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Experimental Study on The Influence of Chitosan Based Solution on Eggplant and Green Pepper Plants

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Introduction

- *Chitosan is a biopolymer that is becoming popular due to its eco-friendly properties and its ability to facilitate the use of reagents effectively.*
- *Chitosan is a natural polymer derived from chitin, which is found in the shells of crustaceans.*
- *Chitosan interacts positively with negatively charged molecules in the soil and on the roots of plants, which can increase the availability of nutrients and improve plant uptake.*
- *Chitosan helps plants germinate their seeds, develop their roots, absorb nutrients, and adapt to stress.*
- *Chitosan can also increase the activity of helpful bacteria in the soil and protect plants against diseases.*
- *Chitosan is a useful fertilizer ingredient because it has a high cation exchange capacity (CEC), improves soil structure, and promotes plant growth and development.*

Introduction

Specifically, chitosan has been shown to:

- ***Increase the number of lateral roots and root biomass***
- ***Increase nutrient intake and plant development***
- ***Boost the growth and yield of plants***
- ***Boost the activity of photosynthetic enzymes***

Overall, chitosan is a versatile and promising fertilizer ingredient with a wide range of benefits for plants.

Solution Preparation Method

Summary of the procedure for preparing a 2.5% chitosan solution in points:

1. ***Weight 2.5 g of chitosan powder.***
2. ***Add the chitosan powder to 100 ml of tap water.***
3. ***Stir the mixture continuously for 10 minutes using a magnetic stirrer.***
4. ***Add 1 ml of acetic acid to the chitosan-water mixture in a dropwise manner.***
5. ***Stir the solution continuously at room temperature for 3 hours.***

Examination Method

1. *Eggplant and pepper plants were used in the study.*
2. *Synthetic fertilizers were used.*
3. *Soil moisture and electrical conductivity (EC) were measured using a sensor test meter.*
4. *The soil moisture meter indicated whether the soil was dry, moist, or wet.*
5. *The EC test measured the amount of salt in the solution.*
6. *The EC test is a rapid and affordable method for checking fertilizer levels.*

