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The Effect of N-Fertilizer Coating ongThe Proximate Content of Sweet Corn (*Zea mays*) Corn

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ABSTRACT: The experiment was conducted to study the effect of N- fertilizer coating on proximate content of sweet corn straw. The study was performed on regosol soil at the Agricultural Training Research and Development Center (ATRD or KP-4), Gadjah Mada University, Kalitirto, Berbah, Sleman, Yogyakarta. Five hundred meter square land was used and divided into 12 plots of 6m X 6m sized and were planted sweet corn seed at spaced of about 0.25m within rows and 0.75m between rows. Three urea fertilizer treatments were applied with four replication, namely: conventional urea application (uncoating), where urea given at the rate of 400kg per ha (T-1), and urea oil coating application given at the rate of 60% (T-2) and 40% (T-3) of T-1. Data found were then subjected to statistical analysis following the randomized complete block design (RCBD). Results of the study indicated that there were significant ($P<0.05$) effect of treatment on crude protein (CP) and on ash content. The highest ($P<0.05$) CP content was obtained at T-1 (4.36%), followed by T-2 (2.95%), and the lowest was T-3 (2.55%). The highest ash content was recorded for T-2 (8.24%) which its comparable to T-1 (8.21%), and the least ($P<0.05$) was T-3 (7.92%). Others nutrient content (crude fat, crude fiber, Ca, P and nitrogen free extract or NFE) between the treatment groups, no significant differences ($P>0.05$) were found. It can be concluded that N-fertlizer coating applied at lower rate than the uncoating (conventional) one, resulted in negative effect on CP content of sweet corn straw.

Key Words: N-Fertilizer Coating, Proximate Content, Sweet Corn

Introduction

Agriculture by products is very common for feeding ruminant animals in the villages in Indonesia. And among them, corn straw or corn stover is the second abondance after rice straw available in the country, especially during the end of rainy season or during dry season.

Reksohadiprodjo (1984) reported that there were about 3.3 million hectares of corn plantation in Indonesia, yielded of about 19.7 million tons DM of corn straw/year, in which would support of about 6.567 animal unit (AU) of cattle if the feed purely from those forages.

Sweet corn (*Zea mays, Saccharata*) native in USA (Koswara, 1982), it contains 5 to 6% of sugar, almost twice of the sugar contains in ordinary corn, however, generally this kind of corn tend to have lower rate of growth (Leonard and Martin, 1963), but it can be harvested as early as 75 days of age in Yogyakarta depend on some factors such as varieties, altitude and climate (Thompson and Kelly, 1957; Koswara, 1982; Prasojo, 1985) for direct human consumption. With increasing income of the people, and a lot of choice of food available in the market, therefore, sweet corn become very popular in many big towns such as in Yogyakarta.

Since sweet corn generally can be harvested in early stage of growth, therefore, it is expected that the stover yielded may contain higher nutritive value than the ordinary corn. Study on the effect of N-fertilizer coating on the proximate content, therefore, need to be done.

Experimental Procedurs

Study was performed at the Agricultural Training, Research and Development centre (ATRD or KP-4), UGM. Five hundred meter square of land was used and divided into 12 plots of 6 X $6m_2$ sized, and were planted with sweet corn seed at distanced of about 0.25m within rows and 0.75m between rows. Three urea fertilizer treatments were applied with four replication, namely: conventional treatment (uncoating), given at the rate of 400kg urea/ha, urea coating oil application given at therate of 60% and

40% of the conventional treatment, which are referred as T-1, T- 2, and T-3, respectively. The same level of P (150 kg TSP/ha) and K (150kg/ha) were applied in all treatment groups. Urea for T-1 were applied twice at 10 and 21 days, while for T-2 and T-3 were applied once at 10 days after the seeds growth, and harvesting was performed at 75 days of growth. Approximateley 1.0kg chopped forage samples were taken from each plots and then were were oven dried at 55°C until the weight constant. Then, samples were ground through 1mm screen in a Thomas Wiley mill. Proportional subsamples from the same treatment plots were composited. Analysis for proximate components following method described in AOAC (1975) was performed. Data recorded were then subjected to statistical analysis following randomized complete block design (RCBD) and significance of differences among means was determined by Duncan's new multiple range test (DMRT) as outlined by Steel and Torrie (1980).

