

Sugarcane Tops: The Next Promising Industry in Negros

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Abstract – *Sugarcane Tops is a bulk crop residue of sugarcane plant which is often left in the field and burnt to speed up land preparation. This tonnage of sugarcane by-product can be utilized but turns to be contributory factor to pollution. This study determined the biomass, nutritional value and total production of sugarcane tops using the top five varieties (VMC 84-524, VMC 84-947, VMC 86-550, PHIL 83-331 and VMC 88-354) by Sugar Regulatory Administration (2013-2014) at 8-9 months. Data gathered in 30 sites around Negros with 3 samples collected in every site. Weight of Sugarcane millable stalk, tops and trash were recorded and analyse using means and percentage. Dried SCT samples were analyse on its nutrient composition. The total production of tops is calculated based on the percent biomass multiplied by the production per crop year. Results revealed that the average biomass of SCT in Negros is 1.817 kgs. of which comprises the following: 70.15% millable stalk, 20.55% sugarcane tops and 9.30% trash. Laboratory analysis shows that SCT has % CP of 7.42, Gross Energy of 4,356.67, % Crude Fiber of 22.54, % Crude Fat of 5.63 and % Ash of 5.48 which is comparable to the nutrient composition of nappier which is commonly feed to ruminant animals. The total sugarcane tops production for the crop year 2013-2014 is about 2,650,659 tons. Based on findings, SCT has a bigger potential in sustaining ruminant production and be able to minimizes the burning in field. Increase ruminant production through crop-livestock integration in Negros will eventually lower importation of meat and dairy products in the country.*

Keywords: *Industry, sugarcane tops, production, utilization*

INTRODUCTION

Negros Island is known to be the sugar basket of the Philippines. More than half of the available agricultural lowland is sugarcane plantation that produces about 53% of the total national production [1]. Productivity in terms of tonne cane harvested per hectare, Philippines has an average annual production of about 60 tons per hectare [1].

The sugarcane top consists of 3 distinct parts: the green leaves (blades), the leaf sheath bundle and a variable amount of young leaves or the green plant tips [3]. The yield of sugarcane tops varies considerably with crop variety, age at harvest, growing conditions and management practices [3]; [4]. Research on Sugarcane tops accounts about 16-18% of the total biomass production or about 28% of the weight of the stalk [5]. This tonnage of sugarcane by-products can be utilized by ruminant animal and bio fuels but turns to be pollutant and reduce soil fertility. This bulk crop residue of sugarcane (consist of sugarcane tops and trash) after harvest are often left in

the field and burnt to speed up land preparation. Sugarcane burning practice is detrimental to the nutritive value of sugarcane tops [2] at the same time causes the depletion of ozone layer through methane gas emission.

Recently, several efforts have been conducted to minimize the negative environmental and human health impacts associated with burnt harvest system in sugarcane plantation. Sugarcane tops particularly the immature stalks, are highly palatable to livestock [6]. Green farming System, forming a straw mulching on the soil surface which benefits a long-term soil quality and crop productivity [7]; [8]; [9]; Alkali-based pre-treatment of Sugarcane baggase and cane leaf for ethanol production [10]; Sugarcane tops as feed to Ruminant animals [11]. Pre-treatment of Silage sugarcane tops to increase digestibility in Ruminant [12]. Sugarcane tops supplemented with urea resulted in a better utilization of the roughage, which was reflected in body weight gain [13].

The study aims to determine the average biomass of sugarcane stalk and the percent composition in terms

of: millable stalk, sugarcane tops and trash considering the new varieties and management practices employed. Nutrient analysis of sugarcane tops was also analyzed such as % Dry Matter, %CP and %ash by method of AOAC (1990) and GE was analysed using diabolic bomb calorimeter. The total sugarcane top production for the crop year (2013-2014) is done through calculation of the percent tops multiplied by the average production per crop year. This becomes the basis of exploring potentials ventures for maximizing sugarcane crop residues of which trashes burning will be reduce and higher productivity of farmers will be achieved.

MATERIALS AND METHODS

The research covers the whole province of Negros region with 30 different sample sites of which sugar centrals are located. The samples collected belong to the top five varieties of sugarcane which includes (VMC 84-524, VMC 84-947, VMC 86-550, PHIL 83-331 and VMC 88-354). Three samples (8–9 months) were gathered from every site. Sample sites are plotted in a geographical information systems (GIS) using coordinates.



Fig.1 The Site where samples were Collected.