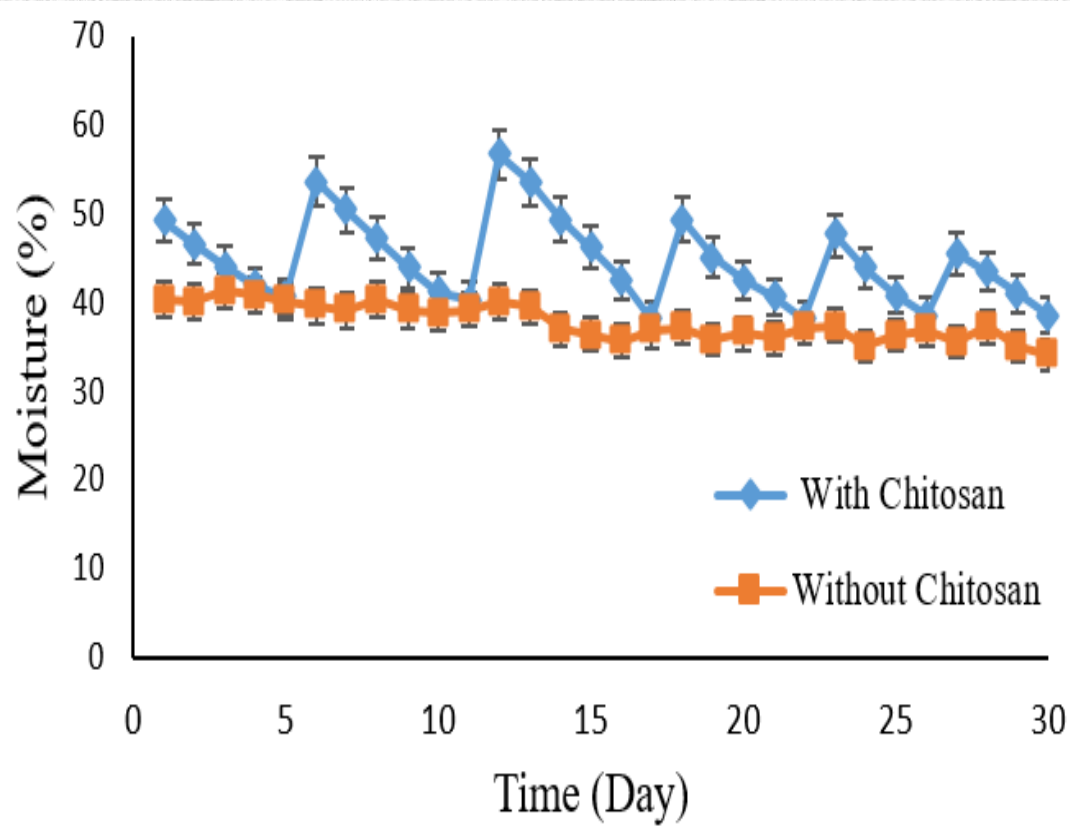
Implementation Method

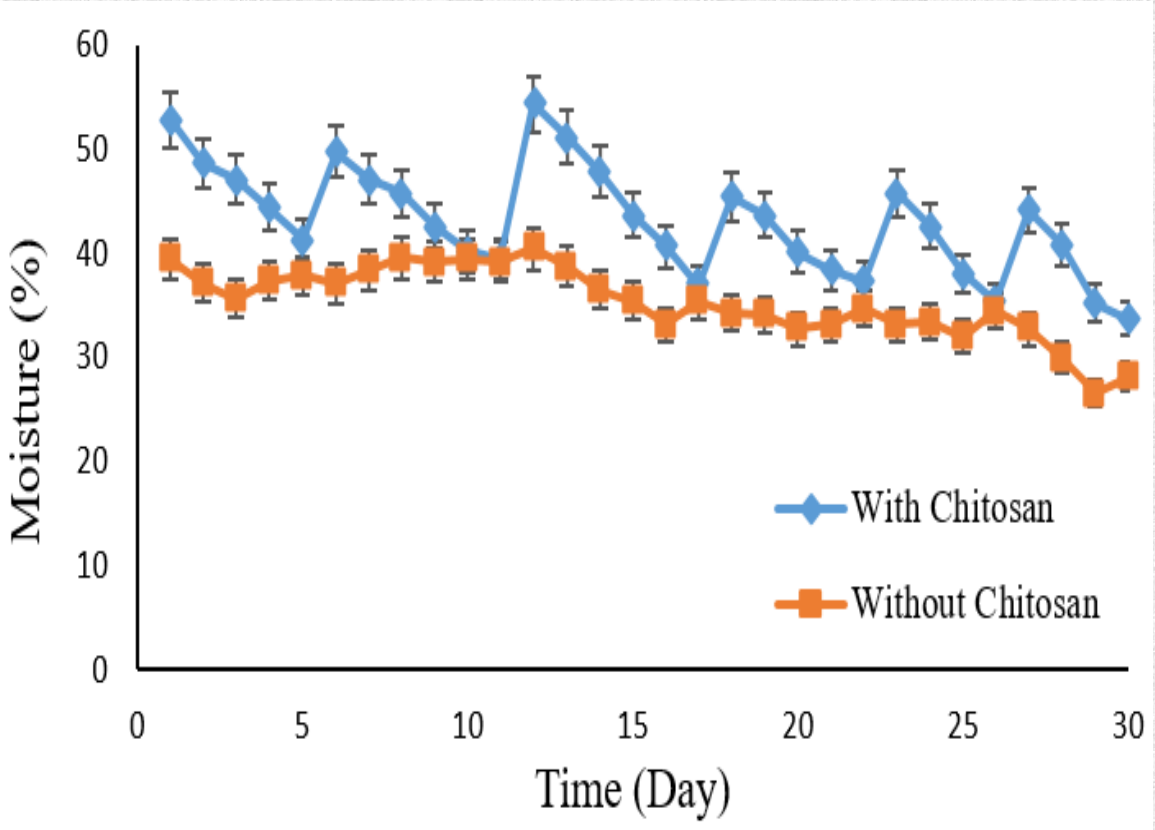
1. *Eggplant and pepper plants were grown in synthetic fertilizer soils.*
2. *Plants were watered with either water or a chitosan solution.*
3. *Water was added only once the soil moisture reduced to 40%.*
4. *Chitosan solution was sprayed with an approximate quantity of 40ml each time.*
5. *Soil moisture level and electrical conductivity were measured once a day and before next day before water irrigation.*

Therefore, this study is investigating the effects of spraying chitosan solution on the growth and development of eggplant and pepper plants grown in synthetic fertilizer soils.

