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## **Self Study Report (1<sup>st</sup> Cycle )**



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#### **Research, Innovation and Extension**

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**3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during the last five years**

**Academic Year 2020-21**

<b>Sr. No.</b>	<b>Title of paper</b>	<b>Name of the author/s</b>	<b>Name of journal</b>	<b>ISSN number</b>	<b>Page No.</b>
1	Enhancement of Growth of Onion By Using Phosphate Solubilizing Bacteria	Mrs.Sunita Gadekar	International E- Research Journal	2348-7143	04-10
2	Effect of Air Pollution on Chlorophyll Content of Leaves for Polluted or Non Polluted Areas Photosynthetic Pigment In Plant	Miss.Yashoda Neel	International E- Research Journal	2348-7143	11-17

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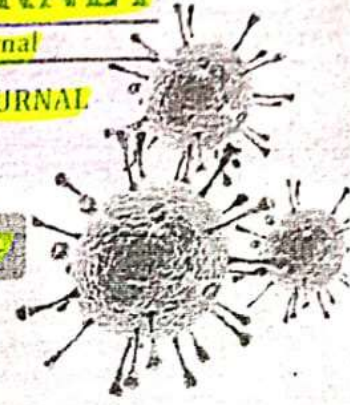
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## Enhancement of Growth of Onion (*Allium Cepa. L.*) By using Phosphate Solubilizing Bacteria

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### Abstracts:

Phosphate solubilizing bacteria (PSB) and interact synergistically because PSB solubilize sparingly available phosphate compounds in to orthophosphate that AMF can absorb and transport to the host plant.

"A field experiment was conducted during rabbi season of 2018 at vegetable research farm Department of botany in botanical garden". The experiment design was arranged in split plot. split plot design with to replicate onion seedlings were planted on 3.4 cm with ridges of 10cm the (after is days) concentration treatment in 0.1%,0.2%,0.3%,0.4,0.5% and control.

**Key words-** Phosphate solubilizing bacteria (PSB) protein, chlorophyll, onion, growth trichoderma.

### Introduction:

"Phosphate solubilizing bacteria are the biological control agent" phosphate solubilizing bacteria can hence be utilized for the production of bio-fertilizers which actually enhances the nutrient quality of soil.

PSB is the bio-availability of onion in insoluble calcium phosphate for plants. Phosphate solubilizing bacteria were isolated from onion rhizospheric soils of Maharashtra Pakistan. Inoculation of PSB bio-fertilizer increases the field of crops by 0.5.% Phosphate solubilizing bacteria (PSB) when inoculated secrete antibiotic substance and solubilize the otherwise unavailable insoluble soil phosphorus and then make it available to the plant.

"PSB is the bio-fertilizer increase the yield of crop by to 0.1 to 0.5 % onion is the one if the most important vegetable crop in the world".

It reached 63000 hector Harvester Area in 2011 with onion and it produced 3619 kg. Hector in 2011 give total yield 2.304207 tons of onion (*allium cepa. L.*) is bulb vegetable grown in ruby season used in daily diet of people in the whole word it becomes major cash crop with higher market demand and price due to its culinary dietary and medicinal value India is the second largest producer in the word next to china onion is being grow in all area of 0.83 Maharashtra with production of three million tone and the productivity is 16.30 tones hector onion cultivator in more than 175 countries in the soil before they available to the plants.

"Onion is used for the cooking as a vegetable or made in to onion paste and also used for the onion. Yields in small holder cropping system are generally for below the potential of the crop due to low quality seed poor crop husbandry and pests and diseases". In recent year damage by sclerotium cepivourm berk the causal agent of white rot in onion has increasing the growth of onion. The possibility of the biological control of Spi-ceppivourm by phosphate solubilizing bacteria spp. Was also investiget phosphate solubilizing bacteria spp. Is plays an important role in biological control and "it represent 60% of other Bio-fungicides" and used in pesticide Herbisicid use of this fungus contributes to the improve of plant growth.



