International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878 (Online), Volume-8 Issue-2, July 2019

Bio-Compost Influences Salinity and Plant Development by Experimenting with Greenhouse Pots

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Abstract: ***This paper deals with this research "Role of compost in reduction of saline soil of Agra" [1] and "Soil salinity reduction by bio-compost" [2]. The salinity of the soil is the occurrence which raises the salt content from standard value. The method of increasing the salt content is called Salinization. In soils and water, salts usually occur. It can be these bilish Salinization. Characteristic methods, e.g., durability of minerals or progressive sea removal. It may also come into being with an artificial drainage and excessive use in agriculture of synthetic fertilizers. Salt content is a significant crisis in both plant and crop development. The aim of this research is to study salinity problems on plant cultivation and how soil management methods can prevent salinization problems. Bio-compost has been used to decrease the salinity of the land. With the use of bio-compost, Agra's estibilised soil hydrology model was decreased. Soil-compost combination of saline soil SA-1 and soil samples SA-2 electrical conductivity (EC).To assess the influence of bio-compost on salinity on plant cultivation, greenhouse pot experiments were carry out on least salinity presence on both the soil by varying pH as 5.5, 6, 7 and 8. The plant chosen for this investigation was wheat (Triticum Aestivum). The plant growth of wheat were obsevered significant at pH-6 and 7 in both SA-1 and SA-2 soil samples. The results of the study recommend bio-compost have great potential to reduce soil salinity and could be highly potent alternative to chemical fertilizer and increase the growth of plant.***

Keywords: ***Bio-compost, Greenhouse pot experiments, Synthetic fertilizer, Wheat plant.***

I. INTRODUCTION

Soil saltiness is a term used to portray the salt substance inside soil. Salt is a normally happening mineral inside soil and water that influences the development and imperativeness of plant. "Gurpal S.Toor et.al.2018" [3].Soil saltiness can be impacted human as ecological causes. The event in which the salt substance turns out to be high, the dirt results as standered as sodic soil and can introduce numerous troubles when utilized as a developing medium."Stefan D. Kalev et.al.2018" [4].Agriculture Crops Tolerance the general impact of salinity is to diminish the development rate bringing about littler leaves, shorter stature, and now and then less leaves.

Revised Manuscript Received on 30 July 2019.
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The underlying and essential impact of salinity, particularly at low to direct fixations, is because of its osmotic impacts. Roots are additionally decreased in length and mass yet may end up more slender or thicker. Serious saltiness reaction additionally interceded due to natural connections, for example, relative stickiness, temperature, radiation and air contamination. Contingent on the creation of the saline arrangement. "J.C. DAGAR 2005" [5].

II. MATERIAL AND METHOD

A. Soil sample collection:

The representation of a field or portion of a field was used to collect a soil sample. Obtaining helpful data about a field of the soil problem(salinity). Sampling a field can be performed by random selection in which Costume field can be sampled repeatedly throughout the whole field, avoiding field corners. The sampling range would be core at a depth of 8* and the sample population would be 200 grams for examination. Blocks of Agra which comes under agriculture area was taken as the study in this project. "R.B SINGH 2017" [6].The collection of samples was as listed below

i. Shamsabad (SA-1)
ii. Fatehabad (SA-2)

B. Production of Bio-compost:

Activate the compost bin in a sheltered area near a river source, the compost piles must be at least 35 inches by 36 inches or 3 square meters in volume.Day1: Divide the compostable products into 1⁄2 "to 11/2" pieces. With such a layer of eco nitrogen-rich substances such as wood chips and kitchen scraps, smaller compost compounds cover these products. Day 3^{th}: Moisten the products of the composite desk. Approximately 50% humidity content. The compounds must be unloaded calmly but not saturated.At day 5^{th} to 10^{th}: Tend to turn the compost pile with a shovel, move the cloth from the bin section to the middle and check at the humidity level of the pile after spinning and spraying water. Hold the compost at an optimal temperature of 160 ^{O}F in 24 to 48 hours. Day 12^{th} to Day 17^{th}: maintain every 2nd day to demonstrate the fertiliser. Last day 18^{th}: Just heat, shady brown, accurate smells and earthworms flow into to the manure, miles are defamed as it is far-reaching and prepared because it is calmed down and nutrient-filled. Circumstance and final compost parameters shown at the desk (Fig.1) parameters of bio-compost."Hot composting – composting 18 days Berkley method"[7]

