

# Increasing Sweet Corn Production: Fertilizing *Zea Mays Saccharata*, *Sturt* Context in Pekanbaru. Indonesia

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**Abstract.** Sweet corn production in Pekanbaru is still low when compared with national production. This is due to environmental factors dominated by the Red Yellow Podsolik lands (PMK). The data were analyzed by qualitative descriptive by comparing between fertilized and untreated fertilizers and compared with descriptions of sweet corn yields that can be achieved. Fertilization in the cultivation of sweet corn proved to increase the yield of sweet corn in various regions. The soil for sweet corn cultivation in Pekanbaru should be given organic or inorganic fertilizers and organizer substances. The combination of organic and inorganic fertilizers is recommended to be tested, this is related to the efficient use of inorganic fertilizers. Biological organic fertilizers are recommended to be tested on sweet corn cultivation in locations with PMK type of soil.

**Keywords:** Qualitative Descriptive, Sweet corn, Red yellow Podsolik.

## 1. Introduction

Pekanbaru is a very rapid city of population growth. Pekanbaru is also a destination city of urbanization from the region and from other provinces, consequently, the increase in the population increased dramatically from year to year. This increase in population is correlated with increasing demand for food. Sweet corn (*Zea mays saccharata*) is one of the alternative foodstuffs that can be used to meet those needs. Sweet corn contains the nutrients needed by the human body and is a popular food item. The sweet taste makes this commodity become one of the superior product to be developed in Pekanbaru. Sweet corn production in Pekanbaru is still low when compared with national production. This is due to environmental factors dominated by the Red Yellow Podsolik lands (PMK). Soil PMK can be exploited so that it is efficient if given organic or inorganic material when used for cultivation process of plants. Research on the addition of organic or inorganic fertilizers to sweet corn cultivation proves to improve yield, but the results obtained have not met the desired target achievement. The purpose of this research is to know the increase of sweet corn production which given by organic or inorganic fertilizer and make fertilization recommendation for sweet corn cultivation in Pekanbaru.



## 2. The Theory and Hypothesis

The sweet corn plant requires N 150-300kg hectares<sup>-1</sup>, two to four times larger than the regular corn crop of Soeprapto, in Simanihuruk, Nusantara, and Faradilla, (2002). Sweet corn is a plant that needs enough N-nutrients during the cultivation process so that fertilizer containing N is given three times in its life cycle (Surtinah, and Nurwati, 2018). Provision of fertilizer in plants must meet the three main requirements of the right dose, right and timely manner. Exactly the dosage means the fertilizer given in accordance with the needs of the crop, exactly the way the fertilizer intention is given to the plant by spraying, sowing, ditugal, or in other ways that can easily be absorbed by plants to spur its growth and development. Timely is the time of administration in accordance with the growth and development of plants (Surtinah, 2017).

Leaf fertilizer given to sweet corn plants, with concentration as recommended, and given by spraying into the leaves of the plant, has not been able to raise the sugar content of sweet corn seeds, due to weather conditions at the time of the research is in the rainy season so the effectiveness of fertilizer is sprayed through the leaves are reduced (Surtinah, 2007). Ramadhani, Roviq, and Maghfoer (2016), reported that sweet corn crops given Urea fertilizer at a dose of 138 Kg hectares yielded the best weights of 312.67 grams of crop<sup>-1</sup>, with three stages. Pradipta, Wicaksono, and Guritno (2014) reported that the application of potassium fertilizer with doses of 150 kg hectares<sup>-1</sup>, yielded the highest weighted cob weight of 238.26 grams, compared with the application of 100 kg hectare<sup>-1</sup> potassium fertilizer, ie 216.26 grams.

Hidayah, Puspitorini, and Setyia (2016) stated that the application of Urea fertilizer with doses of 200 kg hectare<sup>-1</sup> significantly affect the growth of sweet corn plant at 14 days after planting. La Habi (2016) reported that sweet corn planted with Ponska fertilizer combined with 12 ton hectare<sup>-1</sup> granule compost could reduce the use of inorganic fertilizers by 32%. Risal, Hawalid, and Aminah (2017) treat different organic and inorganic fertilizers in sweet corn, and the results obtained on the weight of cobs are 165 grams of plant<sup>-1</sup>. The nutrient uptake of N, P, and K occurring in sweet corn plants can improve the quality of yield and crop production, and high N uptake stimulates dry weight of plants, while nutrient uptake of K stimulates against the quality of starch and sweet corn sugar (Libra, Muslikah, and Basit, 2018). The N uptake was positively correlated with the weight of the sweet corned mackerel, this was reported by Utomo, et.al., (2016). Sweet corn production reached 4.50 kg plot<sup>-1</sup> when the sweet corn plant was given a combination of organic fertilizer plus formula 3 and dosage, 1000 kg hectare [1].

