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Effectiveness of homoeopathic drug *Zincum metallicum 6C* on plant growth of *Raphanus sativus* in natural environment

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Abstract

Background: Agro-Homeopathy implies the use of Homoeopathy in agriculture. Homoeopathic preparations are being used efficiently for increasing active principles in medicinal plants, plant detoxification for metals such as aluminum and copper, increasing plant growth rate and productivity, plant metabolism and control of diseases.

Objectives

1. To evaluate the effect of Homoeopathic preparations of *Zincum metallicum 6C* on germination of *Raphanus sativus* in natural environment.
2. To evaluate the effect of Homoeopathic preparations of *Zincum metallicum 6C* on Plant length of *Raphanus sativus* in natural environment
3. To evaluate the effect of Homoeopathic preparations of *Zincum metallicum 6C* on mass of Fresh matter of the shoot and the root system of *Raphanus sativus* in natural environment

Methodology: Seeds were sown in designated area of campus. 30 Plants of *Raphanus sativus* received *Zincum metallicum 6C* (20 drops in 1 litre of water) while 30 Plants of *Raphanus sativus* receiving normal Water. Data collection was done every day upto germination at the same in afternoon. After 1 week the plants were thinned leaving only 35 plants per group. After 50 days the entire plant was measured for mass, only 30 samples were included in final analysis

Result and Discussion: The mean whole plant length of group receiving *Zincum metallicum 6c* was 74.9 cm while the mean whole plant length of control group was 67.95 cm. the mean whole plant mass of group receiving *Zincum metallicum 6c* was 270.6 gms while the mean whole plant mass of control group was 250.57. the mean Mass of root (gm) of group receiving *Zincum metallicum 6c* was 179.43 while the mean Mass of root (gm) of control group was 162.21. the mean Mass of Shoot system of group receiving *Zincum metallicum 6c* was 88.35 while the mean Mass of Shoot system of control group was 35.39. The application of homoeopathic medicine *Zincum metallicum 6c* increased the average plant length and mass of fresh matter of root and shoot system in relation to the control.

Conclusion: The application of potentised homoeopathic medicine *Zincum metallicum 6c* on *Raphanus sativus* demonstrated a beneficial result by increasing plant length and mass

Keywords: Agrohomoepathy, *Zincum metallicum*, *Raphanus sativus*

Introduction

Agro-Homeopathy implies the use of Homoeopathy in agriculture. Agro-homoeopathy has enormous potential as it covers the majority of crops and enables crop abundance and nutritive yields [1].

Sanganer (Jaipur, Rajasthan) is famous for textile dyeing and printing industries which discharge untreated textile dye wastewater into pools and drains in adjoining areas causing Water pollution. Physicochemical analysis has shown that this soil contains higher amount of heavy metals (specially Zinc, Copper and manganese) and exceed permissible limit and affect the flora existing in such environment [2].

High concentration of heavy metals such as Zinc and manganese lead to detrimental effect on flora e.g. Yellowing between the veins of youngest leaves, leaves may develop gray streaks or dots., brown spots on leaves and chlorosis (yellowing) etc.

Homoeopathic preparations are being used efficiently for increasing active principles in medicinal plants, plant detoxification for metals such as aluminum and copper, increasing plant growth rate and productivity, 3 plant metabolism 4,5 and control of diseases [6-8].

Homoeopathic drug (Zinc sulphate) exhibited growth promotion at higher potency (6X) and growth inhibition at lower potencies (1X to 5X) on *Bacopa monnieri* [9].

A study aimed at evaluating the influence of homoeopathic preparations Alumina 6cH, Alumina 12cH, Calcarea carbonica 6cH and Calcarea carbonica 12cH on the germination

and vigor of lettuce seeds subjected to toxic levels of aluminum in paper-solution concluded that Homoeopathic preparations Alumina 6cH and 12cH and Calcarea carbonica 6cH and 12cH had significant effect on the vigor of lettuce seeds subjected to stress conditions ^[10]. Sanganer and Sitapura industrial area, about 20 kms far from Jaipur city. This area is famous for textile industries i.e. Sanganer prints are famous not only in Rajasthan but also in the India. Zinc toxicity has been reported in soil of Sanganer, Jaipur Rajasthan ^[11].

