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Assessing the Impact of Phosphorus 30C and 200C Potencies on the Growth and Yield of Pisum Sativum (Green Pea)

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Pisum Sativum is one of the commonest crops grown in India. Therefore, increasing the yield of green pea plants without harming the soil with chemicals are important. In places wherever there is deficiency of phosphorus in soil resulted in decreased production of green pea plants. The parameters were analysed by using statistical tool ANOVA test. The Conclusion derived from the study was Phosphorus 200C has significantly influenced in the growth and yield of Pisum Sativum plant in regards to Height of the plant, Number of Pods per Plant, Length of the Pod, and Number of Seeds per Pod.

Keywords: Pisum sativum; phosphorus; commonest; green pea plants.

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1. INTRODUCTION

"Vegetable pea *(Pisum sativum*) is an important vegetable belonging to the family *Leguminosa*e" [10]. In India 49% of production comes from Uttar Pradesh [11]. Green peas are rich sources of proteins and they also contain different nutrients and minerals [10]. Like lentils peas are also good sources of dietary phosphorus [3]. "Green peas are important part of our diet due to presence of carbohydrates, proteins, vitamins, minerals and other nutrients. Green peas are high in fiber and protein and these are also a powerhouse of vitamins, minerals antioxidants and phytonutrients. They lower cholesterol and manage blood sugar levels" [1].

"Phosphorus is needed to promote the development of extensive root systems and vigorous seedlings in case of pea plants. Application of nitrogen and phosphorus to pea crop usually results in increased pod and seed yields" [6]. "In peas increasing the phosphorus levels, generally increase the plant height, number of pods per plant, pod length, number of seeds per pod and pod weight" [4]. "Phosphorous is essential for seed production, it not only enhances the root growth but also promotes early plant maturity". [4] Fertilizers are used to supply pea plant with nitrogen, phosphorus and potassium in ratio of 5%,10%and 10% respectively. Higher amounts of phosphorus and potassium will favor more yield production.

Phosphorus is an important element for enzyme binding in Kreb' s cycle [5]. Its deficiency shows discoloration of leaves and stems, stunted growth, reduced quantity and quality of seeds.

Cultivation of pea is highly profitable and attractive to the farmers for its short durability and high price. It takes about 55 to 75 days from sowing for its green pod harvest and 75 to 100 days for matured seed harvest.

"Compost improves the soil proportion and finally the crop yield, but in view of its inadequacy and low availability of nutrients productivity per unit area is poor. In such cases supplementing phosphorus through inorganic sources thus plays vital role in increasing the yield of this crop. There-fore present investigation was done to undertake the study of effect of phosphorus on Pisum sativum" [6].

"Pisum sativum (Family: Fabaceae), as known as green pea or garden pea, has long been important in diet due to its content of fiber, protein, starch, trace elements, and many phytochemical substances. It has been shown to possess antibacterial, antidiabetic, antifungal, anti-inflammatory, antihypercholesterolemia, and antioxidant activities and also shown anticancer property. Its nonnutritive biologically active components include alkaloids, flavonoids, glycosides, isoflavones, phenols, phytosterols, phytic acid, protease inhibitors, saponins, and tannins. This plant is rich in apigenin, hydroxybenzoic, hydroxycinnamic, luteolin, and quercetin, all of which have been reported to contribute to its remedial properties including anticarcinogenesis property. Based on established literature on the anticancer property of *P. sativum* and possible mode of action, this review article has focused to demonstrate that *P. sativum* could be further explored for the development of anticancer treatment" [15].

"Legume or pulse is one of the traditional medicines used globally because it has the number of nutritional substances and has the efficiency of therapeutic treatments. Legumes include beans, grains, and peas as well as alfalfa, carob, clover, coplayer, fenugreek, indigo, lentil, licorice, lupin, mesquite, natto, soybean, peanut, rosewood, and tamarind are the member of the Fabaceae family. The nutritional values of legume are low fat, high protein, dietary fiber, and various of micronutrients and phytochemical substances which exhibit the medicinal properties, especially anticancer property. Pea is one of the major food legumes that can grow in different regions, and it ranks the fourth in world food legume productions next to soybean, peanut, and dry bean. Seed and sprout of pea have become increasingly consumed because people concern about their health problem by changing dietary habits. The present review explores scientific evidences to provide updated information about the properties of green pea or garden pea (*Pisum sativum*), one of the anticancer plants that is being investigated for its mechanism. The taxonomy of *P. sativum* is in the Kingdom (*Plantae*); Subkingdom (*Viridiplantae*); Infrakingdom (*Streptophyta*); Super division (*Embryophyta*); Division (*Tracheophyta*); Subdivision (*Spermatophytina*); Class (*Magnoliopsida*); Superorder (*Rosanae*); Order (*Fabales*); Family (*Fabaceae*); Genus (*Pisum*); and Species (*P. sativum*)" [15].

