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## The Effect of Waste Bagasse (*Saccharum sp*) Fertilizer toward Growth of Peanuts (*Arachis hypogaea L.*)

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### Abstract

The process of sugar cane into sugar which is carried out in the sugar mill produces bagasse obtained from the milling process around 32% of the total cane processed. Sugarcane production in Indonesia in 2007 amounted to 21 million tons, the potential of bagasse produced about 6 million tons of bagasse per year. Up until now almost every cane sugar mills uses bagasse as boiler fuel, animal feed mixes and the rest are burned or thrown away. One of alternative solid waste management is to turn solid waste into compost. The purpose of this research is to understand the effect of bagasse fertilizer on growth and progress of peanut plants (*Arachis hypogaea L.*). Bagasse fertilizer made using cow dung as bioactivator. Bagasse obtained from several places in Semarang mashed with finely enough size. Then, with a ratio of cow dung and bagasse 1: 3. Placed in a container then mix and sealed until there is no incoming air. Every 4 or 5 days in 4 weeks is being inverted. After 4 weeks it will get bagasse fertilizer with characteristic brown color, odorless and slightly moist. This research uses three treatments there are peanuts with mixed bagasse fertilizer on the soil medium, compost on the soil medium, and without fertilizer then measured the progress for 14 days. After 14 days, so it obtained an average of plants height and number of leaves. Respectively, are 2.10; 1.38; 2.24 while the number of leaves are 2.55; 2.66; 3.22.

**Keywords:** bagasse, peanut, fertilizer

## A. Introduction

Peanuts are one source of food that is quite important in Indonesia, as the source of vegetative protein. Peanuts are also very important to be expanded because of in terms of productivity, peanuts that cultivated in Indonesia is still low, at only about 1 ton/ ha. The results achieved level of productivity is only a half of the potential yields when compared with the USA, China, and Argentina which has reached more than 2.0 tonnes / ha (Adisarwanto, 2000). Differences in the level of peanuts productivity does not particularly caused by differences in production technology that has been applied to farmers, but due to the influence of other factors: the nature or character of agroclimate, the intensity of pests and diseases types, varieties of planted, harvesting and farming operation . According to the results, the efforts towards the improvement of peanut plants need to be done, especially creating an appropriate environment for the growth of peanut plants. There are several ways in connection with these efforts, one of them is with the application of organic fertilizers and soil treatment system (Suwardjono, 2001).

Many soil nutrients are needed by plants and are often getting deficiency on the ground such as N, P, and K. unfulfillment of one nutrient, will decrease the quality and quantity of peanuts production. The nutrients N, P, and K in the soil are not enough available and will be reduced because they are taken for growth and carried away when harvest, washed, vaporized, and erosion. To suffice the nutrient deficiencies of N, P, and K, it must be done the fertilization. The suitable fertilizer that can suffice the nutrient requirements as well as is Phonskafertilizer (Phosphorus Nitrogen Sulphur Potassium). Its nutrient content of 15% N, 15% P, 15% K (Sitorus, 2004). Bagasse is a waste material that is usually dumped in open dumping without further management, so that will cause environmental disturbance and bad odor (Cahaya dan Dody, 2012).

The process of sugar cane into sugar which is carried out in the sugar mill produces bagasse obtained from the milling process around 32% of the total cane processed. In the sugarcane production in Indonesia in 2007 amounted to 21 million tons, the potential of bagasse produced about 6 million tons of bagasse per year. Up until now almost every cane sugar mills use bagasse as boiler fuel, animal feed mixes and the rest are burned or thrown away. (Hamawi, 2005). According to Birowo (1992) bagasse that resulting from the squeezing process, only 50% had been utilized, for example as fuel in the production process, but the rest is still wasted and need more serious care to be reprocessed. One alternative solid waste management is to turn solid waste into compost or composting (Abilash and Singh, 2008). According to research have been done by Guntoro Dwi (2003) explain that dry bagasse content of water 15.86%, content of C 13.324%, content of N 0.422% , C / N 31.57, and pH is 7. The purpose of this research was to understand the influence of bagasse fertilizers to the growth of peanuts (*Arachis hypogaea L.*).

## B. Methodology

The method that used is quantitative method by analyzing the length of the plants, and the number of leaves among the treated by bagasse fertilizer, compost and without fertilizer.

### 1. Method of Making Bagasse Fertilizer

Bagasse fertilizer made using cow dung as bioactivator. Bagasse obtained from several places in Semarang mashed with finely enough size. Then, with a ratio of cow dung and bagasse 1: 3. Placed in a container then mix and sealed until there is no incoming air. Every 4 or 5 days in 4 weeks is being inverted. After 4 weeks it will get bagasse fertilizer with characteristic brown color, odorless and slightly moist.