It is a fact that the high potency of a drug is sometimes the best antidote for the effects of the crude drug ^[11].

Homoeopathic potentiation is a mathematico-mechanical process for the reduction, according to scale, of crude, inert or poisonous medical substances to a state of physical solubility, physiological assimilability and therapeutic activity and harmlessness, for use as homoeopathic healing remedies ^[23].

The primary object of potentiation is to reduce all substances -designed for therapeutic use to "a state of approximately perfect solution or complete ionization, which is fully accomplished only by infinite dilution." (Arrhenius.) ^[23]

Materials & Methodology

- 1. Type of Study and Study Design:** Prospective experimental controlled parallel arm study
- 2. Study site:** Dr. M.P.K. Homoeopathic Medical College Hospital and Research Centre, Saipura, Sanganer, Jaipur Rajasthan
- 3. Sample size**
 1. GROUP A: 30 Plants of *Raphanus sativus* receiving *Zincum metallicum* 6C (20 drops in 1 litre of water)
 2. Group B- 30 Plants of *Raphanus sativus* receiving normal Water
- 4. Intervention**
 1. GROUP A: 30 Plants of *Raphanus sativus* receiving *Zincum metallicum* 6C (20 drops in 1 litre of water)
 2. Group B- 30 plants of *Raphanus sativus* receiving normal Water
- 5. Dosage and repetition**
 - a. GROUP A: 20 drops of *Zincum metallicum* 6C in 1 litre of water every day
 - b. GROUP B: Normal Water every day (as required)
- 6. Data collection:**
 - a. Data collection was done every day upto germination at the same in afternoon.
 - b. After 1 week the plants were thinned leaving only 35 plants per group
 - c. After 50 days the entire plant was measured for mass, only 30 samples were included in final analysis
- 7. Variables measured**
 - a. Germination time
 - b. Plant length
 - c. Fresh matter of the shoot and the root system
- 8. Quality control:** Medicines were procured from a GMP certified pharmacy/manufacturer
- 9. Plan of analysis/statistical tools:** Difference between means of both groups

Observations & Results

A controlled interventional study was performed to evaluate effect of *Zincum metallicum* 6C on germination time, Plant length and Fresh matter of the shoot and the root system of PLANTS OF *Raphanus sativus*.

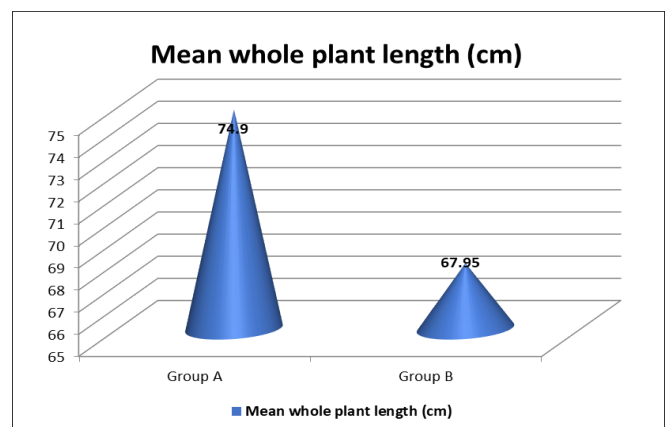
Results were analyzed comparing the mean values and standard deviation within groups:

- 1. Group A:** 30 Plants of *Raphanus sativus* receiving *Zincum metallicum* 6C (20 drops in 1 litre of water)
- 2. Group B:** 30 plants of *Raphanus sativus* receiving normal Water