1.1 Phytochemical Substances

"Active phytochemical substances of *P. sativum* are as follows: Asparaginase; flavonoids

including apigenin, daidzein, genistein, and kaempferol; lectin; phenolic compounds including caffeic, catechin, coumaric acids, gentilic acids, ferulic, protocatechuic, and vanillic acids; The pisatin and an allelopathic active substances; proanthocyanidin; saponins; steroid phytohormone including brassinosteroid; and tannins" [15].

1.2 Traditional Uses

"P. sativum can be consumed in raw form as well as cooked or frozen form. The various bioactive compounds' current uses or phytochemical properties of *P. sativum* from several literature reviews are antibacterial, anti-*Helicobacter pylori*, anticancer, antidiabetic, antifungal, anti-inflammatory, antilipidemic, and antioxidant activities. Moreover, it can act as insecticidal activity" [15]

2. PHYTOCHEMICAL SUBSTANCES WHICH ACT AS ANTICANCER ACTIVITY

"Isoflavones worked as phytoestrogens and could inhibit tumorigenesis both *in vitro* and *in vivo* studies. Their mechanisms were DNA repair, induction of apoptosis, cell proliferation, migration, and invasion" [15].

"There are the most abundant lectin proteins in several legume tree barks, and they have great potential as antitumor and anticancer properties" [15] cytotoxicity or tumour inhibition mechanisms of lectins to various tumour cell lines such as skin liver, bile duct, and bone cell lines.

"A number of legumes contain saponins such as soybean, chickpea, peanut, and lentil, which have reported to exhibit anticancer activities. Several studies suggest that legume saponins may possess anticancer activities in melanoma cell, colon cancer, and cervical cancer. The mechanism of suppressing the metastatic of cancer was mentioned by Chang *et al*. using sialyltransferase inhibition activity of saponin on the cell surface. The other mechanism was saponin regulation of the apoptosis pathway enzymes, leading to programmed cell death of cancer cells" [15].

"Pea (Pisum sativum L.) is a popular pulse crop of India. Pea (Pisum sativum L.) is a popular pulse crop of India and belongs to family Leguminoseae. It is a native of Southern Asia, was among the first crop cultivated by man. Pea is a cold season crop in many parts of the world. There are two types of cultivated pea, the garden pea and the field pea. Garden pea is harvested in an immature condition to be cooked as a green pea delicious dish or uncooked vegetable. It is also used for dehydration (or sun dried), canning and freezing. Pulses are good sources of proteins for a majority of the population in India. Pulses contribute 11% of the total intake of proteins in India. About 89% consume pulses at least once a week. Pulses are not only rich in protein but also have essential amino acid compared to cereal protein. They provide energy to the tune of 372K cal/100g. They also contain other nutrients such as C, Fe and vitamins viz., β-carotene, thiamine, riboflavin and niacin" [8].

"Optimum spacing is necessary to obtain maximum yield in any crop by reducing the competition among the plants for light, nutrient, moisture, etc. It depends on size of plant, elasticity, nature of the plant, capacity to reach optimum leaf area at an early date and seed rate used. Optimum spacing for any crop varies considerably due to environment under which it is grown. It is not possible to recommend a generalized optimum spacing since the crop is grown in different seasons with different management practices in different soil type. So, optimum spacing differs depending on the environmental conditions and plant type. But till date no research work is conducted in this regard for the said variety. Therefore, keeping in view the above aspects the present investigation "Effect of spacing on growth and green pod yield of pea (Pisum sativum L. subsp. hortense) local cultivar Makhyatmubi" is done" [8].

"Growth stimulation of dwarf peas (Pisum sativum L.) through homeopathic potencies of plant growth substances. Efficacy of higher homeopathic potencies is controversial. Universally accepted specific detection assays for homeopathic dilutions do not exist. Basic research has to develop a spectrum of standardized tools to investigate the mode of action and nature of homeopathic potencies. Green Pea seed (Pisum sativum L.) is immersed for 24 hours in homeopathic potency or control solutions for soaking. Plants germinate and grow in a standard cultivation substrate under controlled environmental conditions. Shoot length is measured 14 days after planting. A screening of homeopathic potencies (12x-30x) of four different plant growth substances revealed biological activity of certain potency levels of

gibberellin and kinetin ($p < 0.05$). Growth stimulation through gibberellin 17x (5 x 10(-18 M)) was assessed in six independent replications; results confirmed those of the screening ($p < 0.05$). The effect of gibberellin 17x seemed to weaken during the course of the experiments" [17].

Red soil is known as omnibus soil. The presence of ferric oxide gives a red color to this soil. This soil is mainly found in the eastern and southern parts of Orissa, Chhattisgarh, deccan plateau and southern parts of middle ganga plain. wheat, pulses, tobacco, oilseeds, potatoes are the major crops which are grown in red soil. And it has lesser concentration of nitrogen, phosphorus, potassium and organic matter [19].

"Green peas grow well in red soil it has high percentage of iron oxide and is porous in nature. Ph value of it ranges between 6.6 and 8.0. many soils, from sand to heavy clay, are good for peas as long as you have well drained soil. Peas grow better in soil with a pH between 6- 7.5" [17].

