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COMPARATIVE EVALUATION OF FIVE POTENCIES OF KALIUM SULPHURICUM ON SEED GERMINATION, VEGETATIVE GROWTH, FLOWERING, AND FRUIT PRODUCTION OF SOLANUM MELONGENA: A PLACEBO-CONTROLLED EXPERIMENTAL STUDY

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*Keywords:*Agrohomoeopathy; *Kalium sulphuricum*; *Solanum melongena*; brinjal; plant growth; fruit yield; sustainable agriculture.

ABSTRACT: **Background:**Increasing reliance on chemical fertilizers and pesticides raises environmental and food safety concerns. Agrohomoeopathy offers a potential eco-friendly alternative, though evidence remains limited. *Solanum melongena* L. (brinjal), an economically important crop, provides a suitable model for evaluating agrohomoeopathic interventions.

Objective: To comparatively evaluate the effects of five potencies of *Kalium sulphuricum* (3X, 6X, 12X, 30C, and 200C) on germination, vegetative growth, flowering, and fruit production of *Solanum melongena* under placebo-controlled conditions.

Material and Methods: A prospective, quantitative, placebo-controlled, multi-arm experimental study was conducted during two cropping seasons (March–August 2024 and March–August 2025) at the Government Homoeopathic Medical College and Hospital, Bhopal, India. Thirty-five healthy *Solanum melongena* plants were randomly allocated to seven groups: five treatment groups and two placebo controls. *Kalium sulphuricum* potencies (3X, 6X, 12X, 30C, and 200C) were administered through foliar application. Germination time, plant height, days to first flowering, and number of fruits per plant were recorded. Data were analysed using one-way ANOVA followed by Tukey's HSD test ($P < 0.05$).

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Results:*Kalium sulphuricum* improved all evaluated parameters versus placebo controls. Potencies 6X and 200C showed superior performance, with earlier germination, greater height, earlier flowering, and higher fruit production ($P < 0.05$).

Conclusion: Selected potencies of *Kalium sulphuricum*, particularly 6X and 200C, may positively influence germination, vegetative growth, flowering, and fruit production in *Solanum melongena*. Further multicentric studies with larger sample sizes and different crop species are needed to validate these findings

INTRODUCTION

Agricultural productivity has increased remarkably over the past few decades owing to the extensive use of synthetic fertilizers and pesticides. Although these agrochemicals have contributed substantially to improving crop yield and ensuring food security, their indiscriminate and prolonged use has been associated with soil degradation, contamination of water resources, biodiversity loss, ecological imbalance, and potential risks to human health. These environmental concerns have intensified the search for sustainable agricultural practices capable of maintaining crop productivity while minimizing dependence on synthetic agrochemicals.[1]

Agrohomoeopathy has emerged as a complementary approach for sustainable crop production through the application of potentized homoeopathic preparations to plants. Unlike conventional agricultural inputs, which primarily supply nutrients or directly control pests and diseases, agrohomoeopathy aims to stimulate the inherent self-regulatory capacity of plants, thereby enhancing growth, development, productivity, and resilience under environmental stress. Experimental investigations have reported favourable effects of homoeopathic preparations on seed germination, vegetative growth, flowering, fruit production, and tolerance to biotic and abiotic stresses in various crop species, indicating their potential as environmentally compatible agricultural interventions.[2,3,4]

Despite these encouraging findings, the available scientific evidence remains inconclusive because of considerable variations in experimental design, plant species, remedies, potencies, outcome measures, and methodological quality. A recent scoping review of seventy-six experimental studies concluded that agrohomoeopathy shows promising potential for improving crop growth, yield, pest management, and soil health. However, the review also highlighted important methodological limitations, including inadequate standardization of experimental

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protocols, insufficient replication, inconsistent statistical analyses, and lack of appropriate controls, emphasizing the need for rigorously designed placebo-controlled experimental studies to generate reproducible scientific evidence.[5]

Solanum melongena L. (brinjal) is one of the most widely cultivated vegetable crops worldwide and is of considerable nutritional, medicinal, and economic importance. India is among the leading producers of brinjal, where the crop contributes significantly to vegetable production and food security. The fruits are rich in dietary fibre, vitamins, minerals, phenolic compounds, anthocyanins, and other bioactive constituents possessing antioxidant and health-promoting properties. In addition to its nutritional significance, brinjal exhibits well-defined developmental stages, including seed germination, vegetative growth, flowering, and fruit development, making it an appropriate experimental model for evaluating agrohomoeopathic interventions on plant growth and productivity.[6]

Within the concept of systemic agrohomoeopathy, mineral-based homoeopathic preparations are considered potential modulators of plant metabolism and adaptation under varying environmental conditions.[2] Among the mineral-based homoeopathic medicines, *Kalium sulphuricum,* one of the twelve Schüessler tissue salts, was selected for the present study because of its reported application in agrohomoeopathic research. Previous experimental studies have demonstrated favourable effects of biochemic potassium salts on the growth and development of solanaceous crops. A randomized controlled trial reported that Kalium sulphuricum 6X significantly improved plant height, leaf number, and fruit yield in Capsicum annuum.[7] Similarly, an experimental study found that *Kaliumphosphoricum* 6X enhanced plant growth, promoted earlier flowering, and improved overall development in *Capsicum annuum*, supporting the potential application of biochemic mineral preparations in agriculture.[8]

