

# Utilization of Bio Slurry with Input of Buffalo Faeces and Water Hyacinth (*Eichornia crassipes*) With Various Doses of MOD (*Microorganism Decomposer*) on Productivity of Kelor (*Moringa oleifera*) in Samosir.

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**Abstract.** *This study aims to determine effects of utilization of Bio-Gas Slurry With buffalo Feces Input And water hyacinth with Various Dosage MOD (Microorganism Decomposer) on Productivity of Moringa oleifera. Research conducted at the field experimental, Samosir Sumatra Utara in April-November 2017. The design used in the study was split plot design with four replications. First factor (M): dosage decomposer, M1= 1 liters/150 kg and M2= 2 liters/150 kg. Second factor (P): dosage was fertilizer of Bio-Gas Slurry With buffalo Feces Input And water hyacinth (ton/ha/year), P0=0, P1=20, P2=40. The variable were plant height, stem diameter and number of branches.*

*The results showed that dosage decomposer and dosage of fertilizer Bio-Gas Slurry significantly affect plant height, stem diameter and number of branches Moringa oleifera. The utilization of Bio-Gas With buffalo Feces Input And water hyacinth with Various Dosage MOD affect plant height, stem diameter and number of branches. It is concluded that dosage 2 liter/150 kg and application 40 ton/ha/year show higher on production of Moringa oleifera.*

**Keyword:** *Bio-Gas Slurry, Buffalo faeces, Water Hyacinth, Productivity, Moringa oleifera*

## 1. Introduction

One type of livestock that many people maintain in the District of Samosir is buffalo cattle. The population of buffaloes in Samosir Regency reaches 28,181 in 2015. Waste buffalo is an organic material that is easy to decompose so that if not managed properly can cause environmental pollution either biology, chemical or physical.

Livestock manure can be utilized as a source of biogas and compost energy. In addition to producing biogas as energy, anaero fermentation also produces a biogas slurry of follow-up results that can be used as organic fertilizer.

Slurry of bio gas which is a by product of bio gas technology can be utilized as a source of organic soil material like manure, Sluri useful for the fertilization of vegetables, fruits and trees / perennials. Slur gas bio has an advantage when compared to manure or compost is slurry has nutrients that can be exploited by plants Ginting and Mustamu [1]. Suzuki *et al* [2] shows that bio gas slurry is rich in macro elements, N, P, and K and micro elements such as Ca, Mg, Fe, Mn, Cu and Zn.

Other than that, the development of uncontrolled hyacinth is also a problem in Lake Toba. One way of utilizing water hyacinth is used as raw material for compost fertilizer (organic fertilizer).

The low productivity of livestock in small farms in rural areas is caused by livestock fed only low nutrient content, especially Kelor (*Moringa oleifera*) protein having a high level of forage production. Moringa

oleifera has a complete amino acid content. Contains 18 amino acids consisting of (eight) essential amino acids and 10 nonessential amino acids Makkar and Becker [3].

## 2. Materials and Research Methods

The research was conducted in Parbaba Village, Pangururan Subdistrict, Samosir Regency, Sumatera Urata. The study lasted for 7 months with 2 weeks land preparation and was conducted from April to November 2017.

The materials used were legume seeds of 2-month-old *Moringa oleifera*, slurry of buffalo feces and water hyacinth, water, MOD. The tool used is hoe, gembor, meter gauge, machetes, oven, electric scales, data books, calculator, slider, measuring tape, plastic strap, envelope, biodigester 150 kg of 2 pieces. The experimental design used is a split plot design using two factors, namely:

I. The first factor used as the main plot is the MOD dose

M<sub>1</sub> = Fertilizer slurry buffalo and water hyacinth feces with 1 liter / 150 kg

M<sub>2</sub> = Fertilizer slurry buffalo and water hyacinth feces with MOD 2 liter / 150 kg

II. As sub plot (sub plot) is a different dose of fertilization each treatment, among others:

P<sub>0</sub> = Without the use of bio-slurry fertilizer

P<sub>1</sub> = Given a slurry gas fertilizer with a dose of 166g / plot (20 ton / ha / year)

P<sub>2</sub> = Given a slurry gas fertilizer with a dose of 333g / plot (40 ton / ha / year)

The data obtained will be analyzed, and if the treatment is significantly different ( $F \geq 0.5$ ) or very real ( $F$

$\geq 0.1$ ) then further tested by using Duncan test. The research parameters were plant height, stem diameter, fresh weight production, and dry weight production

### 2.1 Plant height

Plants were measured till before harvesting to obtain high plant values from each treatment. Plant height is measured from the soil surface to the highest part of the *indigofera zollingeriana* plant.

### 2.2 Stem diameter

Measurement of stem diameter was 10 cm above the ground by clamping the stem of the plant with a sliding range. Furthermore, the measuring lever shifted until it did not move anymore and visible numbers on the slide.

### 2. Number of branches

Preliminary data retrieval was performed on 2-month-old plants after trimming. Then the next data is taken at the time of second and third defoliation at 4 and 6 months old. Preliminary data retrieval was performed on 2-month-old plants after trimming. Then the next data is taken at the time of second and third defoliation at 4 and 6 months old.

## 3. Results and Discussion

Table 1. Results of analysis of slurry with buffalo faeces and water hyacinth input with various doses of MOD.