Pea (Pisum sativum L.) requires little water to grow, and therefore, provides an important pulse crop in dryland cropping systems. Pea supplies protein and fibre for human and livestock diets, particularly for vegetarian people in developing countries with limited protein sources and acts as a starch source widely used in processing noodles. From a soil fertility perspective, pea fixes more N from the atmosphere than lentil (Lens culinaris L.) and cowpea (Vigna unguiculta L.) (Miller et al., 2003b) and needs little P or K fertilizer to grow than other legumes.

In the semiarid region of the northern Great Plains, USA, traditional cropping systems that include conventional tillage with spring wheat (Triticum aestivum L.)–fallow have not only degraded soil quality by increasing soil erosion and reducing organic matter, but also decreased annualized yield. To replace fallow and enhance cropping intensification, pea has been increasingly grown in these regions in rotation with cereals. The rotation not only increased crop yields, but also reduced the risk of crop failure, enhanced biodiversity, and increased farm income. As a result, since 1970, the pea area has steadily increased, whereas fallow area decreased.

In addition to other crop production benefits, pea improves soil and environmental quality. Pea residue increases N supply due to higher N concentration from N fixation or lower C/N ratio than non-legumes, which increases N mineralization, thereby reducing N fertilization rates, and enhances soil water availability to succeeding crops due to its lower water requirement than nonlegume crops. Pea reduces the weed, pest, and disease pressure; increases P, K, and S availability due to their greater concentrations than other crops; improves soil structure; and mitigates greenhouse gas emissions compared with continuous non-legume crops.

Recommendations of improved crop cultivars in a region are usually based on their growth performance and yields over a wide range of soil and climatic conditions. These processes often fail to account for management practices that may enhance crop production. With limited global land resources, food production must be increased by twice as much to meet the demand of 9 billion people by 2050 .This can be achieved by including management practices during the recommendation of crop cultivars, called the genetics × environment × management interaction, which accounts for the efficient utilization of soil water and nutrients and reduces weed and pest infections, thereby increasing crop yields .The process will also result in resilient and sustainable production of crops in a changing climate.

"Pulses, including peas, have long been important components of the human diet due to their content of starch, protein and other nutrients. More recently, the health benefits other than nutrition associated with pulse consumption have attracted much interest. The focus of the present review paper is the demonstrated and potential health benefits associated with the consumption of peas, Pisum sativum L., specifically green and yellow cotyledon dry peas, also known as smooth peas or field peas. These health benefits derive mainly from the concentration and properties of starch, protein, fibre, vitamins, minerals and phytochemicals in peas. Fibre from the seed coat and the cell walls of the cotyledon contributes to gastrointestinal function and health, and reduces the digestibility of starch in peas. The intermediate amylose content of pea starch also contributes to its lower glycaemic index and reduced starch digestibility. Pea protein, when hydrolysed, may yield peptides with bioactivities, including angiotensin I-converting enzyme inhibitor activity and antioxidant activity. The vitamin and mineral contents of peas may play important roles in the

prevention of deficiency-related diseases, specifically those related to deficiencies of Se or folate. Peas contain a variety of phytochemicals once thought of only as antinutritive factors. These include polyphenolics, in coloured seed coat types in particular, which may have antioxidant and anticarcinogenic activity, saponins which may exhibit hypo-cholesterolaemic and anticarcinogenic activity, and galactose oligosaccharides which may exert beneficial prebiotic effects in the large intestine" [21].

"Drought stress has become an important factor affecting global food production. Screening and breeding new varieties of peas (Pisum sativum L.) for drought-tolerant is of critical importance to ensure sustainable agricultural production and global food security. Germination rate and germination index are important indicators of seed germination vigor, and the level of germination Vigor of pea seeds directly affects their yield and quality. The traditional manual germination detection can hardly meet the demand of full-time sequence non -destructive detection. We propose YOLOv8-Peas, an improved YOLOv8-n based method for the detection of pea germination vigour" [17].

"Genistein is a naturally occurring isoflavone found mainly in soybean, but also green peas, legumes, and peanuts. Genistein is found to pass through the blood-brain barrier and possess a neuroprotective effect. In this review, we discuss studies in support of these actions and the underlying biological mechanisms. Together, these data indicate that genistein may hold neuroprotective effects in either delaying the onset or relieving the symptoms of neurodegenerative disease" [14].

"The present study aims to improve the availability of P to plants by applying a readily available source of P fertilizer in combination with foliar biostimulant applications for direct absorption by German chamomile plants. The results suggested that the combination of a synthetic P nutrient source and biostimulants can positively affect plant growth, flower yield, and EO composition. According to research, optimal utilization of P fertilizer and biostimulants improved the performance of German chamomile concerning flower production, biomass of flowers, and EO yield. The present research suggested that the utilization of P fertilizers and plant-based biostimulants is efficient for crop improvement in acidic soils, thus contributing to increased yield goal of growers" [18.

