



ORIGINAL RESEARCH PAPER

Agricultural Science

EFFECT OF CROPSIL ON PLANT GROWTH AND YIELD OF MAIZE PART TWO

KEY WORDS:

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ABSTRACT

Silicon is the second most abundant element in the earth crust after oxygen i.e. 28.8%. However, Silicon present in soil is in an inert or polymeric form, which is unavailable form of Silicon for plant uptake. Generally, plants uptake monomeric form of Silicon in soil i.e. plant available silica. Monosilicic acid (H₄SiO₄) or Orthosilicic acid is the form of Silicon which is completely bio-available to the plants. NiChem Solutions, Thane have developed a new product – CROPSIL based on monomeric silica to fulfil the requirement of Silicon as a beneficiary nutrient in plants.

CropSil is a unique formulation of highly stabilized Orthosilicic acid (Monosilicic acid form). CropSil contain 3% Orthosilicic acid which is 99.9% available form of Silicon. It has an alkaline pH. CropSil acts as a plant stress manager, immunity booster, yield improver & a bio stimulant. It is a residue free, non-toxic and eco-friendly product. It has a good stability & does not gel on shelf when stored in air-tight conditions away from direct sunlight. (It has Patent pending in India & US. The International Publication number of CropSil is WO2016/135752 A2).

The field study was conducted on farmer field at Marathwada region in Maharashtra state in Feb, 2018. Marathwada is a region with deficient rainfall Maharashtra state. In the field experiment, application of CropSil @ 2ml/lit resulted in better plant growth and yield of Maize. Foliar application of CropSil recorded better yield and early flowering and maturity over Control.

Results showed that foliar application of CropSil improved cob length by 6.36% and Maize yield by 26.0% with early flowering and seed maturity over Control. Thus, foliar application with CropSil proved to be an effective treatment to improve the plant growth and Maize yield.

INTRODUCTION

Maize (*Zea mays* L.) is an important crop in the world. It is widely used for feed and industrial raw material. Maize ranks third in world production followed by wheat and rice for the area and production. It is also the main crop of northern China, where the climate is a combination of temperate and semi-arid monsoon. Rapid and uniform field emergence is an important factor to achieve higher yield to meet the growing demand for food & energy.

Silicon, after oxygen, is the second most abundant element in the earth's crust. Although Si has not been recognised as an essential element for plant growth but the beneficial effects of Silicon have been observed in wide variety of plant species including Maize. Many plant species in Gramineae family such as Maize and Wheat accumulate high Si in their shoots like Sugarcane & Rice. However, the extent of accumulation is lower than that of Rice (Ma and Takahashi, 2002; Tamai and Ma, 2003; Liang et al. 2006). Due to unhealthy agricultural activities, Silicon is removed in large quantities from the soil. Even highly purified water contains about 0.02 ppm Si (Werner and Roth, 1983). Silicon helps the plants in various ways namely 1) Activates plant pathways to stimulate growth & Self Acquired Resistance (SAR) against fungi & bacteria; 2) Builds tolerance to biotic & abiotic stress; 3) Improves drought resistance by reducing water requirement up to 40%; 4) Improves uptake of minerals especially Phosphorus; 5) Mitigates toxicity of Mn, Cu, Co, Fe, Al & Ca; 6) Enhances quality & quantity of produce upto 25%. This data is well documented in literature & deep research by agronomists still continues to conclude the benefits of Silicon on crops. Recently, Government of India has included OSA as one of the micronutrients.

Gerroh and Gascho (2004) reported that both Maize shoot

and root dry weights increased by the application of silicate and phosphate alone and by application of silicate together with phosphate. Dry weight of shoot and root were increased by 3.92 mg when Si was applied together with P. Silicon and P contents in the root and shoot were increased by Si but not by P applications. Hence, in this trial, we have studied CropSil as Silicon source and its effect on plant growth and yield of Maize.

MATERIALS AND METHODS

Seeds of Maize (variety 6240) were collected from seed shop. Seeds were sown as per farmer practices in one acre i.e. 40 R area. The field was divided into 20 R for Control plot and 20 R for CropSil Treated plot. Foliar sprays of CropSil were taken at different stages of Maize. This trial did not document statistical data. We had studied the visual difference & measurement parameters of Treated & Control plots.

RESULTS AND DISCUSSION

Germination and seedling establishment are critical stages of Maize which affect both quality and quantity of crop yield. Soil water content is the key factor affecting seed germination and plant establishment in the semiarid area.

The results of field study indicated that foliar application of CropSil at different stages helped plant establishment and increased the growth and yield of Maize. There was an improvement in vegetative growth, cob length, number of rows of cob, outer diameter of cob and weight of cob in Cropsil treated plots as compared to Control. Plots treated with CropSil showed greater influence on early flowering, early seed maturity. CropSil treated plot showed maximum cob length **6.364 Cm**, outer diameter **2.415 Cm** and weight **7.98 Gm** as compared with Control. At the time of harvest, Maize yield increased by 26.0% in CropSil treated plot as

compared to Control plot.

The results of CropSil on Maize growth and yield are presented in following Table 01 and 02.

The visual difference of Maize cob growth is presented in Fig no 1 and 2.

Table 01: Effect of CropSil on spray on various parameters of Maize

Parameters	Control	CropSil	Difference	% increase over Control
Cob length (cm)	16.34	17.38	1.04	6.36
Outer dia (mm)	5.336	51.31	1.21	2.42
No. of Rows	14.8	15.6	0.8	5.41
Weight in (gm)	230.86	249.3	18.44	7.99

Table 02: Effect of Cropsil on Yield Improvement in Maize

Test Sample	Weight of 30 cobs (Kg)	Difference over Control (Kg)	% increase over Control
Control	5.55	--	--
CropSil	7.0	1.45	26.0%

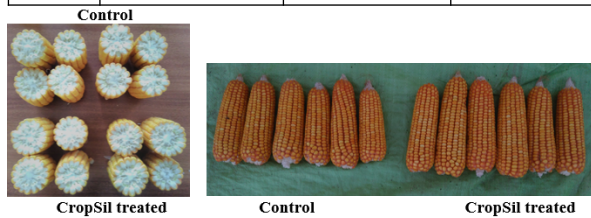


Fig: 01



Fig: 02

SUMMARY & CONCLUSION

An investigation was undertaken to study the effect of CropSil as Silicon source on plant growth and yield of Maize at farmer field in Marathwada region of the Maharashtra state in India in Feb, 2018. In this field experiment, foliar spray of CropSil @2ml/lit was used at different stages of Maize to know the effect on growth and yield along its crop cycle of 4 months. It was found that plant height, cob length, no of grain rows, diameter and yield of Maize increased with the foliar application of CropSil-treated plots as compared to Control. Similarly, there was early flowering and early maturity of Maize seed by 7 days in Cropsil treated plots over the Control.

Thus, it can be concluded that CropSil can be used as a Silicon source to increase or improve the plant growth and yield of Maize.

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