



EFFECTIVENESS OF HOMOEOPATHIC PREPARATIONS OF NATRIUM PHOSPHORICUM, CALCAREA SULPHURICUM AND NATRIUM MURIATICUM IN 6C AND 200C POTENCIES IN COMPARISON TO OMEPRAZOLE IN IMPROVING TOLERANCE LEVEL OF SOLANUM LYCOPERSICUM TOWARDS ABIOTIC[NaCl] STRESS.

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ABSTRACT:

Solanum lycopersicum [Tomato], is an important economic crop in India. Agrohomoepathy contribute to control many diseases, abiotic stress and also help in directly promoting increased production. Agrohomoepathy has enormous potential as it covers the majority of crops and enables crop abundance and nutritive yields. Important benefits of agrohomoepathy include economical savings and preservation of natural ecology. It also reduces costs for agrochemicals, it will not damage the organisms, surrounding area and the water that serves as the solvent in the dynamization.

The homoeopathic preparations can influence the growth, secondary metabolites production, essential oil yield and phytochemical profile. By this experimental research we could conclude that agrohomoepathy stimulate favourable biological and even genetic responses in plants which develops the organic homoeopathy.

This study is to know the effect of homoeopathic medicines i.e., Natrium phosphoricum, Calcarea sulphuricum and Natrium muriaticum on the most used crop solanum lycopersicum and also to test saline concentration in each group. Potency that acts exactly on the plant is unknown so that each medicine with two different potencies is administrated for better study .so that 6CH and 200CH potencies are used. From this it can be known which potency acts better on the plant solanum lycopersicum growth, and on salinity of the soil.



NEED FOR STUDY:

Agriculture is defined as the cultivation of plants, medicinal plants, breeding of animals and production of food and fuel. Agricultural sciences known as scientific study of agriculture which is helpful to develop growth and yield of crop and to attain new crops and new animal breeding.¹ In recent days in agriculture abiotic stresses are the major problem which is affecting the development of crop in aspect of growth and yield.

To overcome these abiotic stress farmers are using fertilizers which are made up of chemicals by using these fertilizers in large quantities using these fertilizers repeatedly leads to eutrophication in plants. Nitrogen, Potassium, Calcium, Phosphorus is very important for plant growth, root development, photosynthesis and yield of the plant. But by using fertilizers which are made up of chemicals in large quantities will increase the toxicity, nitrogen content in soil which gives negative impact and these also pollute drinking water.² So homoeopathic medicines are using to nullify the action of abiotic stress and to increase the soil fertility by decreasing nitrogen content.

ABIOTIC STRESS:

Abiotic stress includes salinity stress, drought stress, heavy metal toxicity, temperature and humidity impairment. These are not only limiting crop growth and yield but also cause harmful effects on human health plant growth regulators will help to counteract the effect of abiotic stress. Among them nitrogen and sulphur are more important.³

SALINITY STRESS:

Salinity stress in soil is one of the abiotic factors which is limiting crop growth and yield and also causing harmful effects on human health the major risks the plants are facing due to salinity stress are

- Low osmotic process
- Nutritional impairment
- Ion toxicity
- Sometimes combination of all these three.

Osmotic stress and Ion toxicity mainly affect the salt stresses plants. Under high sodium chloride [NaCl] concentration in soil there will be reduction of water intake by roots. If sodium chloride component is more in soil Na⁺ ion will compete with K⁺ and accumulate in roots in place of K⁺ ion. In the same way Cl⁻ ion compete with nitrate and settle in roots instead of nitrate. This led to damage of plant cell finally affect growth and yield of crop.⁴

Previously there were many experiments conducted on salinity stress tolerance in various vegetables and in flowering plants to observe their shoot length, root and shoot dry weight, leaf area. Leaf color, flowering time, growth and yield. In these studies, they were



concluded that low salinity was not showing any effect on the growth and yield of the crop. But when salinity concentration is raised it shows changes in the flowering time, fruit production time, leaf area, stem length, time period of growth and yield.