"The systemic agro-homeopathic approach considers the farm as a single organism, an agroecosystem of living and non-living elements, which establishes a dense network of interactions. Its purpose is to strengthen and intensify the relationships among the organisms to create a stronger and healthier agroecosystem, involving all the organisms within the agroecosystem. To fulfill this aim, the described approach allows one to control and manage the agricultural processes through the application of highly diluted and dynamized natural substances. The latter might restore the equilibrium in the agroecosystem by stimulating the natural resistance already present in the agrarian system. The identification of the correct mineral remedy, through the biotypes and pathogenesis levels, could allow one to act on the chronic conditions of the agroecosystem (imbalance in plant primary metabolism or cellular levels), whereas, the identification of plant/animal homeopathic remedy, based on the principle of metabolic similarity, might allow the management of the acute conditions (phytopathological diseases)" [3].

"Till now, the systemic agro-homeopathic approach has been adopted by some farmers in Europe, particularly in Italy, for about six years and it is increasing interest, especially among organic producers. To date, several observations have been reported by farmers (personal communications), providing positive and encouraging perspectives, but some rigorous scientific experimentation at the farm level is needed to validate such results. If statistical data from field trials were to confirm the observations made so far, the systemic agro-homeopathic approach could represent an agroecological production model with a very low energy impact. Additionally, this approach could be in line with the current European community orientation (European Green Deal), which aims to promote a type of sustainable agriculture. In this context, systemic agro-homeopathy would meet the three pillars of sustainability: (1) economic, due to the very low use of raw materials; (2) environmental, by avoiding the use of chemical substances such as fertilizers, pesticides, etc.; and (3) social, with the production of healthy, safe, and high-quality food" [3].

2.1 Phosphorus

Phosphorus in homeopathy is prepared from the red amorphous phosphorus. The process of trituration helps to extract the medicinal

properties of red amorphous phosphorus. It is used for treating large variety of disease conditions without any side effects like anxiety, fears, hair-fall, dandruff, cough, bronchitis, pneumonia, nose bleeding, gastritis, glaucoma, hoarse voice and excessive bleeding. It is suited especially to tall, slender, narrow chested persons, who has fair skin, blonde or red hair, and delicate eyelashes. Nervousness and sensitiveness in nature marked. Adapted to young people, who grow too rapidly and tend to stoop, and persons who have tendency to bleed easily.

"Phosphorus improves the general characteristics in plants and results in production of larger stem diameter, with the application of this medicine. Phosphorus was absorbed faster by the plant tissues, which caused a greater growth, leaf development, and fruit size besides favoring the concentration of anthocyanins and promoting a greater photosynthetic activity. Phosphorus in homoeopathy is meant to add dynamism to life" [22].

2.2 Aim

- To know the efficacy of Phosphorus 30c and 200c on growth and yield of Green Peas.

2.3 Objectives

1. To know the effectiveness of Homoeopathy in plant culture.
2. To know the efficacy of Phosphorus 30c and 200c on growth and yield of Green Peas.

3. MATERIALS AND METHODS

Type of study: - Agro-Homoeopathy.

Study design: - Experimental study.

Study setting: - The study was conducted in MNR homoeopathic medical college premises in GREEN HOUSE with good sunlight and ventilation.

Sample size: - Total sample size is 15 plants. Each group contains 5 plants to analyze the parameters.

Selection criteria

- Inclusion Criteria: - Healthy seeds of green peas variety was taken.
- Exclusion Criteria: - Unhealthy seeds are not taken.

MATERIALS USED

- Red soil: -

As green peas grow well in red soil. I have selected the red soil for my study and it is taken from a Nursery in and around Sangareddy.

- Vermicompost.

  It is collected from Acharya NG Ranga Agricultural University, Hyderabad.

Plant height of pea was significantly increased by different vermicompost levels. Under the present investigation, the maximum significant plant height was recorded under vermicompost treatment. The maximum growth of pea with the application of vermi- compost was noticed.

- Seeds: non hybrid seeds of Green peas are procured from reliable local dealer.
- Drugs: Phosphorus 30C and 200C is procured from authentic Homoeopathic Pharmaceuticals Industrial outlet.

3.1 METHODS

Three separate groups will be created and each group contains 5 plants.

- Group A: Plants without addition of any medicine.
- Group B: Plants will be given Phosphorous 30c.
- Group C: Plants will be given Phosphorus 200c.

Sunlight, Water and Nutrients will be equally supplied for all the groups.

- Sprouted Seeds will be directly planted in the pots.
- The medication will be initiated after the germination and repeated once in seven days.

The parameters of each group are analyzed individually and data is thus tabulated accordingly to the table given table.no:1,2,3. The statistical data is analyzed by ANOVA one tail test. Study was conducted at the green house for 6months to 8 months with 15 plants as sample size.