Although previous investigations have demonstrated the potential of homoeopathic medicines in promoting plant growth, comparatively few studies have evaluated the influence of different potencies of *Kalium sulphuricum* on multiple developmental stages of *Solanum melongena* under placebo-controlled conditions. Previous studies have also rarely assessed seed germination, vegetative growth, flowering, and fruit production within a single experimental design using standardized outcome measures and appropriate statistical analyses. Addressing these methodological gaps is essential for strengthening the scientific evidence supporting agrohomoeopathy and improving the reproducibility of experimental findings.[9,4]

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Therefore, the present study was undertaken to comparatively evaluate the effects of five potencies of *Kalium sulphuricum* (3X, 6X, 12X, 30C, and 200C) on germination, vegetative growth, flowering, and fruit yield of *Solanum melongena* under placebo-controlled experimental conditions. By evaluating multiple developmental stages within a single experimental framework, the study aimed to generate objective evidence on the biological response of Solanum melongena to different potencies of *Kalium sulphuricum.* The findings are expected to contribute to the growing body of scientific evidence on agrohomoeopathy and provide a basis for further research on its potential applications in sustainable agriculture.

MATERIALS AND METHODS

Study design

A prospective, placebo-controlled, completely randomized experimental study was conducted to evaluate the effects of different potencies of *Kalium sulphuricum* on the growth and yield parameters of *Solanum melongena L*. (brinjal). The experiment was carried out over two consecutive cropping seasons (March–August 2024 and March–August 2025) to minimize seasonal variation and improve the reproducibility of the findings.

Study setting

The study was conducted at the Government Homoeopathic Medical College and Hospital, Ayush Campus, Chuna Bhatti, Bhopal, Madhya Pradesh, India. The experiment was performed under open-field conditions, allowing the plants to grow under natural environmental conditions typical of the region during both cropping seasons.

Plant material

Certified seeds of *Solanum melongena L*. (variety Pusa Hara Baigan-1) were procured from the National Seeds Corporation, Govindpura, Bhopal. Only healthy seeds of uniform size, free from visible physical damage, deformities, or fungal infection, were included in the study to ensure uniform germination and plant establishment. Seedlings were initially raised in jiffy bags and transplanted approximately 25–30 days after germination into plastic pots, with one healthy seedling maintained as an individual experimental unit.

Experimental design

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The experiment followed a Completely Randomized Design (CRD). Thirty-five healthy brinjal plants served as independent experimental units and were randomly allocated into seven groups, with five plants in each group. The treatment groups received *Kalium sulphuricum* in five different potencies (3X, 6X, 12X, 30C, and 200C), while two placebo control groups were maintained: a tablet control receiving dissolved blank lactose tablets and a water control receiving plain water. Replicate plants within each treatment group were identified using sample labels (A–E) solely for data recording and statistical analysis.

The experimental groups were as follows:

Group	Intervention
Group I	*Kalium sulphuricum* 3X
Group II	*Kalium sulphuricum* 6X
Group III	*Kalium sulphuricum* 12X
Control I	Tablet control
Group IV	*Kalium sulphuricum* 30C
Group V	*Kalium sulphuricum* 200C
Control II	Water control

Table 1. Experimental groups and corresponding interventions

Preparation of treatment solutions and experimental procedure

Study medicines

Kalium sulphuricum was selected as the investigational medicine and evaluated in three decimal potencies (3X, 6X, and 12X) and two centesimal potencies (30C and 200C). The decimal potencies were procured in medicated tablet form, whereas the centesimal potencies were obtained in liquid form from a GMP-certified homoeopathic pharmaceutical manufacturer. Blank lactose tablets identical in appearance to the medicated tablets served as the placebo for the decimal potency groups, while plain water served as the placebo for the centesimal potency group.

Seed treatment

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Before sowing, seeds assigned to each treatment group were pre-soaked for 8 hours in freshly prepared treatment solutions. For the decimal potency groups (3X, 6X, and 12X), one medicated tablet of the respective potency was dissolved separately in 50 mL of water, and the seeds were soaked in the solution. Seeds allocated to the tablet placebo group were similarly soaked in a solution prepared by dissolving one blank lactose tablet in 50 mL of water.

For the centesimal potency groups (30C and 200C), one drop of the respective potency was added separately to 50 mL of water, and the seeds were soaked for 8 hours. Seeds in the water control group were soaked in 50 mL of water alone for the same duration. Following seed treatment, all seeds were sown in jiffy bags under identical nursery conditions.

Preparation of foliar spray solutions

Fresh treatment solutions were prepared immediately before each application. For the decimal potency groups, four medicated tablets of the respective potency (3X, 6X, or 12X) were dissolved separately in 1 L of water. Similarly, four blank lactose tablets were dissolved in 1 L of water for the tablet placebo group.