In Arabidopsis flowering plant its flowering time were greatly affected due to NaCl stress and when 25mM NaCl [low saline concentration] used there were no change in the flowering time but when 50mM NaCl used it delayed flowering time for 4-5 days. And when 100mM NaCl used flowering time delayed for 13 days, when >150mM [high saline concentration] we're used then there were no plant shown flowering.⁵

In the same way chilly [capsicum annum] and okra [abelmoschus esculentus] plants are also more sensitive to the NaCl stress.^{6,7} In abelmoschus esculentus [okra] plants due to accumulation of Na⁺ ion and Cl⁻ ion in roots instead of K⁺ ion and Ca²⁺ ion and nitrate the germination is affected. And under low saline concentration maximum germination were noticed when compared to high saline concentration were lowest germination and yield were remark.⁷

SOME PROVEN ACTIONS IN AGROHOMOEOPATHY:

The potentized remedies are used in many researches and found successful in controlling the biotic stress along with plant diseases and causative organisms which are producing various diseases in the plants. There were many homoeopathic drugs which increase plant growth, nutrition and germination.

Sulphur, Silicea, Calcarea carb., Carbo veg. raise plant growth, nutrition. Silicea, Natrium muriaticum, Phosphoric acid raise germination.⁹

Phosphorus 6CH can increase the rate of seed germination of Brassica oleracea. Sulphur can affect the growth and productivity of Radish. Growth of Basil using phosphorus 30CH. Germination of lactuea sativa using Arsenic album 7CH.⁸

Regrowth of Yerba mate plants using Arnica montana 30CH and Calendula officinalis 30CH.⁸

Arsenic album 6CH,12CH,24CH,30CH dynamizations has increased wheat seeds germinations.¹⁰

Calcarea carb. 1000CH has shown great results in hindrance of s. Sclerotiorum mycelial growth which cause white mold.¹¹

Sulphur 24CH and 30CH, Arsenic album 24CH and 30CH has increased height of mint plants. And sulphur 24CH and 30CH has enhanced the essential oil content of mint plant.¹²

Arsenic album dynamizations has shown positive effects on tobacco plant in resistance to Tobacco mosaic virus.¹³



Higher dilutions of homoeopathic drugs has reduced germination of canidia of n.solani . In this 26CH, 27CH, 28CH dilutions has shown better results. At the same time selenium 31CH has completely eliminated the early blight spots in Tomato plant.¹⁴

Sulphur dilutions has influenced growth, yield and also improved the essential oil concentration in ocimum basilicum L. plant.¹⁵

Sulphur and nosode prepared from macrophomina phaseolina in homoeopathic dynamization process has shown reduction of grey stem and elimination of macrophomina phaseolina microbial growth in soyabean plant.¹⁶

HOMOEOPATHIC STUDIES ON TOMATO [SOLANUM LYCOPERSICUM] PLANT:

The solanum lycopersicum [tomato] seedlings treated with Zincum phosphoricum 7CH dynamization shows greatest results in stem length, fresh weight, dry weight.¹⁷

Homoeopathic dilutions like sulphur, pulsatilla, podophyllum, cina, lycopodium, natrium muriaticum, arsenic album has arrested the Alternaria solani which cause leaf spot disease growth in solanum lycopersicum.¹⁸

It is proven that by the use of homoeopathic medicine ocimum basilicum 30CH, 200CH, 1M have shown increase in beta-carotene and lycopene in solanum lycopersicum.¹⁸

Arnica montana 12DH dilutions has increased tomato yield under organic production system and homoeopathic dilution of sulphur 12CH that equalling to B. thuringensis has lowered seotoria leaf spot in tomato crop.¹⁹

Staphysagria 12CH has increased tomato fruit yield with high diameter sulphur 12CH has reduced tomato fruit damage by small borer [Neoleucino des elegantalis].¹⁹

Ferrum sulphuricum 6CH, 12CH, 24CH, 96CH has increased chlorophyll content to 99% also reduced the powdery mildew effect on tomato genotype.²⁰

Staphysagria 25CH, 100CH has reduced fungal growth on tomato plants and at the same time nitric acid 200CH inhibited 22 genera fungal growth in solanum lycopersicum.¹⁰

High dilutions of nitricum acidicum has cured fissures, ulcerations on tomato fruit, leaves, stem which are caused due to extreme cold wind.¹⁰