Table 6.1: Whole plant length

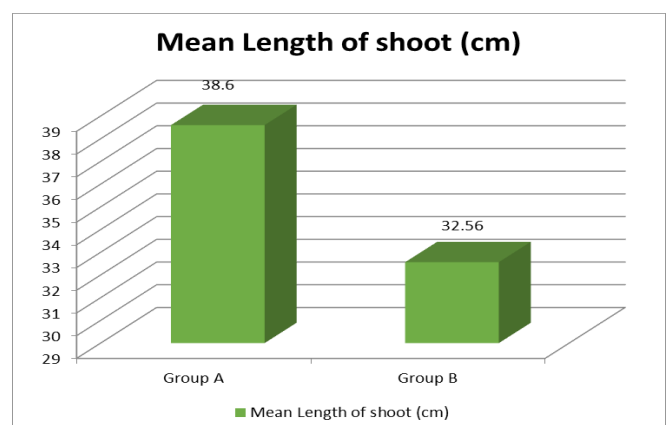
Plant attribute Mean ± SD	Group A	Group B
Whole plant length (cm)	74.9 ± 2.95	67.95 ± 4.35
Length of shoot (cm)	38.6 ± 1.28	32.56 ± 4.88
Length of root	36.37 ± 2.66	35.39 ± 2.88
Whole plant mass (gm)	270.6 ± 18.37	250.57 ± 16.13
Mass of root (gm)	179.43 ± 14.65	162.21 ± 11.35
Mass of shoot (gm)	91.17 ± 15.69	88.35 ± 15.15

The mean whole plant length of group receiving *Zincum metallicum* 6c was 74.9 cm with standard deviation of 2.95 while the mean whole plant length of control group was 67.95 cm with standard deviation of 4.35 The application of homoeopathic medicine *Zincum metallicum* 6 c increased the average plant length in relation to the control.



Graph 1: Graphical representation of mean Whole plant length

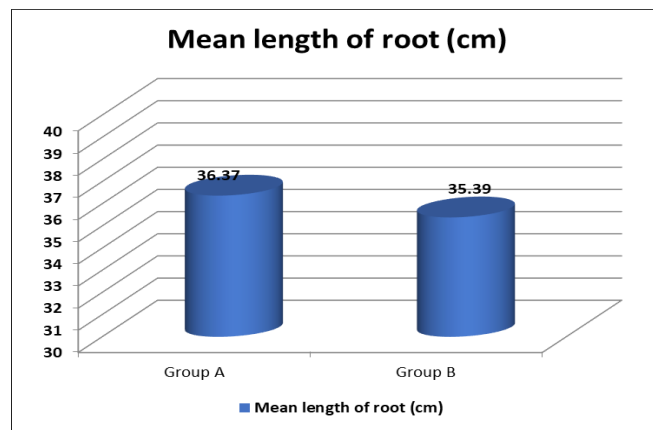
The mean length of shoot of group receiving *Zincum metallicum* 6c was 38.6 cm with standard deviation of 1.28 while the mean length of shoot of control group was 32.56 with standard deviation of 4.88



Graph 2: Graphical representation of mean Length of shoot (cm)

The mean length of root of group receiving *Zincum metallicum* 6c was 36.37 with standard deviation of 2.66 while the mean whole plant height of control group was

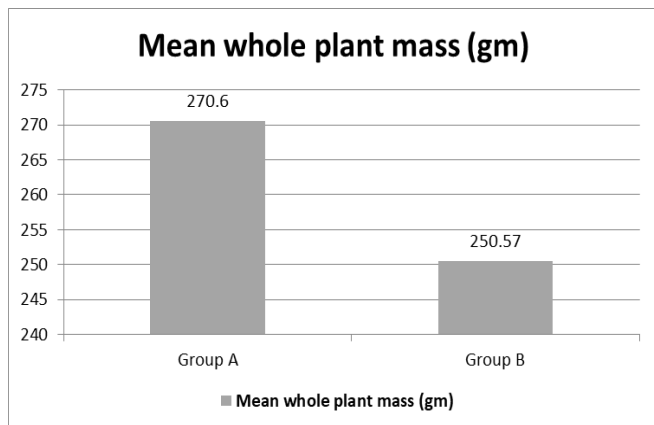
35.39 with standard deviation of 2.8813 The application of homoeopathic medicine *Zincum metallicum* 6 c increased the average plant length in relation to the control.