BRIEF OF PROCEDURES

- Non hybrid varieties of green pea Seeds are procured from authentic local dealer on 20/09/2023.
- And soaked the seeds for 24 hours and the seeds started to sprout after soaking for 24 hours in wet cloth.
- These sprouted seeds are sowed in soil on 22/09/2023., 30 seeds are sowed.
- Seeds started to germinate on day 5th i.e., on 27/09/2023.
- And the germination started in 17 seeds out of 30 seeds.
- After two weeks of sowing the height of the plant is 7cms.
  And number of leaves are 19-22 for each plant.
- Healthy plants were separated and placed under 3 groups A, B, C.
- all the requirements like water sunlight were provided equally for all the three groups.
- All the essential nutrients were also been supplied equally.
- Then, after Phosphorous of two potencies i.e., 30C and 200C were being administered for groups B and C respectively. 10 drops of phosphorus dilutions were diluted in 10 liters of water and being administered for every three days except for the control group or for group A.
- No other fertilizers are being used in this procedure.
- The temperature and pH of the soil is monitored regularly.
- Group A-The control group plants grown upto 7-17 cms after 20 days. 2 out of 5 plants were attacked by aphids and caused bacterial blight, and powdery mildew and plant started to die gradually.
- Group B- the plants which are been treated with phosphorus 30c potency started flowering after 32 days of sowing the seeds.
- Group C-Plants started flowering after 30-34th days i.e., on 27/10/23-01/11/2023, early maturity, green pods started to grow from days 45-50 and full maturity happened 65- 78 days after sowing the seeds.
- The yield is collected and the following parameters are analyzed from three groups.
- Following are the parameters used to record and analyze:

1. Height of the plant.
2. Number of pods per plant.
3. Length of the pod.
4. Number of seeds.

3.2 Statistical Techniques and Data Analysis

- After study completion the results was represented by different statistical methods with proper analysis by using ANOVA test.

3.3 Plan for Data Analysis

- The collected data was analyzed by ANOVA TEST.
- There is no conflict of interest.

4. RESULTS

GROUP-A

The non hybrid seeds of green peas were taken from local authentic dealer and soaked for 24 hours and after sprouting the seeds were sowed in soil on 22/09/2023 and the seeds started to germinate out of 5 germinated two plants died in between the study by showing symptoms like marginal necrosis and chlorosis with premature drop of leaves with young shoot tip cessation, failure to flower with lesions around the stems and petioles and the plants become wither off. The remaining 3 plants showed mild growth and yield.

GROUP-B

The non hybrid seeds of green peas were taken from local authentic dealer and soaked for 24 hours and after sprouting the seeds were sowed in soil on 22/09/2023 and the seeds started to germinate on 27/09/2023. And homoeopathic Phosphorus 30C was supplied by diluting in water for every three days. And moderate growth is noticed when compared to other two group of plants.

GROUP-C

The non hybrid seeds of green peas were taken from local authentic dealer and soaked for 24 hours and after sprouting the seeds were sowed in soil on 22/09/2023 and the seeds started to

germinate on 27/09/2023. And homeopathic phosphorus 200C was supplied by diluting in water for every three days. And overall production and yield was more in this group of plants when compared to other two group of plants.

Fig. 1. Phosphorus raw

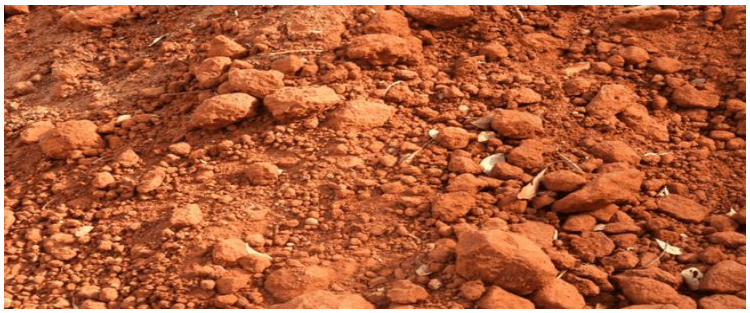

Fig. 2. Red Soil

Fig. 3. Green Pea Seeds

Fig. 4. Red Phosphorus

Fig. 5. Phosphorus 30 C

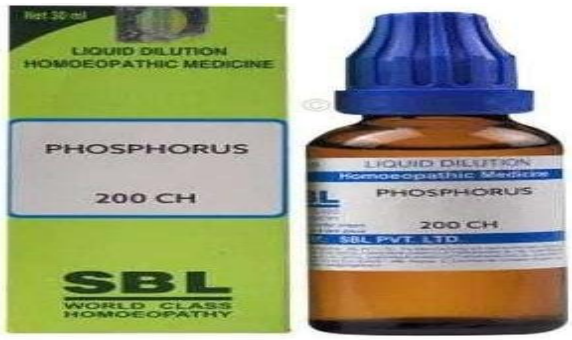

Fig. 6. Phosphorus 200 C

Fig. 7. (A): - 22/09/2023

Fig. 7. (B): -17/10/2023

(Germination of sprouted seeds)

Fig. 7. (C): - 25/10/2023

Fig. 7. (D): - 29/10/2023

Fig. 8. (A): - 27/09/2023 **Fig. 8. (B): - 25/10/2023**

(Seeds started to germinate)

