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The potential impact of Silicea on growth of the plants belonging to liliaceac and solanaceae family

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Abstract
In the current scenario, the intensive use of agrochemicals and pesticides has become a widespread practice in agriculture, aimed at enhancing crop yield, protecting against pests and diseases which has lead to deleterious impacts on plants like phytotoxicity, reduced germination rates, compromised photosynthetic efficiency and increased susceptibility to stress and nutritional deficiencies, giving rise to potential risks to food safety and human health upon consumption. This study is aimed to know the effect of Silicea a Homoeopathic medicine on growth of plants. Silica is known to be an overlooked element which has potential to improves plant photosynthesis and aids in the plant uptake of nitrogen, phosphorus, potassium, zinc etc. increases plant resistance to fungal disease and pest attack because of harder epidermal cells, ability to survive and even thrive in high salinity areas and drought hit areas. Thus a need for ecofreindly agricultural practices that can minimize the use of synthetic products, chemicals and pesticides, promoting ecological balance and ensuring the long-term viability of plant life and agricultural ecosystems.

Keywords: *Allium cepa*, *Allium sativa*, *Silicea*, agricultural ecosystems, reduced germination rates

Introduction
Garlic and onion are widely used in flavouring food because of the distinctive aroma of organosulphur compounds, Garlic and onion has various health it is used as a natural antibiotic for the fever, common cold, bronchitis and lowers serum cholesterol and triglycerides in cardiovascular diseases. Likewise capsicum and tomato are consumed almost every day either raw or in cooked form therefore intended to take up as comparative family for study. Silica is one of the most common minerals on Earth and second most abundant nutrient found in the Earth’s crust. Thus it's highly concentrated in many soils, which in turn makes it a major part of plant tissues. Silica, a common but often overlooked element that is essential for soil and plant health. Silicon, often referred to as Silica, is just one of many ‘bio-essential’ minerals, routinely used agriculture practices and fertilizers were not enough for the plants to cope with the climatic adversities and require additional growth nutrients. One of the biggest reasons growers feed their plants a silica supplement is because they see more growth. This nutrient helps improve cell growth by speeding up the production of cell walls, helping serve as a framework. It also acts like cement for the cells. All of this adds up to a plant that can grow tissue faster, and thus grow faster. Thus having known the qualities of silica, this research was carried out to know to potential of silica in dynamic form on growth of plants.

Materials and Methods
An observational study on the onion, garlic, capsicum and tomato were carried out during Rabi season from October 2024 to March 2025) in the herbal garden field at AM Shaikh Homoeopathic Medical College and PG Centre Belagavi (Karnataka), India (74.516525^{O} longitude and 15.869181^{O} latitude). Seeds were purchased from Shakti seed dealers from belagavi and sowed in the seed bags with potting mix of soil, vermicompost purchased from biocentre belagavi and various potencies of Silicea were procured from Padma Homoeopathic pharmacy belagavi. Silicea Sprays were prepared by using Silicea and tap water in the ratio of 1:100 ml. Silicea sprays was be applied at a regular interval of 15days. Pesticides or agrochemicals were not used during the entire study.

Plant growth was assessed by germination of seeds, height of the plant, yield, bulb's diameter recorded at the final harvest. Growth parameters were observed and harvested matured bulbs and yield of capsicum and solanum lycopersicum were recorded at the Department of Homoeopathic Pharmacy at AM Shaikh Homoeopathic Medical College and PG Centre Belagavi.

The soil characteristics before treatments were as per report ref num B20:0526739 tested at biocentre belagavi
pH 6.10, E.C 0.069, OC/OM 1.687N, P, K, are 23.52, 1.62 and 70.88. Ca, Mg are 0.188 and 4.550. Cu, Zn, Fe are 0.192, 0.285 and 0.326, per kg respectively. There was no rainfall and field temperature was varied from 16°C to 35°C during the complete growth period. Results were statistically analyzed by one way ANOVA.