HOMOEOPATHIC STUDY ON ABIOTIC[NaCl] STRESS:

Natrium muriatum 13CH has shown best results in reducing the saline concentration in soil.²¹

Natrium muriaticum 7CH also shown best results in increasing tolerance to salinity stress in Phaseolus vulgaris L. [common bean].²²

Natrium muriaticum 7CH favoured best results under higher salinity conditions [75mM] and also mitigated salinity effects in basil [ocimum basilicum].²³

Natrium muriaticum 5CH and 7CH has shown positive response in seed germination and growth of tomato plant which are subjected to saline stress.²⁴

Natrium muriaticum 13CH has increased Capsicum annum resistance to NaCl stress.²⁵

Recent studies have concluded that Natrium muriaticum shows benefits on development of cherry tomato plant grown under salinity stress. Natrium muriaticum also induced seed germination in cow pea, Basil and solanum lycopersicum they used natural Natrium muriaticum 6CH and 200CH for better results.^{26,27,28}

MATERIALS AND METHODS:

STUDY SITE:

This research study was performed in the Herbal Garden of KKC HOMOEOPATHIC MEDICAL COLLEGE AND HOSPITAL.



Fig no:1 Herbal Garden

STUDY TIME:

The study was done for five months in order to fully observe the effect of homoeopathic medicines on growth, development and saline concentration of soil in solanum lycopersicum.

MATERIALS USED:

1. Certified seeds of Tomato (Selection 22 ARKA VIKAS) - from regional plant nursery
2. Seedling tray
3. Grow bags [Size: 40× 24×24 CM] – 45 bags
4. Plastic bottles - 45 bottles
5. Dripping spikes - 45 spikes
6. Coco peat - 30kgs

7. Soil
8. water
9. Omeprazole(20mg)
10. Fertilizer (Gypsum) – 500 grams
11. Bamboo sticks – 45 sticks
12. Medicine – Natrium phosphoricum 6C (100 ml)
13. Medicine – Natrium phosphoricum 200C (100ml)
14. Medicine – Calcarea sulphuricum 6C (100ml)
15. Medicine – calcarea sulphuricum 200C (100ml)
16. Medicine – Natrium muriaticum 6C (100ml)
17. Medicine- Natrium muriaticum 200c(100ml)

GROUPS OF PLANTS:

1. Control group - only water is used without any fertilizer and medicines
2. Standard group (omeprazole group) – Plants are treated with omeprazole drug once
3. Standard group - plants are treated with gypsum fertilizer once in 15 days.

Medicinal groups:

4. Natrium phosphoricum 6CH group – 5 drops of medicine added to half litre of water in dripping bottle once in a day (morning).
5. Natrium phosphoricum 200CH – 5 drops of medicine added to half litre of water in dripping bottle once in a day (morning).
6. Calcareous Sulphuricum 6CH – 5 drops of medicine added to half litre of water in dripping bottle once in a day (morning).
7. Calcarea sulphurium 200CH – 5 drops of medicine added to half litre of water in dripping bottle once in a day [morning].



Fig no:2 – Total No. of Groups

PROCEDURE:

Firstly, the seeds were germinated by placing them in the seedling tray. I have taken *solanum lycopersicum* (selection 22 ARKA VIKAS) seeds and sowed them in seedling tray containing soil in orderly manner in a row in nine groups. The seeds were sowed on 14-06-2023 and placed the seedling tray under sunlight. Then watered (spray) them twice in a day, morning and evening. Then plastic bottles were placed in grow bags for drip irrigation to plants. Then plastic bottles were placed in grow bags for drip irrigation to plants. After 45 days of growth (on 29-07-2023) plants were taken out from the tray and planted in grow bags (Size:45×24×24CM) with a mixture of soil (containing high saline concentration) and cocopeat. Then plastic bottles were placed in grow bags for drip irrigation to plants. Omeprazole capsules (20mg) are used. Here each capsule (20 mg) contains 115 globules, each globule contains 0.17mg. One globule is dissolved in tea glass of water and then equally distributed to each plant (5 plants) in omeprazole group. So that each plant will receive 34micro grams of omeprazole drug. I have used Gypsum fertilizer as mentioned on the direction to use. Half spoon of fertilizer is mixed in half litre of water once in 15 days to the dripping bottles of standard group of plants. 5 drops of above-mentioned medicines were mixed in half litre of water in dripping bottles of medicine groups daily morning and the changes were observed once in 15 days.