**Scientific Classification**

Kingdom- Plantae  
 Subkingdom - Tracheobionta  
 Super-division- spermatophyte  
 Division- Magnoliophyta  
 Class- Liliopsida  
 Subclass- liliidae  
 Order- Liliales  
 Family- Liliaceae  
 Genus- Allium L.  
 Species- Allium cepa. L.

**Material And Method:**

Study Site and Analysis Of soil Sample the effect was central at Bhanashivara which one of the commercial agriculture zone of Maharashtra soil form the effect site where sample from where onion had previously been growth.

The soil where found to have the following chemical character-tics.

PH in H<sub>2</sub>O= 4.2%

N 0.350/0 c- 3.86

K- 0.5 Mg/l

Na— trace

CFC in [mol.]/kg = 19.4

Phosphorous in PPMP= 6.67

The soil from the field was mixed were. With sand in the ratio 3:1 (soil:sand) to improve the soil texture. The soil were left for a period of one week to allow for escape of volatile poisonous substance.

The soil was then out in to 500ml plastic pots and each of these was then enriched with 0.2g of Dai-ammonium phosphate fertilizer (DAP). The soil was then used for the growth of onion seedling in the green house.

**Biochemical analysis of onion with respect to Chlorophyll and Protein (at 620nm)**

Treat.1	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
1.	0.18	0.20	0.20	0.20	0.25	0.22	0.03

**After 15 Days**

Treat.2	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
1.	0.22	0.38	0.25	0.35	0.40	0.30	0.03

**After 15 Days**

Treat.3	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
1.	0.39	0.29	0.45	0.45	0.40	0.35	0.03

**Result And Discussion:**

The data concerning plant height is presented in phosphate solubilizing material had significant effect and plant height the experimental result indicated that maximum height 48.2 . while plant



height were control is observed in control of phosphate (PSB)

"Is used as biological control. It produced vit.and phytohormones and solubilizeminerals"

**Number of Leaves:**

Data regarding number of leaves plant is presented in observation (PSB) 0.5% solution is treated & leaf size is 5 to 6 cm while number of leaves in control is 2 to 3 the result is indicated that phosphate solubilizing bacteria significantly affect the growth phosphate solubilizing bacteria increase the root surface allowing the root explore large volume of soil in rhizophore therefore the nutrient uptake easily

The application of bio fertilizer in promoting the number of leaves.

Leaf Diameater The experiment is shows the highest leaf width is 1.05 cm was observed in plant where controlled leaf width is 0.90 cm Our result shows that the there were increased in mean, chlorophyll pigment were found in 0.5% also there were decreased mean chlorophyll pigment found in 0.1%,0.2%

After 15 Days

Treat.4	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
l.	1.47	0.57	0.70	0.37	0.51	0.40	0.03

**Protein:**

Treat.1	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
l.	0.30	0.40	0.45	0.20	0.35	0.10	0.00

After 15 Days

Treat.2	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
l.	0.35	0.42	0.50	0.25	0.40	0.10	0.00

After 15 Days

Treat.3	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
l.	1.40	0.50	0.65	0.30	0.42	0.18	0.00

After 15 Days

Treat.4	0.1%	0.2%	0.3%	0.4%	0.5%	Control	Blank
l.	1.47	0.57	0.70	0.37	0.51	0.21	0.00

Both positive and negative increased in mean was observed in this investigation similar increases in chlorophyll pigment was observed after solubilizing bacteria (PSB ) treatment by increased in 0.5% similarly decreased in chlorophyll pigment in 0.1%,0.2%.