Data Gathering Procedure

The data were collected from thirty (30) different sites around Negros region where there is Sugar Central within its service area. Collected samples were weight in terms of total weight of sugarcane, weight of the harvestable or millable stalk, weight of sugarcane tops and weight of trash. Average weight of sugarcane, millable stalk, sugarcane tops and trash are analyze using means and percentage. Sugarcane tops were then chopped about 2-3 inches and sundried for 3-4 days grounded and brought along to the laboratory for analysis.

Dried SCT were grounded using hammer mill and pass through a 3 mm screen oven dry at 60°C for 48h; analyzed for dry matter (%DM), crude protein (CP) analysis using Kjeldahl method, Gross Energy using Bomb calorimeter test, ash, Crude Fat and Crude Fiber at VSU nutrition laboratory.

RESULT AND DISCUSSION

Biomass of Sugarcane Stalk

The average weight of collected sugarcane stalk and the composition of millable stalk, sugarcane tops and trash around Negros region are presented in table 1. Average size of sugarcane stalk is 1.817 of which the average millable stem, tops and trash are 1.272, 0.373 and 0.169 respectively. The average percentage composition of millable stalk, tops and trash in sugarcane stalk of 8 – 9 months reveals that of the five leading varieties it has 70.10% harvestable stalk, 20.55% sugarcane tops and only 9.35% trash yield. Sugarcane tops accounts for 16-18% of the total biomass production or about 28% of the weight of stalk [5], but this is influence by crop variety, age at harvest, growing conditions and management practices [3]. This signifies further that the new varieties the region is using yield more tops compared to others thus, producing more volume of crop residue.

Table 1. **The Average Weight of Sugarcane Stalk (kg) at 8-9 months**

Location	N	Min.	Max.	Sum	Mean	Std.
						Deviation
Location	90	1	30	1395	15.50	8.704
Sample	90	1.05	2.62	163.55	1.8172	.36149
Valid N	90					

Table 2. The Average composition of Sugarcane Stalk (kg) and its (%) composition

Weight of Stem	Weight of Tops	Weight of Trash	Total Weight of Stalk
1.272	0.373	0.169	1.817

Nutritive Value of Sugarcane Tops

The chemical composition of chopped-dried sugarcane tops are presented in table 2. This table shows the results on analysis of nutrients on the sugarcane tops gathered around Negros region. This data correspond the analysis of Top 5 leading varieties for 2015 as released by SRA office which includes (VMC 84-524, VMC 84-947, VMC 86-550, PHIL 83-331 and VMC 88-354). The nutrients composition of Sugarcane tops is 7.42 % Crude Protein, 4,356.67 Gross Energy, 22.54 % Crude Fiber, 5.63% Crude Fat and 5.48 % Ash which is analyze at VSU nutrition laboratory. This further implies that new variety of sugarcane planted has higher nutritive value than the old one which is a good source of roughage for animal production. The yield of sugarcane tops varies considerably with crop variety, age at harvest, growing conditions and management practices [7], [8], [9].

Production of Sugarcane Tops

The country has a total of 423,333 covering the crop year 2013-2014 around 20 provinces within the 10 regions with an average production of 59.07 TC/Ha [1]. Negros having 53% of the countries production, sugarcane tops production of about 20.55% means an estimated of total production of 2,650,659 metric tons.

Table 3. The Nutrient Analysis of Sugarcane Tops

% Crude Protein	Gross Energy	% Crude Fiber	% Crude Fat	% Ash
7.42	4,356.67	22.54	5.63	5.48

Table 4. Total Production of Sugarcane Tops for CY (2016-2017)

Negros Total area Planted (Ha)	Average TC/Ha	Total Yield of Sugarcane (ton)	Total Yield of SCT (ton)
224,336	59.07	13,253,299	2,650,659

CONCLUSION AND RECOMMENDATION

Based on finding, Sugarcane tops increases its biomass availability using the top five new varieties release by SRA with a composition of 20.55% of the

sugarcane plant. Nutritive composition of Sugarcane tops comprises of 7.42 % Crude Protein, 4,356.67 Gross Energy, 22.54 % Crude Fiber, 5.63% Crude Fat and 5.48 % Ash. Knowing the nutritive value of SCT will enable farmers to look into possibilities of utilizing this crop residue which has a bigger potential in sustaining ruminant production aside from minimizing field burning considering the volume of about 2,650,659 tons per crop year throughout the region. Therefore, it is recommended to utilized sugarcane tops as feed to ruminant animals to increase ruminant production through crop-livestock integration. Looking also on developing a processing strategies in order to preserve and stored SCT which is an annual crop making it available to the farmers all through out the year. This eventually helps lower importation of meat and dairy products in the country.

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