestibility was very low (no more than 5 kg/day).

#### Economic Analysis

The cost for the first corn herbage production was shown on table 4. Cost of fresh corn herbage production will reduce after second plantation. Cost production will decreased to be Rp 858,-/kg after third plantation. Price of concentrate in this research is Rp 2,223.9/kg.

Table 4. Cost Analysis of Corn herbage Production

Treatments	Cost (Rp/kg fresh matter)
Soil Media	
Without Fertilizer	1,380.1
Phonska Fertilizer	2,818.4
Complete Fertilizer	2,758.0
Husk Charcoal Media	
Without Fertilizer	1,312.8
Phonska Fertilizer	3,244.3
Complete Fertilizer	3,208.6

#### CONCLUSIONS

Corn herbage can be produced in 15 days by local seed, use simple batch or a square from mulch plastics as constraint of water and fertilizer for production efficiently. Corn herbage production (15 days age) by soil media and complete fertilizer contains crude protein 18.23%. Corn herbage has potency to improve as concentrate alternative and the ways of corn storage and as product variation for feed.

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