**Neck Thickness:**

The observation recorded in case of neck thickness of bulb among variation treatment was found significant at all growth stage . At P.S.B(25%) trichoderma (50%) showed the maximum neck thickness (1.06) was recorded in





**Morphological Observation:**

Sr.no	Height of the plant (cm)						Number of leaves					
	0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.2%	0.3%	0.4%	0.5%	Contr
1	35	30	35.1	35.1	40.1	20	2	2	3	2	3	2
2	20	25	25.1	35	35.1	22	2	2	2	2	3	2
3	20.1	30.1	20.2	25	35.5	23	2	2	2	2	2	2
mean	25.3	28.3	26.8	31.7	76.9	21.6						
Leaf Diameter						Stem Diameter						
0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.2%	0.3%	0.4%	0.5%	Contr	
2.5	2	3.1	3.6	3.11	0.25	0.35	0.30	0.40	0.41	0.50	0.40	
2.5	2.1	3.5	3.7	3.5	0.22	2.5	0.35	0.42	0.42	0.75	0.22	
0.5	2.89	3.5	3.10	3.6	0.26	0.27	0.40	0.35	0.50	0.65	0.35	

**After 15 Days**

Sr.no	Height of the plant (cm)						Number of leaves					
	0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.2%	0.3%	0.4%	0.5%	Contr
1	25	35.2	40	42.1	45.1	22	2	2	3	3	2	2
2	25	40.1	35.2	40	40.1	25	2	2	2	3	2	2
3	25.1	35.1	32.1	35	40.2	24	2	2	3	2	2	2
mean	28.3	36.8	35.7	39.0	41.8	23.6						
Leaf Diameter						Stem Diameter						
0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.2%	0.3%	0.4%	0.5%	Contr	
0.37	0.38	0.38	0.45	0.32	2	0.37	0.38	0.45	0.32	0.62	0.35	
0.38	0.39	0.39	1.42	0.55	2	0.38	0.39	1.42	0.55	0.70	0.40	
0.40	0.42	0.42	1.30	0.60	2	0.40	0.42	1.30	0.60	0.72	0.45	

**After 15 Days**

Sr.no	Height of the plant (cm)						Number of leaves					
	0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.2%	0.3%	0.4%	0.5%	Contr
1	40	40.3	46	48.2	48.1	37	2	3	2	3	3	3



2	30	4.3	40.8	42.1	45.0	26	2	4	2	3	2	2
3	30.2	30.5	35.2	42.0	42.0	26	2	3	4	3	2	3
mean	33.4	37.3	40.6	44.1	45.3	26.3						
Leaf Diameter						Stem Diameter						
0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.12%	0.3%	0.4%	0.5%	Contr	
0.50	0.49	0.40	0.62	0.72	0.40	3.2	4.5	4.8	7.10	8.10	0.52	
0.46	0.48	0.49	0.62	0.48	0.48	3.7	3.7	4.6	7.9	7.20	0.62	
0.40	0.48	0.50	0.70	0.52	0.52	4.9	3.5	6.9	8.10	9.1	0.61	

**After 15 Days**

Sr.no	Height of the plant (cm)						Number of leaves					
	0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.2%	0.3%	0.4%	0.5%	Contr
1	42.1	40.1	35.2	40.2	40.5	28	3	4	4	3	4	3
2	35.1	42.5	40.1	35.1	45.2	32	4	4	3	4	3	4
3	32.1	45.1	42.2	40.1	48.2	39	3	4	3	5	3	4
mean	33.4	37.3	40.6	45.4	45.8	23.6						
Leaf Diameter						Stem Diameter						
0.1%	0.2%	0.3%	0.4%	0.5%	Contr	0.1%	0.2%	0.3%	0.4%	0.5%	Contr	
0.37	0.38	0.45	0.32	0.62	0.35	3.5	3.5	4.2	4.9	5.2	3.5	
0.38	0.39	1.42	0.55	0.70	0.40	3.7	3.6	4.3	5.0	5.5	3.2	
0.40	0.42	1.30	1.60	0.70	0.45	3.9	3.9	4.8	5.0	5.6	3.7	

**Conclusion:**

Maximum plant height, leaf width, number of leaves, chlorophyll content and protein content were observed in plot treated in 0.1%, 0.2%, 0.3%, 0.4%, 0.5% and control plot show to poor result in all parameters of the study as compared to other plot.