No.	Parameter	Unit	MOD (liter)	
			1	2
1	C-Organik	%	3,82	4,12
2	N total	%	0,26	0,35
3	C/N	-	17,69	15,16
4	P <sub>2</sub> O <sub>5</sub>	%	0,46	0,52
5	K <sub>2</sub> O	%	0,73	0,54

  

Dose MOD	Fertilization Dose(ton/ha/yr)			Average
	0	20	40	

<b>Plant Height</b>				
1	117	119,75	140,75	125,833 <sup>B</sup>
2	119,25	131,5	145,75	132,167 <sup>A</sup>
<b>Average</b>	118,12 <sup>C</sup>	125,62 <sup>B</sup>	143,25 <sup>A</sup>	
<b>Stem Diamete</b>				
1	10,38	13,31	16,67	13,45 <sup>B</sup>
2	11,50	15,55	21,98	16,34 <sup>A</sup>
<b>Average</b>	10,94 <sup>C</sup>	14,43 <sup>B</sup>	19,33 <sup>A</sup>	
<b>Number of branches</b>				
1	13,5	17,25	22,5	17,75 <sup>B</sup>
2	13,25	21	32,75	22,33 <sup>A</sup>
<b>Average</b>	13,37 <sup>C</sup>	19,12 <sup>B</sup>	27,62 <sup>A</sup>	

### 3.1 Chemical Composition of Slurry

Laboratory test showed that on slur of bio gas with buffalo faeces input and water hyacinth have C / N ratio with MOD 2 liter and 1 liter equal to 15,16 and 17,69 and already fulfill SNI standard. The result of analysis of bio gas slurry with buffalo faeces and water hyacinth inputs can be categorized quite well because of the C-organic MOD content of 2 liters and 1 liter of 4.12 and 3.82, N-total of MOD 2 liters and 1 liter of 0.35 and 0.26, and C / N ratios of 15.16 and 17.69. Slurries that have matured tend to be solid, light brown or green and tend to be dark, little or no gas bubbles, odorless and do not invite insects. Both liquid and solid slurries are classified as organic fertilizers because all of the ingredients are derived from organic materials ie fermented manure that has been fermented Tanti et al [4].

### 3.2 Plant height

The high value of plants using bio-slurry fertilizer with buffalo and water hyacinth input (*Eichornia crassipes*) with MOD 2 liter (M2) of 132,167 cm, there is a tendency of higher growth rate when compared with MOD 1 liter (M1) 125.83 cm. This is because the nutrient content of fertilizer (M2) has a nitrogen content of 0.35 higher than the fertilizer (M1) that is equal to 0.26 so that plant growth is fulfilled. This is in accordance with wahyuni's [5] statement stating that Nitrogen is one of the main nutrients needed throughout the plant including legumes for optimal growth and production.

The highest value of plant height of each treatment of dosage of sluron bio fertilizer was found at treatment of 40 ton / ha / yr (P2) dose of 143,25 cm and the lowest plant height was found in treatment of 0 ton / ha / year (P0) of 118.12 cm. Factors in including genetic traits in the form of genes and hormones. While external factors include macro nutrients and micro nutrients contained in the soil. This is in accordance with Hapsari [6] statement stating that organic fertilizer is very beneficial to increase agricultural production both quality and quantity, can reduce environmental pollution, and improve the quality of land in a sustainable manner.

### 3.3 Stem diameter

The highest value of stem diameter of *Moringa oleifera* stem using bio-slurry fertilizer with buffalo and water hyacinth input with MOD 2 liters (M2) of 16.34 mm, there is a tendency to have a higher growth rate when compared with slurry biofuel fecal input buffalo with water hyacinth with 1 liter MOD (M1) that is equal to 13,45 mm. This is because the nutrient content of the fertilizer (M2) has higher content than the fertilizer (M1) because the microorganisms contained in the M2 fertilizer is larger and therefore stimulates the development of the plant stems. This is in accordance with the statement of Dobermann and Fairhurst [7] which states that the role of N elements in the most important crop is as a compiler or as the basic ingredients of protein and the formation of chlorophyll because N has the function of making parts of plants to be greener, containing many grains green and most importantly in the process of photosynthesis, accelerate plant growth.

The highest value of stem diameter per treatment of dosage of bio-slurry fertilizer with buffalo and water hyacinth (*Eichornia crassipes*) faucet was found at treatment of 40 tons / ha / year (P2) of 19.33 mm and the lowest diameter of stem was treated dose 0 ton / ha / yr (P0) that is equal to 10,94 mm. This is due to the fulfillment of nutrients on the soil with slurry. This is in accordance with the statement Hardjowigeno [8] which states that fertilizer contains N, P, K, so as to stimulate the growth of stem diameter.

### 3.4 Number of branches

The highest value of branch number of *Moringa oleifera* using bio-slurry fertilizer with buffalo and water hyacinth input with 2 liters MOD (M2) of 22.33, there is a tendency to have a higher growth rate when compared with slurry bio buffalo input water buffalo feces with water hyacinth with 1 liter MOD (M1) that is equal to 17,75. This is because the nitrogen content required for plant growth is met and also the higher the plant the number of branches also increases. This is in accordance with the statement Parnata [12] which states that Nitrogen is very useful to stimulate the growth of leaves.

## 4. Conclusions

The higher use of slurry from buffalo faeces and water hyacinth (*Eichornia crassipes*) can increase the production of plant height, stem diameter, number of branches of *Moringa oleifera*. The best treatment was 2 liters / 150 kg of MOD with a fertilization dose of 40 ton / ha / yr.

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