C. Measurement of salinity in the soil:

The salinity of the soil can be checked readily and cheaply. Soil analyzes have to determine the amount of saltiness and the kind of salt involved in order to affirm a capability salt problem. The amount of soluble (salt) ions in soil is indicated by the electrical conductivity meter (ECe). Electrical conduction has been used to obtain the original reading of SA-1 and SA-2 soil salinity in the solution and the bio-compost was added sequentially after the initial value and the salinity throughout the solution was drastically reduced by reducing the volume of bio-compost (g).

D. Greenhouse pot experiment:

A greenhouse was utilized to test whether saltiness presented with fertilizers impacts youthful plants in a way like standard reference esteems. To test the impact of manure instigated saltiness on plant development, a nursery pot explore was led utilizing a totally randomized structure with 4 recreates treatment for Shamsabad (SA-1), Fatehabad (SA-2) and utilizing the pH contrast. The yield chose for this investigation was wheat (Triticum Aestivum). "Namaratha Reddy et. al. 2012" [8].

Plantation steps:

1st: The pot were cleaned and disinfected in 10% blanch answer for 20 minute. Washed with water to evacuate any dazes on.

2nd: The Pot got approximately 2.5 kg of air-dried soil, adding the seed of wheat and its separate compost (1/2 kg).

3rd: The wheat, the pH of the dirt fertilizer blend was changed in accordance with 5.5 to 7.0 or by including the powdered sulfur at the rate of 0.732 kg m^2 adjusting the pH of soil.

4th: The wheat to were planted.

5th: Then irrigated by de-ionized water.

6th: Plants were irrigated at least each other day and on the days of high evaporative insist daily irrigation were given.

7th: No leaching or drainage from end to end the pot.

8th Growth was evaluated as the dry shoot weight after plant appearance or tranplantion. Wheat growth initial day to 15 days. The growth rate of the wheat plant shown in table. 1 for SA-1, table. 2 for SA-2.

III. RESULT AND DISCUSSION

The reduction of soil salinity from the salinity area in Agra by the use of bio-compost as well as estimating the concentration of salinity in soil using electrical conductivity. Greenhouse experiment was conducted a greenhouse was utilized to test whether saltiness presented with fertilizers impacts youthful plants in a way like standard reference esteems. The reduction of soil salinity was done for the samples collected from saline place of Agra with the usage of bio-compost. The parameters observed for bio-compost is given in fig.1.

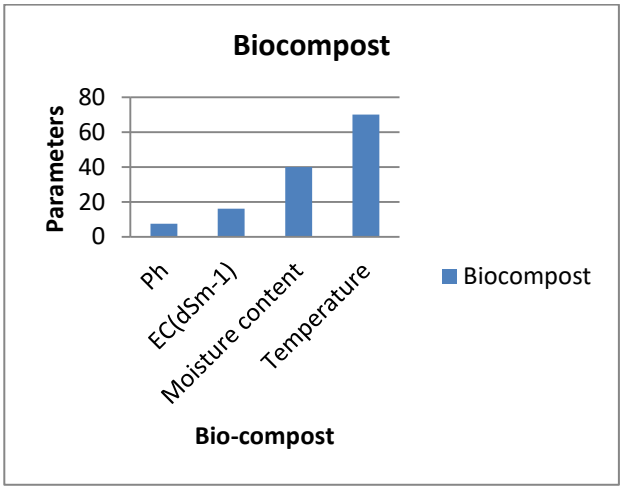

Fig 1: Parameter of bio-compost

The saline soil SA-1 and SA-2 was formulated in which 50 ml of sterile water by mixing the 50 gm saline soil. The bio-compost was introduced with an increase of 2 g beginning at 2 g until the salinity was minimized. The electrical conductivity was displayed at least with the addition of 140 g of bio-compost. The electrical conductivity was not influenced by additional bio-compost. The result is summarized in Figure: 2 and 3.