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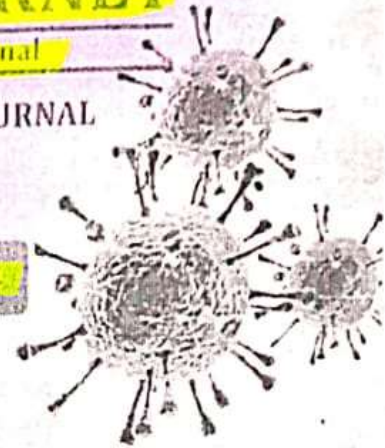
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*- Chief & Executive Editor*



## Effect of Air pollution on chlorophyll contain of leaves for polluted or non-polluted areas photosynthetic pigment in plants

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### Abstract:

"The ornamental plant such as -*Boganvelia spectabilis*, *Nerium oleander*, *Dhatra stramonium*, *Azadiracta indica* ect". plant along the divider of polluted area Karkhana site (Bhenda Factory) and non-polluted site , college campus, Botanical garden ,selected in the presents work and see the effect of vehicle gases on photosynthetic pigment. This effect has been studied by calculating chlo-a, chlo-b and total chlorophyll (A+B).The comparative studies investigation to find the effect of air pollution on chlorophyll content of leaves.

**Keywords** - Chlorophyll , Caretenoids , vehicle gases, ornamental plants , karkhana site, (Bhenda Factory) and college campus , Air pollution quantification photosynthetic pigment.

### Introduction :

"The plant leaf samples used for this experiment were constantly exposed to air pollutants (polluted are non-polluted area) karkhana site and college campus, they has absorbed "accumalated and integrated pollutants on their surface and showed specific responcese." plants can be used as "bio-indicadores" in various field of research. It is density populated and has heavy vehicular traffic. Air pollution has increased tremendously that is the affecting the proper growth of plants in it's vicinity. "The rapid addition of toxic substance to environments is responsible for altering the ecosystem." Plant growing in heavy trafficular used , & polluted are thus exposed variety of pollutants such as SMP, nox , & so2 etc. The exposure of these pollutants to the leaves causes a reduction of in the concentration of their photosynthetic pigments viz, chlorophyll, carotenoids which affect the plant productivity germination of seeds, length of pedicles, & no. flowers inflorescence." Chlorophyll is the principal photoreceptor in photosynthesis, the light driven process by which carbon dioxide is "fixed" to yield carbohydrates & oxygen. They play in critical or role in photosynthetics process & also protect chlorophyll from photo-oxidative destruction.

### Material & Method:

Present investigation deals with comparative study of under heavy trafficular or polluted, pollution with those growing in (Polluted, or non-polluted area).

For this purpose leaf sample of-

- 1) *Azadiracta indica* (Neem)
- 2) *Nerium oleanader* (Kaner)
- 3) *Boganvelia spectabilis* (kagdiful)
- 4) *Dhatra Stramonium* (Dhotra)



**Study Area & Sample Collection -**

Two site were selected for polluted area as well as for non-polluted area for karkhana site, Bhenda collage campus area, Botanical garden.

Polluted are plant selected for Bhenda factory area, then chlorophyll estimation of leaves,

**Extraction Of Chlorophyll -**

Chlorophyll extraction by Arnon method

1 gm leaf of plant (wash & dary)



Crush with 80% Acetone with help of mortar & pestel



Filter with filter paper (whatman filter paper)



Centrifuge at 5000-10000 rpm, For 5-minutes



The collect supernatant of sample & transfer the test tube



Find the absorbance was taken at 645-663nm (against the solvent ) (acetone) blank cubbete was also taken.

**Estimation of chlorophyll-**

The concentration of chlorophyll-a, chlorophyll-b, and total chlorophyll by using following formula.

- 1) chlorophyll- a =  $12.7(A_{663nm}) - 2.69(A_{645nm}) \times w / 1000$
- 2) chlorophyll-b =  $22.9(A_{645nm}) - 4.68(A_{663nm}) \times w / 1000$
- 3) Total chlorophyll =  $20.2(A_{645nm}) + 8.02(A_{663nm}) \times w / 1000$

**Photosynthetic pigment changes-**

The changes will be observed in the selected plant under study is been tubulated between Decrease & increasing photosynthetic pigments.