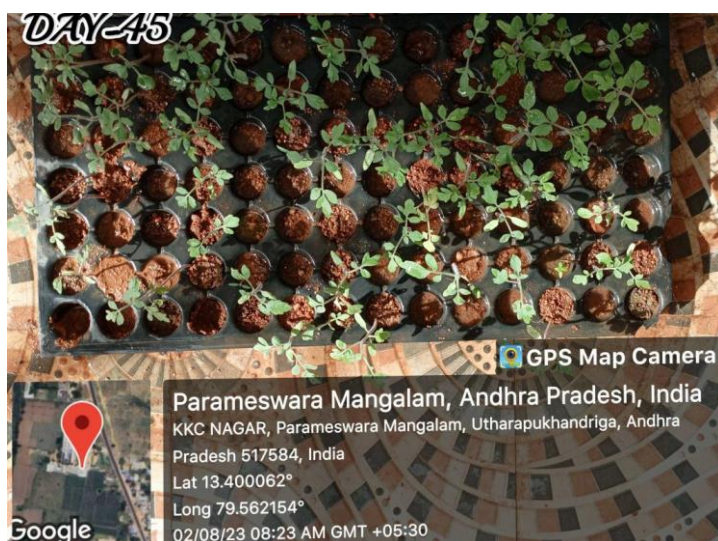


Fig no:3 – Seedling Tray Day 45

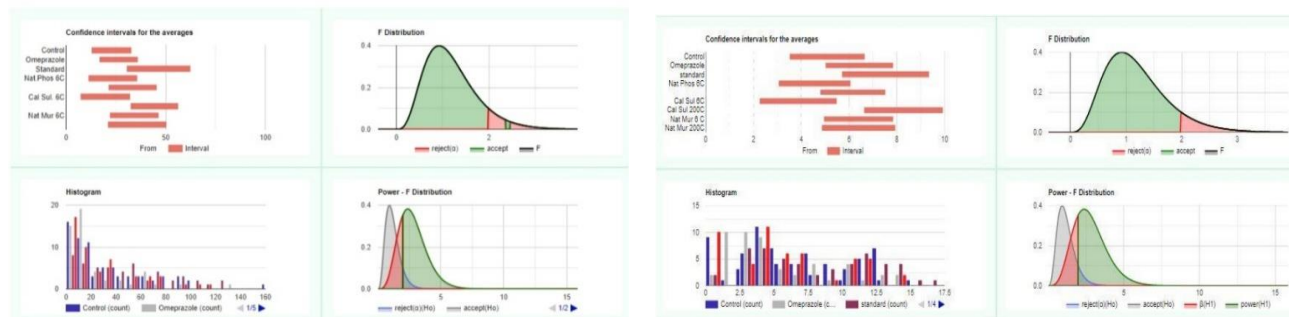


Fig no:4 – Flowering Stage

AIM AND OBJECTIVES:

1. To know About the effect of homeopathic medicine (Natrium phosphoricum, calcarean sulphuricum, Natrium muriaticum) 6C and 200 C on growth and development of *solanum lycopersicum* under salinity stress.
2. To compare the effect of omeprazole with homeopathic medicines on growth and development of *solanum lycopersicum* under salinity stress.
3. To compare the saline concentration of soil in each group before and after the experiment.

ANALYSIS:



CONCLUSION:

The application of potentized Homoeopathic Medicines Natrium phosphoricum 6CH, Natrium phosphoricum 200CH, calcarea Sulphuricum 6CH, calcarea Sulphuricum 200CH, Natrium Muriaticum 6CH, Natrium Muriaticum 200CH on solanum lycopersicum demonstrated a beneficial result by developing resistance in abiotic stress. Calcarea Sulphuricum- 200CH was beneficial both in controlling the saline concentration levels and increasing length, Number of leaves, Number of branches in solanum lycopersicum. Therefore, this study demonstrates that the Medium Potency has higher efficacy in Agrohomoepathy.

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