

# Comparative study to assess the complementary action of Homoeopathic medicines [*Phosphorus 200 CH* (mineral kingdom) and *Pulsatilla 200 CH* (vegetable kingdom)] as growth enhancers on plant *Allium cepa* L.

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## Abstract

Agro-Homeopathy is the specialized area of homeopathic practice used to treat garden and agriculture. Homeopathic preparations are being used efficiently for increasing active principles in medicinal plants, plant detoxification for metals, increasing plant growth rate and productivity, plant metabolism and control of diseases. This controlled experimental prospective study was planned to evaluate the effects of homeopathic potentised medicines *Phosphorus 200 CH* and *Pulsatilla 200 CH* on plant growth (length, diameter and mass of fresh matter of whole plant) using *Allium cepa* L. as model system in natural environment. Seeds were sown in designated area of campus of Homoeopathy University, Saipura, Sanganer, jaipur, Rajasthan, India. Total 105 plants were grown in three groups (A, B and C) each having 35 plants. They were treated with *Phosphorus 200 CH*, *Pulsatilla 200 CH* and normal water respectively. After 14 weeks all the plants were measured in their entire growth for length, bulb diameter and mass. The application of potentised homeopathic medicine *Phosphorus 200CH* and *Pulsatilla 200CH* on *Allium cepa* demonstrated a beneficial result as observed by significant difference in plant length, bulb diameter and mass between the experimental and control groups. *Pulsatilla 200 CH* induced early flowering in *Allium cepa* in relation to the control group.

**Keywords:** *Agro homeopathy, Phosphorus, Pulsatilla, Allium cepa.*

## 1. Introduction

The extensive use of synthetic fertilizers in agriculture is causing environmental problem. In this situation it is desirable to find out suitable agents, which would increase plant growth without compromising with the quality of plants and of soil. In homeopathy a substance, which produces morbid symptoms at high doses on healthy individuals, ameliorates the disease in a patient showing similar symptoms at ultra low doses.<sup>1</sup> Dynamisation or potentisation (by the process of trituration or succussion) is unique aspect of the science of Homeopathy that in comparison to simple dilution, even at higher levels, is more effective.<sup>2</sup> It is a fact that the high potency of a drug is sometimes the best antidote for the effects of the crude drug.<sup>3,4</sup> The use of homeopathic preparations in agriculture has started recently by following the above principle.<sup>5</sup> Agro-homeopathy helps build up the plant's basic structure and gives it optimum health, thus reducing and sometimes even eliminating its susceptibility.<sup>6,7</sup> Homeopathic preparations are being used efficiently for increasing active principles in medicinal plants, plant detoxification for metals such as aluminum, Phosphorus,

Sulphur and copper, increasing plant growth rate and productivity,<sup>5</sup> plant metabolism<sup>8,9</sup> and control of diseases.<sup>10,11,12</sup>

This controlled experiment prospective study is conducted to evaluate the effect of homeopathic medicines *Phosphorus 200 CH* and *Pulsatilla 200 CH* on plant growth of *Allium cepa* in natural environment as these medicines have complementary relationship in there dynamised medicinal form. It's a Hypothetical criterion for selecting *Pulsatilla* and to observe its effects on plant of *Allium cepa*. This study will help to assess and establish the role of homeopathy in propagating plant growth in natural environment conditions.

## 2. Review of Literature

### **ALLIUM CEPA (Common name: ONION):**

Onion (botanical name: *Allium cepa* L.) is an important crop in all continents with world production of about 25 million tons. It is the modification of stem which layered by underground leaves. Onion is a cool season crop that has some frost tolerance but is best adapted to a temperature range between 13°C - 24 °C. Onion is a popular vegetable everywhere and its bulb is used raw, sliced for seasoning salads, and cooked with other vegetables.<sup>13,14</sup>