**1) Concentration of Different :**

Photosynthetic pigment (1gm) in leaves of collected *Baganvella spectabilis* from polluted or non -polluted site

<i>Bgvellia spectabilis</i>	bluted area	on- polluted area
Chlorophyll-'a'	0.02 gm	0.09 gm
Chlorophyll -b,	0.04 gm	0.19 gm
Total chlorophyll	0.05 gm	0.32 gm

**2) Concentration of Different**

Photosynthetic pigment (1gm)in leaves of *Nerium oleander* collected from polluted or non -polluted site

2	<i>Nerium Oleander</i>	Pollutated area	Non-polluted area
*	Chlorophyll-'a'	0.01 gm	0.12 gm
*	Chlorophyll-'b'	0.14 gm	0.06 gm
*	Total chlorophyll	0.29 gm	1.13 gm



**3) Concentration of Different**

Photosynthetic pigment (1gm) in leaves of *Azadiracta indica* collected from polluted or non-polluted site

3	<i>Azadiracta indica</i>	Polluted area	Non-polluted area
*	Chlorophyll-'a'	0.02 gm	0.28 gm
*	Chlorophyll-'b'	0.4 gm	0.50 gm
*	Total chlorophyll	0.07 gm	0.72 gm

**4) Concentration of Different**

Photosynthetic pigment (1gm) in leaves of *Dhatura Stramonium* collected from polluted or non-polluted site

4	<i>Dhatura Stramonium</i>	Polluted area	Non-polluted area
*	Chlorophyll-'a'	0.01 gm	0.10 gm
*	Chlorophyll-'b'	0.10 gm	0.23 gm
*	Total chlorophyll	0.22 gm	0.33 gm

**Observation Table-**

(polluted & non-polluted area)-

Sr.no	Plant Name	Polluted area A (663nm/645nm)	Non-polluted A (663nm/645nm)
1	<i>Boganvella Spectablis</i>	0.26gm-0.15gm	1.96 gm-8.25 gm
*	Chlorophyll-a	0.26 gm	0.09 gm
*	Chlorophyll-b	0.02 gm	0.19 gm
*	Total chlorophyll	0.04 gm	0.32 gm
2	<i>Nerium Oleander</i>	0.14 gm-0.09 gm	1.04 gm-0.24 gm
*	Chlorophyll-a	0.01 gm	0.12 gm
*	Chlorophyll-b	0.014 gm	0.06 gm
*	Total chlorophyll	0.29 gm	0.13 gm
3	<i>Azadiracta indica</i>	0.20 gm-0.17 gm	2.28 gm-0.22 gm
*	Chlorophyll-a	0.02 gm	0.28 gm
*	Chlorophyll-b	0.04 gm	0.50 gm
*	Total chorophyll	0.07 gm	0.72 gm
4	<i>Dhatura stramonium</i>	0.11 gm-0.07 gm	1.999 gm-0.854 gm
*	Chorophyll-a	0.01 gm	0.23 gm
*	Chlorophyll-b	0.10 gm	0.10 gm
*	Total chorophyll	0.22 gm	0.33 gm

**Result & Conclusion-**

Result- "The present study was conducted to assess impact of effect of air pollution on chlorophyll content of leaves by two selection area/site".

Plant such as- 1) *Boganvella spectablis* 2) *Azadiracta indica* 3) *Dhatura stramonium* 4) *Nerium Oleander*.

"Polluted site- plant chlorophyll content are less amount found."

"Non-polluted site-plant chlorophyll are large amount found."





#### Conclusion-

The present investigation / experiment showed change in the level of pigment (total chlorophyll) content in plant exposed to plant leaves. Study of chlorophyll content of leaves. The selected of plant on polluted or non-polluted area. It induce the biochemical parameter by increasing & decreasing their level of pigment of plant leaves. The extend of such changes depends on tolerance towards & chemical nature.

"Polluted area - chlorophyll content are **less amount** present in leaves."

"Non-polluted area - chlorophyll content are **large amount** present in plant leaves."

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