Results and Discussion

During the study it showed that monthly rainfall (98mm) was slightly lower that the requirement for growing sweet corn (100 to 125mm) as reported by Anonimus (1992). Visually, it was noticed that chlorosis symptoms of the leaf were occured in all treatment groups. The hard rainfall that was happened at 35 days of growth was probably responsible for the chlorosis of the corn plantation. Karjono (1992) stated that lodging would caused the root dead, while Winarno (1991) mentioned that hard rainfall would caused leaching of N, resulted in very low N of the soil.

Proximate analysis (Table 1) of the samples showed that percentage DM of straw were varied between 28.45% (T-2) to 30.39% (T-1). There were significant ($P<0.05$) effects of treatment on CP and minerals (ash) content, but not on the ether extract (EE) crude fiber (CF), nitrogen free extract (NFE), Ca and P content of the forages.

From the analysis were found that T-1 contained higher ($P< 0.05$) CP and ash (4.36% and 8.21%, respectively) than T-3 (2.55% and 7.92%, respectively), while T-2 contained lower ($P<0.05$) CP (2.95%) than T-1, but higher than T-3, however, the ash content (8.24%) was comparable to T-1. Eventhough T-1 tend to have higher DM content, however, the EE (1.04%) and NFE content (51.42%) were slightly lower than T-2 (1.32% EE and 54.43% NFE) and T-3 (1.47% EE and 56.05% NFE).

Compared to the report given by Anggorodi (1984), on the average the DM content of corn straw in this study was considered lower, but higher than the report written by Bo Gohl (1980) and Crampton and Harris (1969), and comparable to the report from Japan (Fukumi et al, 1990). Whiteman (1980), Crowder and Chheda (1982), and Tillman et al (1984) stated that DM content of forages was affected by stage of growth of the plant, the more mature the plant the higher the DM content of the forages will be. The CP contents found in this study were very low, because it only content about 23% to

Table 1. Nutritive value (%) of sweet corn straw (DM basis)

Nutrients	Treatments		
	T-1	T-2	T-3
Dry matter (DM)	30.39	28.45	28.71
Crude protein (CP)	4.36[a]	2.95[b]	2.55[c]
Ether extract (crude fat or EE)	1.04	1.32	1.47
Crude fiber (CF)	34.97	33.06	32.01
Crude ash (minerals)	8.21[a]	8.24[a]	7.92[b]
N-free extract (NFE)	51.42	54.43	56.05
Ca	2.80	2.19	2.62
P	0.75	0.67	0.79

Means with different superscripts are significantly different at the 5% level probability.

42% of the CP corn straw as documented by Bo Gohl (1980), Amalija (1992) and Bahrun (1994). The low CP content in this study was probably due to the hard rainfall occured at 35 days of growth. According to Winarno (1991), palm oil consisted of short chain saturated fatty acid which its very easy to be hydrolized by water into glyserol and fatty acid, therefore, under excess of water urea coating with oil-palm is meaningless. The ash content in this study (7.9% to 8.2%) was higher than stated by McDonald et al (6.0%, 1973), but lower than the data reported by Hartadi et al (10.2%, 1986) and by Bahrun (9.2% to 9.9%, 1994). While the EE, CF and NFE contents were slightly higher than the report from Malaysia, Israel and Tanzania obtained by Bo Gohl (1975), but almost the same to the report from Japan (Fukumi et al, 1990). The Ca and P contents found in this study were superior, almost three times for Ca and ten times for P than those found in corn fodder as recorded by Crampton and Harris (1969). The differences in nutritive contents of corn straw can be attributed to the different varieties, stages of growth, soil fertility and or management practices applied.

Implication

Based on this study it can be concluded that N-ferttilizer coating with oil palm given at the rate of about 40% and 60% were not able to equalized the protein content of corn forages, however, other nutrients content in the proximate analysis were comparable to the conventional application (uncoating) given at recommended rate (400kg urea/ha). For feeding ruminant purpose, protein from other feed sources have to be added and ratio of Ca and P requirement must be considered.

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