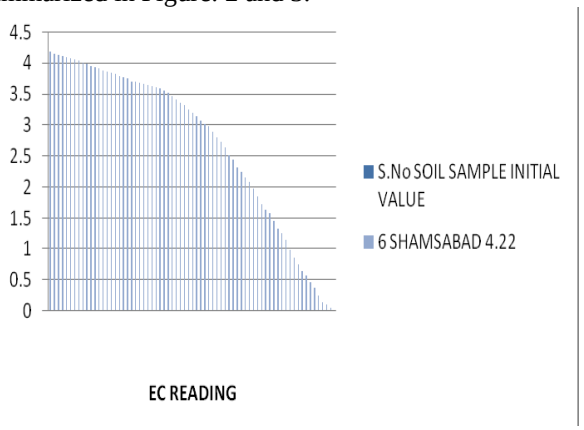

Fig 2: Reducing saline soil SA-1 (Shamsabad) ECe-4.22 dSm^{-1} to 0.05 dSm^{-1}.

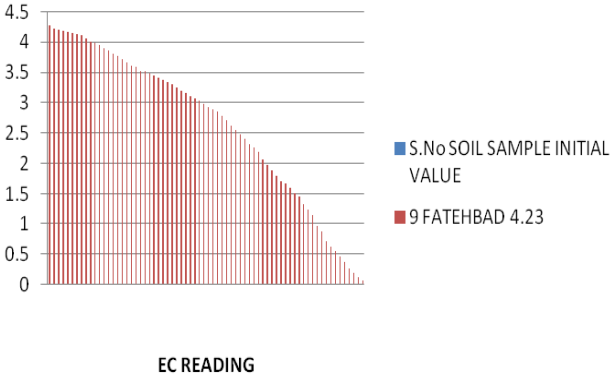

Fig 3: Reducing saline soil SA-2(Fatehbad) ECe-4.23 dSm^1 to ECe- 0.07 dSm^{-1}

The estibilisted soil hydrology model of Agra was reduced with the use bio-compost. Electrical conductive (EC) of soil-compost mixture of SA-1 and SA-2. To estimate the influence of bio-compost salinity on plant cultivation, greenhouse pot experiment were associated with the least salinity presence on both the soil with pH difference (5.5, 6, 7 and 8) and The yield chose for this investigation was wheat (Triticum Aestivum). The plant growth of wheat was significantly increases at pH-6 and 7 in both SA-1 and SA-2.

Table 1: Growth rate: Saline soil SA-1

S. No.	Day	pH-5.5	pH-6	pH-7	pH-8
1	1st	No Growth	No Growth	No Growth	No Growth
2	5th	Low	Low	Low	Low
3	10th	Low	Moderate	Full	Low
4	15th	Low	Full	Full	Moderate

Table 2: Growth rate: Saline soil SA-2

S. No.	Day	pH-5.5	pH-6	pH-7	pH-8
1	1st	No Growth	No Growth	No Growth	No Growth
2	5th	Low	Low	Moderate	Low
3	10th	Low	Moderate	Moderate	Low
4	15th	Low	Full	Full	Low

IV. CONCLUSION

The electrical conductivity (EC) of soil- compost mixture of Saline soil SA-1 and SA-2 of soil samples. To assess the influence of bio-compost on salinity as well as on plant cultivation, greenhouse pot experiments were carry out on least salinity presence on both the soil by varying pH as 5.5, 6, 7 and 8. The plant chosen for this investigation was wheat (*Triticum Aestivum*). The plant growth of wheat were obsevered significant at pH-6 and 7 in both SA-1 and SA-2 soil samples. The results of the study recommend bio-compost have great potential to reduce soil salinity and could be highly potent alternative to chemical fertilizer and increase the growth of plant.

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