Fig. 8. (C): - 29/10/2023 **Fig. 8. (D): - 28/11/2023(pods)**

Fig. 9. (A): - (27/09/2023) **Fig. 9. (B): - 27/10/2023**

(Germination)

Fig. 9. (C): - 02/12/2023

Fig. 9. (D): - 04/12/2023

Fig. 9. (E): - 14/12/2023

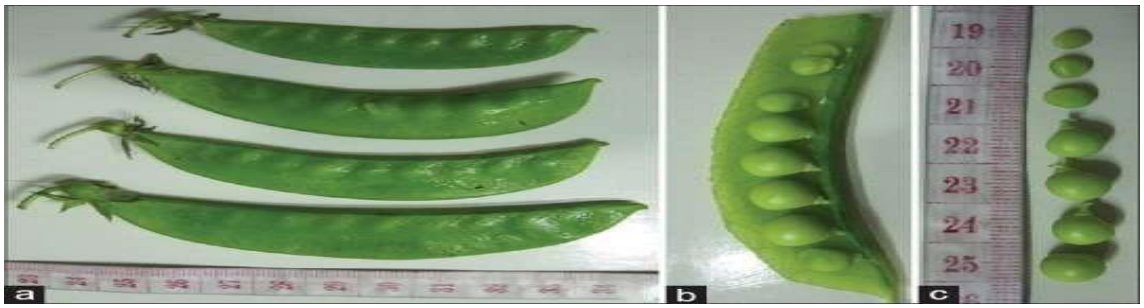

Fig. 9. (F): - 14/12/2023

Table 1. Height of the Plant

PLANT NO.	GROUP-A	GROUP-B	GROUP-C
1.	19cms	40cms	52cms
2.	10cms	35cms	49cms
3.	-	31cms	56cms
4.	-	32cms	61cms
5.	7.5cms	27cms	42cms