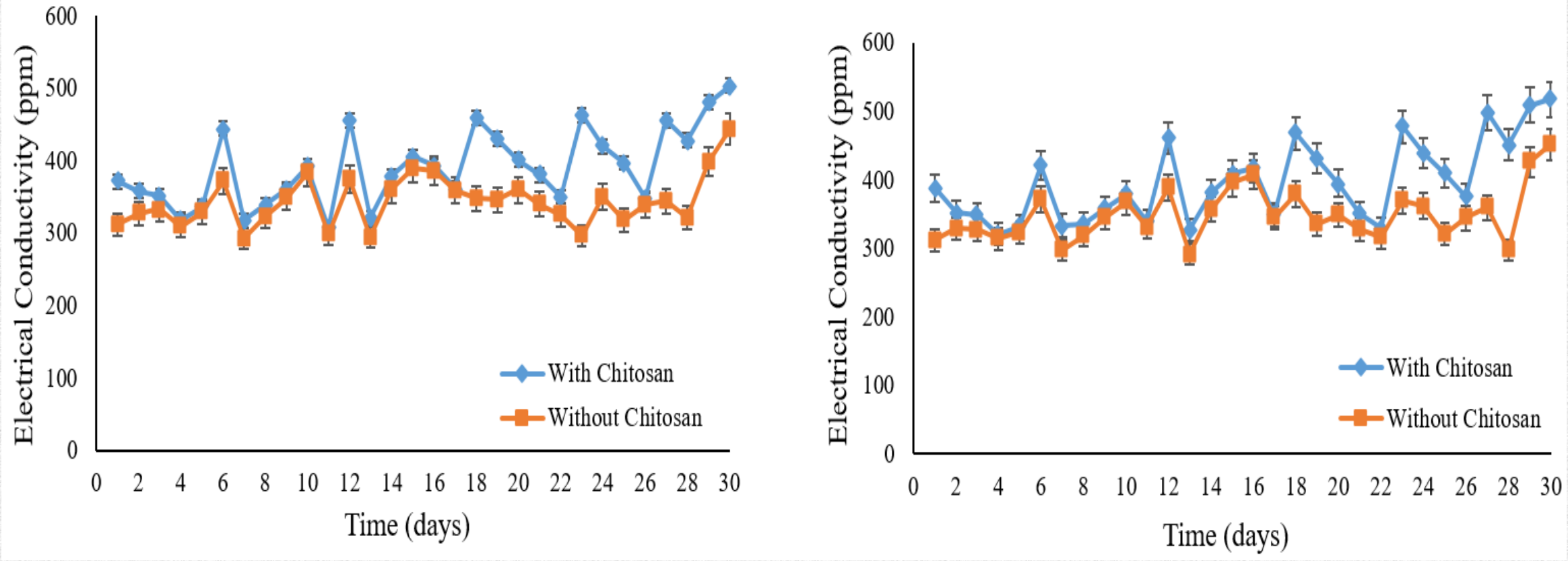
Results and Discussions

- ***Soils with chitosan solution have survived for an average period of 4 days before reaching the 40% moisture content***





- ***The electrical conductivity increased slightly with time, specifically for soils treated with the chitosan solution.***



- ***The interesting observation at this point is that soil treated with chitosan solution resulted more healthy plant and greener leaves.***

Conclusions

- ✓ *Chitosan solution increased the moisture level in the soil by nearly 170%.*
- ✓ *Chitosan solution reduced water consumption by nearly 170%.*
- ✓ *Chitosan solution resulted in healthier and greener eggplant and pepper plants.*
- ✓ *Chitosan solution had a positive effect on electrical conductivity (EC) in the soil.*
- ✓ *EC is a measure of the amount of salt in the soil, and higher EC levels can inhibit plant growth.*
- ✓ *Chitosan solution helped to reduce EC levels in the soil, which created a more favorable environment for plant growth.*