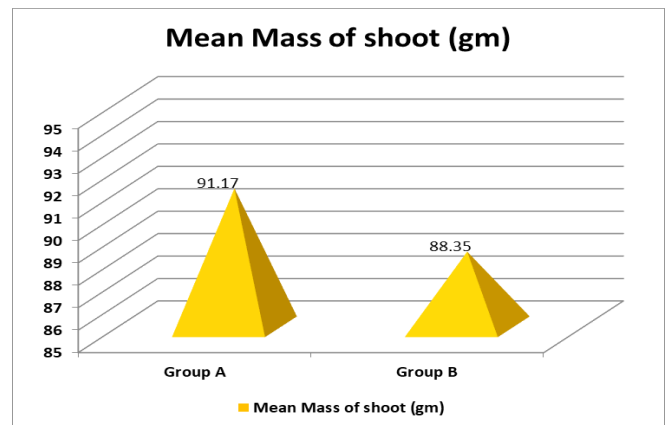
Graph 3: Graphical representation of mean Length of root (cm)

The mean whole plant mass of group receiving *Zincum metallicum* 6c was 270.6 gms while the mean whole plant mass of control group was 250.57. The application of homoeopathic medicine *Zincum metallicum* 6 c increased the whole plant mass in relation to the control.

The mean Mass of Shoot system of group receiving *Zincum metallicum* 6c was 88.35 while the mean Mass of Shoot system of control group was 35.39. The application of homoeopathic medicine *Zincum metallicum* 6 c increased the mean Mass of Shoot system in relation to the control.



Graph 4: Graphical representation of mean Whole Plant mass (gm)



Graph 6: Graphical representation of mean Mass of Shoot system

The mean Mass of root (gm) of group receiving *Zincum metallicum* 6c was 179.43 while the mean Mass of root (gm) of control group was 162.21. The application of homoeopathic medicine *Zincum metallicum* 6 c increased the Mass of root (gm) in relation to the control.

Discussion

The controlled interventional study was performed to evaluate effect of *Zincum metallicum* 6C on germination time, Plant length and Fresh matter of the shoot and the root system of plants of *Raphanus sativus*. In addition overall germination was earlier in the experimental group and more plants of control group showed yellow mottling than the experimental group.

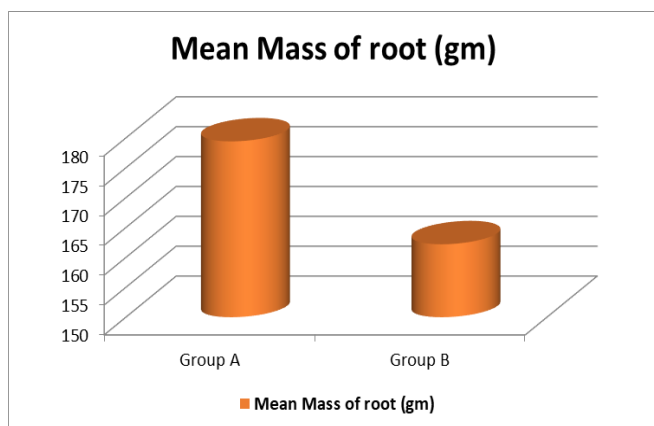
The use of homoeopathic preparations in agriculture has started recently. Homoeopathic preparations are being used efficiently for increasing active principles in medicinal plants, plant detoxification for metals such as aluminum and copper, increasing plant growth rate and productivity, plant metabolism and control of diseases [4-10].

Conclusion

The application of potentised homoeopathic medicine *Zincum metallicum* 6 c on *Raphanus sativus* demonstrated a beneficial result by increasing plant length and mass.

Limitations of the Study

The study sample size was small. The critical analysis of



Graph 5: Graphical representation of mean Mass of root (gm)

these findings were beyond the scope of this study due to smaller size and lack of investigative measures.

Further Recommendation

Homoeopathy may offer a suitable method for antidoting the effects of high levels of heavy metals on plant growth. This avenue needs to be explored with further studies on large samples for confirmatory evidence which will help in furthering homoeopathic science in addition to offering a solution for growing concerns relating to growing crops in polluted areas.

Acknowledgement

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