Table 2. Number of pods per plant

PLANTNO.	GROUP-A	GROUP-B	GROUP-C
1.	9	47	69
2.	5	41	50
3.	-	38	71
4.	-	38	74
5.	3	29	42

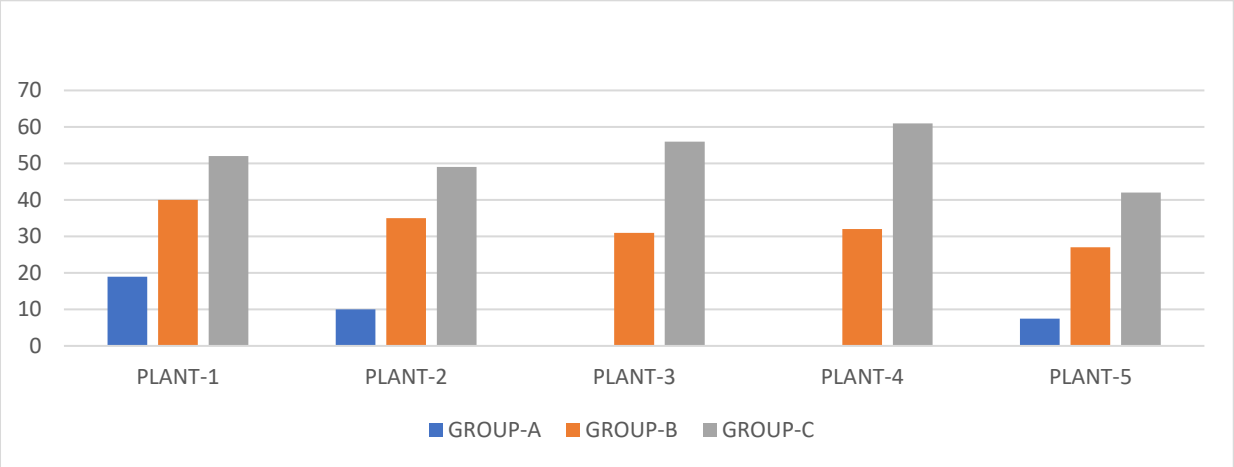

Fig. 10. Height of the Plant

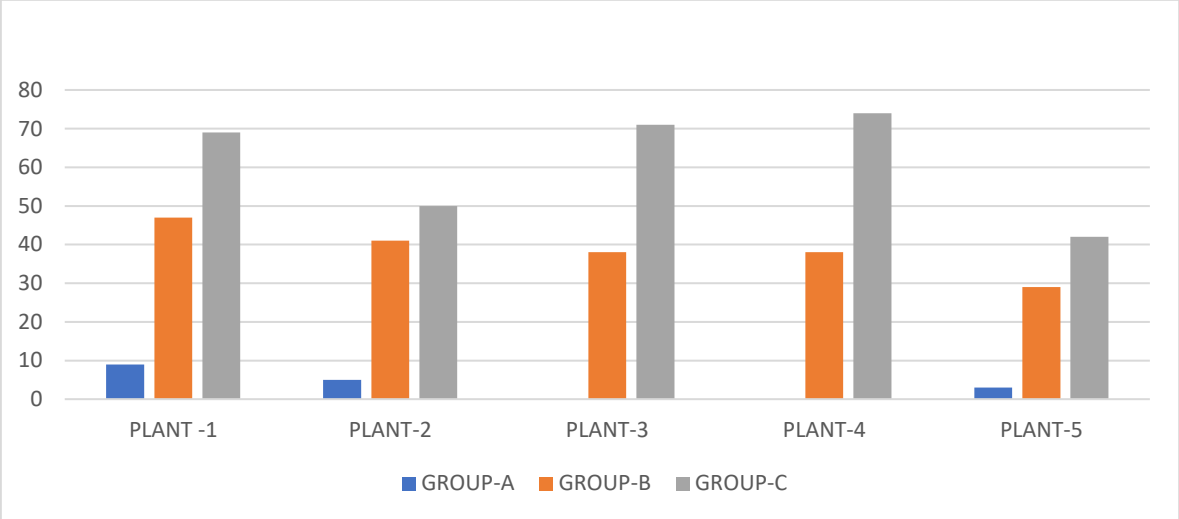

Fig. 11. Number of pods per plant

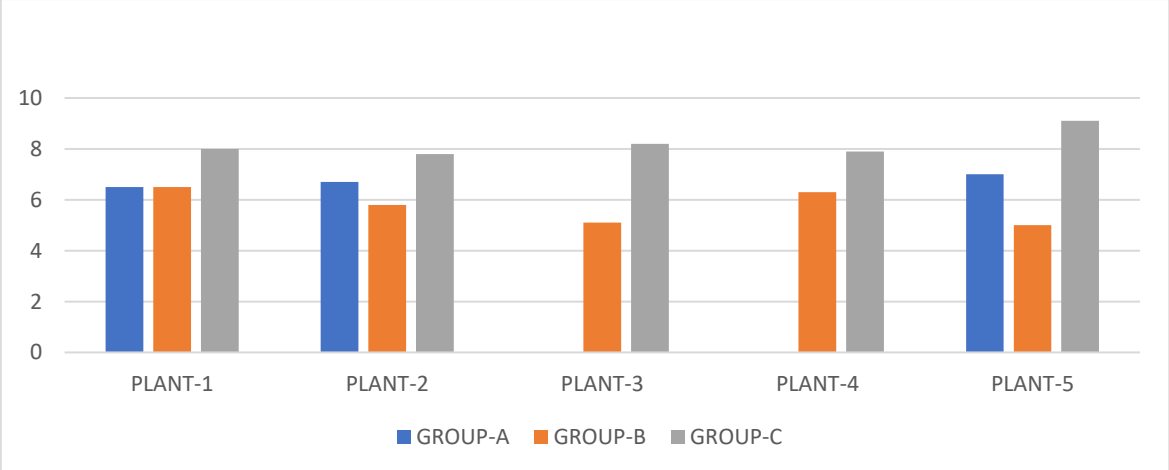

Fig. 12. Length of the pod

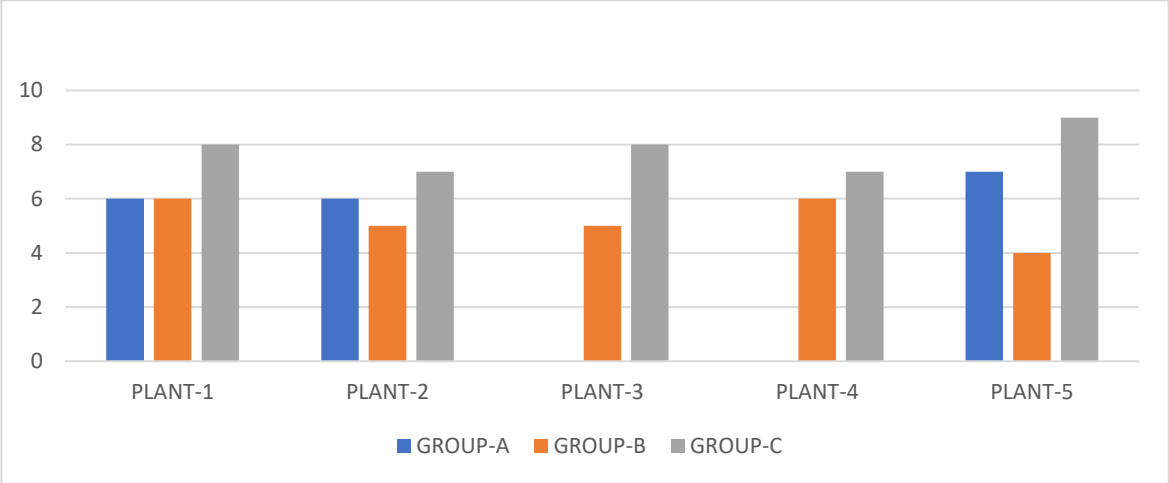

Fig. 13. Number of seeds per pod

Table 3. Length of the pod

PLANT NO.	GROUP-A	GROUP-B	GROUP-C
1.	6.5	6.5cms	8cms
2.	6.7cms	5.8cms	7.8cms
3.	-	5.1cms	8.2cms
4.		6.3cms	7.9cms
5.	7cms	5.0cms	9.1cms