### **PHOSPHORUS AND ITS ROLE IN AGRICULTURE:**

Phosphorus is most commonly found in the soil in the form of polyprotic phosphoric acid ( $H_3PO_4$ ), but is taken up most readily in the form of dihydrogen phosphate ( $H_2PO_4^-$ ). Phosphorus is an important component of plant structure, in membrane development and function. Phosphorus affects root development, quality of flowering, fruiting and seed production.<sup>15,16,17</sup> A deficiency of Phosphorus is characterized by stunted growth, weak roots, and thin shoots, dark green, purple or red leaves whereas typical phosphorus toxicity symptoms are iron chlorosis, necrosis and lack of green color in the leaves.<sup>18</sup>

### **PULSATILLA NIGRICANS:**

*Pulsatilla* is a plant. The parts of the plant that grow above the ground are dried and used as medicine.<sup>19</sup> It is a polychrest remedy in Homoeopathic drug science, which belongs to Plant kingdom. It has neither any

known effect on *Allium cepa* plant nor any previous studies suggesting so. But these medicines have complementary relationships in there dynamised medicinal form. It's a Hypothetical criterion for selecting *Pulsatilla* and to observe its effects on plant of *Allium cepa*.

## 3. Materials and Methods

**Type of Study and Study Design-** Prospective experimental controlled parallel arm study

**Study site:** Dr. M.P.K. Homoeopathic Medical College Hospital and Research Centre, Saipura, Sanganer, Jaipur Rajasthan- Onion seed were sown directly in field in designated area at campus.

**Study Duration:** 14 weeks

**Sample size-**105 plants

- Experimental Group: group A : 35 plants (receiving *Phosphorus 200 CH*)
- Experimental Group: group B : 35 plants (receiving *Pulsatilla 200 CH*)
- Control Group: group C: 35 plants (receiving only water)

### **Proposed intervention**

- Experimental Groups: (20 drops in 1 liter of water).
  - Group A: 35 plants of *Allium cepa* receiving *Phosphorus 200 CH*
  - Group B: 35 plants of *Allium cepa* receiving *Pulsatilla 200 CH*
- Control Group C: 35 plants of *Allium cepa* receiving normal water.

**Data collection:** After 14 weeks, the entire plant was measured for plant mass, bulb diameter, germination time and length.

### **Variables measured:**

- Germination time
- Plant bulb parameter
- Mass of the whole plant (shoot and root)
- Length of the plant

**Plan of analysis/statistical tools-** ANOVA<sup>20</sup>

## 4. Results and Observations

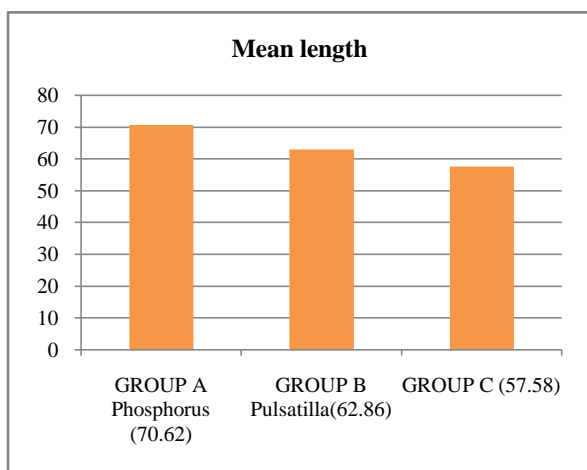
A controlled interventional study was performed to evaluate effect of *Phosphorus 200 CH* and *Pulsatilla 200 CH* on germination time, plant length and fresh matter of the shoot and the root system of plant of *Allium cepa*. Results were analyzed comparing the mean values and standard deviation within groups (A, B and C):

**Table 1:** Germination time:

	Group A	Group B	Group C
Day	12	12	16

**Whole plant length:**

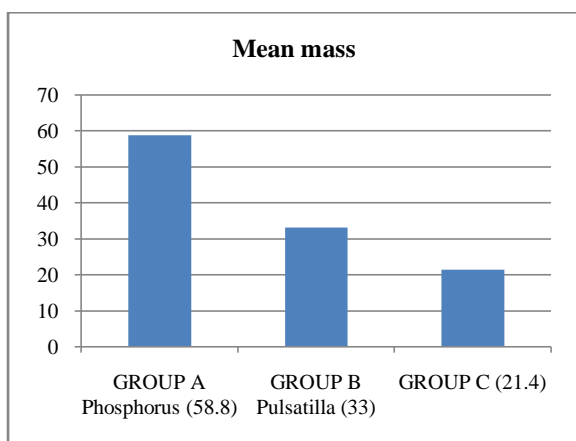
As shown in figure 1 the mean whole plant length of group A was 70.62 cm with standard deviation of 3.42 and group B was 62.86 cm with standard deviation of 11.24; while the mean whole plant length of group C was 57.58 cm with standard deviation of 16.52.