Experimental design
The experimental setup was designed as randomized complete blocks (grow bags) consisted of six treatments for each species having an area measuring 8*10 inch for germination and 15*16 inch for plant growth. Allium sativum bulbs were carefully separated into individual cloves and sown in the bags so that the distal end was upward and covered with soil, for rest other species seeds were sown.

Results: Observations

Table 1: Experimental design

	Control	Silicea 6X	Silicea 30	Silicea 200	Silicea 1M	Silicea 10M
Allium Cepa	T_1	T_2	T_3	T_4	T_5	T_6
Allium Sativum	T_1	T_2	T_3	T_4	T_5	T_6
Capsicum	T_1	T_2	T_3	T_4	T_5	T_6
Solanum lycopersicum	T_1	T_2	T_3	T_4	T_5	T_6

Table 2: Germination

Plant Species	Control	Silicea 6X	Silicea 30	Silicea 200	Silicea 1M	Silicea 10M
Allium cepa	5/5	5/5	5/5	5/5	5/5	5/5
Allium Sativum	5/5	5/5	5/5	5/5	5/5	5/5
Capsicum	5/5	5/5	5/5	5/5	5/5	5/5
Solanum lycopersicum	0/5	0/5	1/5	0/5	0/5	0/5

Table 3: Growth and yield

Plant Species	Length (cm) Control	Yield (no) Control	Length (cm) Silicea 6X	Yield (no) Silicea 6X	Length (cm) Silicea 30	Yield (no) Silicea 30	Length (cm) Silicea 200	Yield (no) Silicea 200	Length (cm) Silicea 1M	Yield (no) Silicea 1M	Length (cm) Silicea 10M	Yield (no) Silicea 10M
Allium cepa	51	1	51	3	3.67	3	55.50	4	61	1	3	2
Allium sativum	16.2	0.22	19.26	3	18.2	1.25	26.28	4	28.23	4	26.2	4
Capsicum	3.5	16	6.5	22	8	18	6	10	8.5	21	6.5	28
Solanum lycopersicum	62	-	22	-	-	-	-	-	-	-	-	-

Table 4: Statistical Analysis

Group 1	Group 2	t_value	p_value	bonf_p	holm_p	bonf_inference	holm_inference
control	Sil_6x	-0.9449112	0.04444444	1.000000	0.8888889	Not significant	Not significant
control	Sil_30	-1.5118579	0.2697033	0.8091098	0.8091098	Not significant	Not significant
control	Sil_200	0.1125346	0.9167856	1.000000	9167856	Not significant	Not significant

Discussion
The growth was assessed based on germination of seeds, height of the plant, yield, Bulb's diameter as shown in Table 2 and Table 3. Based on Statistical analysis it does not show any significant difference between the control group and Silicea group in the growth of the plants. In regards to germination, *Allium cepa*, *Allium sativum*, *Capsicum* showed 100% germination across all Silicea treatments and control. *Solanum lycopersicum* had very poor germination (only1/5in Silicea30, rest 0/5). Silicea treatments did not significantly influence germination in first three species. Poor compatibility or effect on Solanum lycopersicum. Silicea 200 was best for *Allium cepa* yield and Allium sativum growth/yield. Silicea 10M gives highest yield in Capsicum, though plant height is not the highest. Solanum lycopersicum did not germinate well, possibly indicating incompatibility. *Silicea* 30 promotes good plant length in *Allium cepa* and *Allium sativum*. There was no pest, fungus affections or any disease noted in plants throughout the study. Thus this study contributes to the use of homeopathic medicines for their potential productive applications in agriculture, which could represent a viable alternative to decrease the use of agrochemicals and pesticides in farming.

Conclusion
Based on the observations and descriptive analysis this research concludes that the use of Silicea in various dynamised powers improved the growth and yield in first three species. This study incurs Silicea has resistance over plant diseases, pest and fungus. Further research should be carried out in large scale farming on the effect of homeopathic medicines in agricultural cultivation using chemical, enzymatic, molecular and genetic analyses to know the action mechanisms of Homoeopathic medicines.

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Conflict of interest
None.

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