Table 4. Number of seeds per pod

PLANT NO:	GROUP-A	GROUP-B	GROUP-C
1.	6	6	8
2.	6	5	7
3.	-	5	8
4.	-	6	7
5.	7	4	9

Table 5. Statistical analysis

Source of variation	Sum of Squares	Degree of Freedom	F – ratio
Between the samples	Sum of Squares between the samples= 731.07	K-1 3-1= 2	365.5/ 29.5 = 12.38
Within samples	Sum of squares within the samples= 354	R-K 15-3= 12	12.38 F-ratio

4.1 Parameters Analysed

Parameters like height of the plant, height of the pods, weight of the pods and no.of pods are been analysed and the tables are related to this.

Findings: In regards to Height of the plant: in group A which is of control group has shown less growth while in Group B has showed slight growth with 30C potency, whereas in Group C has showed good results with 200C potency.

Findings: Group A or control group plants produced less number of pods, while Group B plants produced moderate number of pods with 30C potency whereas Group C plants produced more number of pods per plant with 200C potency.

Findings: Length of each pod in Group A plants is 6-7 cms while in Group B plants the length of each pod varied between 5- 6.5 cms with 30C potency, whereas in Group C the length varied between 7-9cms with 200C potency.

Findings: In group A the number of seeds per pod are between 6-7 without any medicine while in group B plants the number of seeds were between 4-6 with 30C potency, whereas in Group C the number of seeds is between 7-9 per pod with 200C potency.

This Table shows that the calculated value of 'F' ratio is 12.38 which is more than the table value of 3.4903 at 5% level with degree of freedom. V1 =2 and V2= 12.

This analysis supports the research hypothesis of difference in means. So Green pea is having difference between the potencies and within the potencies. So, the study is highly significant.

5. DISCUSSION

In regards to height of the plant, phosphorus 200C acted well when compared to the plants of control group and plants of phosphorus 30C group. In a group 200C showed significant increase in number of pods per plant and length of the pod and number of seeds per pod.

In case of plants of Group A which are not been treated with phosphorus, 2 plants out of 5 plants died in between the study by showing symptoms marginal necrosis and chlorosis with premature drop of leaves with young shoot tip cessation, failure to flower with lesions around the stems and petioles and the plants become wither off. The remaining plants showed mild growth and yield when compared to other two group of plants which are been supplied with homoeopathic phosphorus of potencies 30C and 200C.

In case of plants of Group-B all the five plants showed moderate growth in height of plant, no. of pods per plant, length of the pod and no. of seeds per pod which were supplied with Phosphorus 30C potency.

In case of Group-C plants all the five plants showed marked results when compared to the other two groups; in regards to height of the plant, number of pods per plant, length of the pod and number of seeds per pod which were supplied with dilutions of Phosphorus 200C.

Total yield including other parameters like height of the plant, number of pods per plant, length of pods and number of seeds per pod of Pisum sativum is having good result with 200C potency of phosphorus when compared to that of control group and 30C potency group.

Therefore, Phosphorus 200C alleviates growth and production of Pisum Sativum and reduces the effects caused by Phosphorus deficiency.

6. SUMMARY

Pisum Sativum is one of the commonest crops grown in India. Therefore, increasing the yield of green pea plants without harming the soil with chemicals are important. In places wherever there is deficiency of phosphorus in soil resulted in decreased production of green pea plants. Hence phosphorus is thus selected "to investigate and compare the efficacy of phosphorus on growth and yield of Pisum Sativum (Green Peas) with two different potencies of homoeopathic phosphorus dilutions.

For the study 15 plants were taken and divided into 3 groups which includes group-A named as control group, Group-B plants which are been supplied with Phosphorus 30C and Group-C plants which are been treated with Phosphorus 200C. The plants of Groups A and B were administered with dilutions of Phosphorus 30C and 200C respectively directly by diluting in water every third day. No other fertilizers or chemicals were added. Following are the parameters which are recorded -Height of the plant, Number of pods per plant, Length of the pod and Number of seeds per pod.

And the data was then analysed by using statistical tool ANOVA test. Conclusion derived was Phosphorus 200C has significantly influenced in the growth and yield of Pisum Sativum plant in regards to Height of the plant, Number of Pods per Plant, Length of the Pod, and Number of Seeds per Pod.

7. CONCLUSION

The aim is to avoid fertilizers which may affect the health of human beings. So, to develop the organic farming, application of homeopathic medicines for agriculture is playing a key role in healthy cultivating practices. Concluding the above discussed points, we derive the conclusion stating that Phosphorus 200C had significantly influenced the growth and yield of green peas thereby contributing to rise in the economic output. Further studies are required on large scale to validate and confirm the current findings. In addition to the yield, nutritive value can also be analysed to have a detailed overview of the same.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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