**Fig 1:** Graphical representation of mean of Whole plant length (cm)

**Whole Plant mass (in gm)**

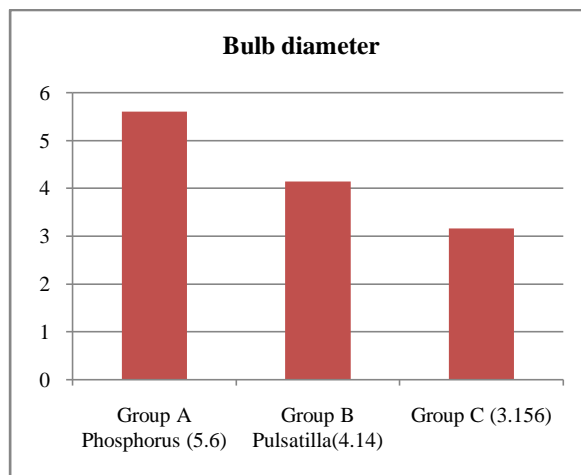
As shown in figure 2 the mean whole plant mass of group A was 58.8 gm and group B was 33 gm; while the mean whole plant mass of group C was 21.4 gm.



**Fig 2:** Graphical representation of mean Whole Plant mass (gm)

**Plant Bulb diameter (cm)**

As shown in figure 3 the mean plant bulb diameter of group A was 5.6 cm and group B was 4.14 cm. while the mean whole plant mass of group C was 3.16 cm. Bulb diameter is calculated by measuring the circumference of each plant from middle of the bulb.



**Fig.3:** Graphical representation of mean Plant bulb diameter (cm)

**STATISTICAL ANALYSIS:**

**A. Statistical analysis of Mass of plant by ANOVA method,** of Experimental Groups and Control Group.

**Table 2:** Group Statistics (ANOVA)- Mass

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	25696.689	2	12848.345	732.844	.000
Within Groups	1788.282	102	17.532		
Total	27484.972	104			

**Table 3:** Report to see the mean of MASS for each Group:

	Mean	N	Std. deviation
Group A	58.83	35	4.162
Group B	33.07	35	5.407
Group C	21.40	35	2.354
Total	37.77	105	16.246

From this we can see that the plants receiving *Phosphorus* have the highest mean mass, while plants receiving water have the lowest. There is significant difference in mass of plants receiving *Phosphorus* 200CH and *Pulsatilla* 200CH than the mass of plant receiving water

## B. Statistical analysis of Bulb Diameter of plant by ANOVA method, of Experimental Groups and Control Group.

**Table 4:** Group Statistics (ANOVA)- Bulb diameter

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	101.952	2	50.976	721.989	.000
Within Groups	7.202	102	.071		
Total	109.154	104			

**Table 5:** Report to see the mean of Bulb Diameter for each Group

	Mean	N	Std. deviation
Group A	5.56	35	0.370
Group B	4.14	35	0.197
Group C	3.16	35	0.189
Total	4.29	105	1.024

From this we can see that the plants receiving *Phosphorus* have the highest mean bulb diameter, while plants receiving water have the lowest. Thus as per ANOVA test result, there is significant difference in bulb diameter of plant receiving *Phosphorus* 200 CH and *Pulsatilla* 200 CH than the bulb diameter of plant receiving water.