## 3. Methods

This research is a case study research, one of descriptive research, with reference to quantitative and qualitative data, obtained from secondary data based on the results of research that has been done either directly conducted by the author or through research journals. The data were analyzed by qualitative descriptive by comparing between fertilized and untreated fertilizers and compared with descriptions of sweet corn yields that can be achieved. Quantitative analysis technique is conducted to compare the achievement of sweet corn production growth based on the measurement of appearance, while the qualitative analysis based on the quality measurement obtained from sweet corn result from the application of fertilizer.

## 4. Results and Discussion

Research conducted by giving the treatment of organic or inorganic fertilizers, or by adding growth regulator aims to increase the production of sweet corn. The treatment of fertilizer in sweet corn crop generally improves yield, but still not satisfactory when compared with the description of the sweet corn plant.

**Table 1.** Heavy cobs weighing sweet corn given Bio Extrim and Hormax.

Treatment of Bio Extrim (BE)	Zpt Hormax			
	without zpt	2 ml L <sup>-1</sup>	4 ml L <sup>-1</sup>	6 ml L <sup>-1</sup>
Without BE	270.69 a A	394.96 c A	380.00 b A	406.58 d A
BE 10 ml L <sup>-1</sup>	398.07 c B	376.93 b B	434.51 d B	346.15 a B

Source: research data (Surtinah, 2017)

The weight of cobs of sweet corn increased compared to without the application of Bio Extreme fertilizer, and the weight of cob weighing will be better if sweet corn plant gave growth hormone regulator Hormax with concentration 4 ml L<sup>-1</sup>. This shows that sweet corn plants when given fertilizer treatment will give better results than when sweet corn crops are not given any treatment. This phenomenon shows that planting media in research location lack of nutrients for the growth and production of sweet corn, so at that location when used for planting sweet corn is recommended to add nutrient stove in accordance with the needs of the plant.

**Table 2.** Heavy cobs weighing sweet corn with the provision of potassium fertilizer.

Dosage of potassium kg hectare <sup>-1</sup>	Heavy cob weights (g)
50	206.15 a
100	216.92 ab
150	238.26 b

Source: research data (Pradipta, et al,2014)

The weight of the sweet-corned cobs fed with Potassium fertilizer increases with the increase in the amount of K fertilizer provided. This illustrates that corn plants require elements of K in the process of growth and production. Sufficient potassium is available and absorbed by the plant will be used for various metabolic processes that occur during growth and production period. K<sup>+</sup> is absorbed by plants will affect the opening of stomata, which will affect the process of photosynthesis, and the resulting photosynthate will be used by plants to meet their life needs. Organic fertilizers given to the sweet corn planting medium can increase the yield of sweet corn plants, as reported by Rizqulloh et al, (2017), where chicken manure with a dose of 15 tons of hectares<sup>-1</sup> produces a weight of cobs berkelobot, and the best sugar content compared with other organic fertilizers. Hidayah, et al, (2016) obtained the same result that increased the yield of sweet corn idberi treatment of chicken manure with a dose of 20 tons of hectares<sup>-1</sup> plus Urea 200 kg hectares<sup>-1</sup> produced the best growth and production of sweet corn compared with the treatment others.

Sweet corn production increased by 30% - 47%, when the plants were treated with granular compost and inorganic fertilizers (Urea, SP 36, and KCl) compared to sweet corn without fertilizer combination (La Habi, 2016). The combination of fertilization in sweet corn crop generally increases the agronomic yield of the crop. Bonanza varieties treated with organic fertilizer and 75% NPK resulted in the best growth and production compared with 1.5 dosage of organic fertilizer and 2 times the dose 75% NPK Risal et. al., (2017). Libra, et al. (2018) explains that increased levels of N, P, and K in plants are positively correlated with elevation of starch and sugar content of sweet corn kernels. Surtinah (2017) added that the sugar content of sweet corn seed treated with Hormax 2 ml L<sup>-1</sup> hormone resulted in the highest sugar content of 17.33%, compared with 17% without Hormax. The results shown above show an increase in the production of sweet corn in both quantity and quality. This indicates that the addition of nutrients through fertilization is highly recommended to improve the yield of low sweet corn in Pekanbaru.

Fertilization is given, when coupled with the provision of soil organic matter, will provide better results sweet corn again than if only given inorganic pupils only. Land in Pekanbaru that will be empowered to produce food crops, it is absolutely necessary to add organic material. Organic materials given in the study of sweet corn plants at the Rumbai site should be given an additional 40 tonnes of ready-to-use manure (Surtinah, 2017)

## 5. Conclusions

Fertilization in the cultivation of sweet corn proved to increase the yield of sweet corn in various regions. Soil for sweet corn cultivation in Pekanbaru should be given organic or inorganic fertilizer with sufficient dose, and to increase yield more leverage then growth regulator substance is recommended to be given. Increased yield of sweet corn, from several studies that became the source of reference as evidence that nutrients in the soil for cultivation sites have been reduced so that the need to add if it will be used to improve yield. The combination of organic and inorganic fertilizers is recommended to be tested, this is related to the efficient use of inorganic fertilizers. Biological organic fertilizers are recommended to be tested on sweet corn cultivation in locations with PMK type of soil.

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