### 2. Data Collection Methode

Methods of data collection using experimental methods to analyze the length of plants, and number of leaves the untreated and treated with bagasse fertilizer and compost as a sample. This research was conducted by analyzing the effect of bagasse fertilizer in the growth of peanuts (*Arachis hypogaea L.*). The growth of peanuts without treatment, treatment with bagasse fertilizer and compost each day is measured by using a ruler for 14 days. The growth of peanuts seen from plants length, and number of leaves for 14 days. Fertilizer application on samples made by mixing bagasse fertilizer with red soil. Compared to bagasse fertilizer and soil is 1: 3, then stirred and placed 6 seeds of peanuts with the most excellent quality. Then observe the difference between peanut-treated bagasse fertilizer, compost, and without treatment.

### C. Result and Discussion

The results of observations on growth and development of peanut plants (*Arachis hypogaea* L.) that given treatment by bagasse fertilizer with cow dung bio-activator, with a ratio of 4: 1 after analysis showed that the peanut-treated bagasse fertilizer influence on plants length, and leaves. The measurement results can be seen in the results table the average growth of plants and leaves of peanut plants for 14 days.

Based on the results, influence the using of compost and bagasse fertilizer to the growth of peanut plants (*Arachis hypogaea* L.) which the plants height data taken for 14 days:

Table 1. Average height

Peanut plants	Without treatment	Compost	Bagasse fertilizer
1	2,13	1,38	2,25
2	2,03	-	1,72
3	2,16	-	2,76
<u>Average</u>	<u>2,10</u>	<u>1,38</u>	<u>2,24</u>

At first, the research has been done by planting six peanut seeds. However, there are only 3 seeds in the ground that can grow in the soil that was not given the addition of fertilizer and soil with the addition of bagasse fertilizer. While on soil which the addition of compost only grow one seed peanuts. This research was conducted with watering every day for 14 days, also measuring the height of plants and the calculating the number of leaves.

In general, with the addition of fertilizer, the plants will be faster growing and more fertile than plants which not fertilized at all. Fertilizer application did not make peanut plants grow faster. However, the advantage in the fertilizer bagasse visible when the all media is not watered for two days. In pot 3 shows that the soil is still moist and wet, while the second pot still slightly moist, while pot 1 getting dryness of the soil so that plants are also drying up.

The using of planting medium influence on peanut plants height. Using of the planting medium which only the soil without adding fertilizers produce peanut plants 14 days old with an average height of 2.10 cm. In media supplemented with compost, obtained the average height 1.38 cm tall peanut plants. While for medium which add by fertilizer from bagasse obtained an average height of 2.24 cm.

Tabel 2. Average number of leaves

Peanut plants	Without treatment	Compost	Bagasse fertilizer
1	2,22	2,66	2,66
2	2,22	-	3
3	3,20	-	4
<u>Average</u>	<u>2,55</u>	<u>2,66</u>	<u>3,22</u>

The using of planting medium also affect the number of leaves produced peanuts plants aged 14 days. In the peanut plants that uses soil medium without fertilizer obtained peanuts plants aged 14 days with number of leaves 20 strands with an average of 2.55. For the planting medium which added by compost, have 16 strands leaves with average of 2.66. And on media supplemented with bagasse fertilizer obtained plants with 20 strands leaves with an average of 3.22. From tables 1 and 2, it can be seen that the plant height and number of leaves peanuts with bagasse fertilizer shows more rapid growth, because that bagasse fertilizer containing macro nutrients calcium. This is in accordance with the opinion of Suprayitno, 2016 that this element is most responsible in the growth of cells. Calcium strengthens component, and set the penetrating power, and treating the cell wall. Its role is crucial in the growing point of the root.

### D. Conclusion

Based on the results of this research concluded that the addition of compost and bagasse fertilizer greatly affect the length growth of plants and the number of leaves on the peanut plants. The results obtained by the length growth of plants for planting medium without fertilizer obtained an average growth of 2.13 cm, the planting medium is added compost have an average of 1.38 cm, while the planting medium added by bagasse fertilizers have average plant growth of 2.25 cm per day. Besides on plant growth also affects the number of leaves produced. In the planting medium without the addition of fertilizer for 14 days obtained leaves number 20 strands. In the planting medium which added by compost for 14 days obtained as

much as 16 strands of number of leaves, whereas in the planting medium which added by bagasse fertilizer for 14 days obtained the number of leaves as much as 20 strands.

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