## 5. Discussion

The controlled interventional study was performed to evaluate effect of *Phosphorus* 200 CH and *Pulsatilla* 200 CH on germination time, plant mass, bulb diameter and length of the plants of *Allium cepa*. The study showed that application of potentised homeopathic medicine *Phosphorus* 200 CH and *Pulsatilla* 200 CH affected the plant mass (root and shoot) system, bulb diameter and length of whole plant (root and shoot) of *Allium cepa* (onion). *Phosphorus* 200CH produces more beneficial effects than *Pulsatilla* 200CH in plants germination time, mass, bulb diameter and as well as in its length; but *Pulsatilla* 200CH induce early flowering. In addition overall germination was earlier in the experimental groups than the control group. Some plants of control group showed yellow mottling but not in the experimental groups. These findings correlate with the previous studies by Singhania<sup>2</sup> and Panda<sup>21</sup> conducted on use of potentised homeopathic medicines in plants.

## 6. Conclusion

The application of potentised homeopathic medicines *Phosphorus* 200 CH and *Pulsatilla* 200 CH on *Allium cepa* demonstrated a beneficial result by increasing plant mass, bulb diameter and length. There is reduction in germination time too, in comparison to control group. *Pulsatilla* 200 CH induced early flowering. Therefore this study demonstrates the efficacy of potentised homeopathic medicines in agriculture.

**Implication:** Homeopathy may offer a suitable method for anti-doting the effects of high levels of heavy metals on plant growth. This avenue needs to be explored with further studies on larger samples for confirmatory evidence which will help in furthering homeopathic science in addition to offering a solution for growing concerns relating to growing crops in polluted areas.

## Appendices

**Annexure 1:** Master chart of Mass of plants in Experimental and control groups-

S.No	Mass of root and shoot		
	Group A- Receiving Phosphorous 200 CH	Group B- Receiving Pulsatilla 200 CH	Group C- Receiving Water
1	58.8	33.2	20.2
2	56	28.6	21.4
3	58.3	24.5	18
4	60.1	38.7	18.3
5	55	27.7	25.1
6	62.4	32.3	19.2
7	58	40.9	26.1
8	58.3	36.1	21.4
9	55.9	33.2	23.7
10	58.8	38	21.4
11	65.3	26.2	24.6
12	63.1	24.2	23.1
13	58.8	33	22
14	57	40.5	18.4
15	62.4	28.2	25.1
16	56	37.8	21.4
17	60.2	33	18.7
18	58.3	40.9	20.1
19	61	33.4	22.1
20	57.1	29.7	23.1
21	65	35.4	20.3
22	58.3	26.2	21.4
23	55.1	30.4	19.1
24	60.1	33	21.4
25	58.8	28.1	26.1
26	63.4	27.7	20.2
27	57.3	40.9	21.4
28	58.8	32.3	18.4
29	60.1	28.4	25.2
30	56.9	33.2	21.4
31	55.85	24.2	19.3

32	62.54	39.8	22.3
33	41.8	39.3	21
34	58.3	37.6	20.1
35	66.1	41.1	18.1
Mean	58.8	33.0	21.4

**Annexure 2:** Master chart of Bulb Diameters in Experimental and control Groups—

S.No	Bulb Diameter		
	Group A- Receiving Phosphorus 200 CH	Group B- Receiving Pulsatilla 200 CH	Group C- Receiving Water
1	5	4.4	3.1
2	5.2	4.3	3.5
3	6.1	4.2	3.3
4	5.7	4	3.1
5	5.3	4.1	3.2
6	5	3.8	3.2
7	5.5	4.2	3.1
8	5.1	4	3.4
9	6	4.2	3
10	5.7	4.5	2.9
11	5.3	4	3.2
12	5.5	4.3	3.5
13	5.9	4.1	3.3
14	5.4	4.5	2.9
15	5	4.5	3.4
16	5.7	4.3	3
17	6.1	3.9	3.3
18	5.5	4.2	3.1
19	6	3.8	2.9
20	5.7	4.3	3.2
21	5.9	4.1	3.18
22	5.9	4.2	2.87
23	5.5	4.1	3
24	5	4	3.18
25	6.1	3.8	3.3
26	5.2	4.2	3.18
27	5.2	3.8	3.1
28	5.5	4.2	2.9
29	5.3	4.3	3.4
30	5.7	4.2	3.18
31	5.9	4	3.1
32	5	4.1	3.3
33	5.7	3.9	2.9
34	6.1	4.3	3.5
35	5.9	4.1	2.9
Mean	5.56	4.14	3.16

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