For the centesimal potency groups, one drop of either *Kalium sulphuricum* 30C or 200C was added separately to 1 L of water. The water control group received 1 L of plain water without any medicine.

Nursery raising and transplantation

Seeds were raised in jiffy bags under uniform nursery conditions. Healthy seedlings of comparable vigour were maintained under identical cultural practices until transplantation. Approximately 25–30 days after germination, seedlings were transplanted individually into plastic pots containing a uniform growing medium. One healthy seedling was maintained in each pot, and each pot represented one experimental unit. All plants were maintained under identical environmental conditions and received uniform irrigation and routine horticultural practices throughout the study.

Administration of treatments

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The prepared treatment solutions were applied as foliar sprays using a hand sprayer to ensure uniform coverage of the aerial parts of each plant. Treatments were administered at 10-day intervals throughout the experimental period, beginning after transplantation and continuing until completion of the study. All treatment and control groups were maintained under identical cultivation practices to minimise environmental variation and ensure that observed differences were attributable to the respective treatment protocols.

Outcome measures and data collection

The effects of *Kalium sulphuricum* on the growth and yield of *Solanum melongena* were evaluated by recording four predefined outcome measures representing successive stages of plant development. Observations were made throughout the experimental period during both cropping seasons using identical procedures for all treatment and control groups. The mean values obtained from the two cropping seasons were used for statistical analysis.

Primary outcome measures

The primary outcome measures were:

1. **Seed germination time (days):** Germination time was recorded as the number of days from sowing until visible emergence of the seedling above the growing medium for each experimental unit.
2. **Plant height (cm):** Plant height was measured in centimetres at **60 days after transplantation (DAT)** using a measuring scale. Measurements were taken from the soil surface at the base of the stem to the apical growing point of each plant.
3. **Days to first flower initiation:** The number of days from transplantation to the appearance of the first fully visible flower bud was recorded for each plant.
4. **Number of fruits per plant:** At harvest, the total number of mature fruits produced by each plant was counted and recorded as an indicator of yield.

Data collection

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All observations were recorded by direct measurement using the same assessment methods for every experimental unit throughout the study. To minimise measurement bias, identical observation criteria and recording procedures were followed across all treatment and control groups during both cropping seasons. Data from the two seasons were pooled by calculating the mean value for each parameter before statistical analysis.

Statistical analysis

Statistical analysis was performed using JASP software (version 0.95.4). Prior to inferential analysis, the assumptions for parametric testing were evaluated. The normality of data distribution for each treatment group was assessed using the Shapiro–Wilk test, and homogeneity of variances was examined using Levene's test.

As the assumptions of normality and homogeneity of variances were satisfied, one-way analysis of variance (ANOVA) was performed separately for each outcome measure, including seed germination time, plant height, days to first flower initiation, and number of fruits per plant, to compare the treatment and control groups. When the ANOVA indicated statistically significant differences, Tukey's Honestly Significant Difference (HSD) test was applied for multiple pairwise comparisons between groups. A two-sided p-value <0.05 was considered statistically significant.

To estimate the magnitude of treatment effects, eta squared (η^2) was calculated as a measure of effect size. Where appropriate, Cohen's f was derived from η^2 to facilitate interpretation of the practical significance of the observed effects.

RESULTS

Thirty-five Solanum melongena plants were evaluated to determine the effect of *Kalium sulphuricum* potencies (3X, 6X, 12X, 30C, and 200C) on seed germination, vegetative growth, flowering, and fruit yield. Data represent the mean observations obtained over two cropping seasons. Statistical analysis was performed using one-way ANOVA followed by Tukey's Honestly Significant Difference (HSD) test.

1.GERMINATION TIME

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Descriptive Statistics	3X	6X	12X	Control I	30C	200C	Control II
Mode	7.176	6.000	7.000	9.000	7.015	5.985	9.015
Median	7.000	6.000	7.000	9.000	7.000	6.000	9.000
Mean	7.200	6.000	7.000	9.000	7.400	5.600	9.400
Std. Deviation	0.837	0.707	0.707	0.707	0.548	0.548	0.548
Coefficient of variation	0.116	0.118	0.101	0.079	0.074	0.098	0.058
Skewness	-0.512	0.000	0.000	0.000	0.609	0.609	0.609
Kurtosis	-0.612	2.000	2.000	2.000	3.333	3.333	-3.333
Shapiro-Wilk	0.881	0.883	0.883	0.883	0.684	0.684	0.684
P-value of Shapiro-Wilk	.314	.325	.325	.325	.006	.006	.006
Minimum	6.000	5.000	6.000	8.000	7.000	5.000	9.000
Maximum	8.000	7.000	8.000	10.00	8.000	6.000	10.00
Sum	36.00	30.00	35.00	45.00	37.00	28.00	47.00

Table 2. Descriptive Statistics of Germination Time (Days) across Different Treatment Groups and Control Groups

Mean germination time varied between 5.6 days (200C) and 9.4 days (Water Control). All *Kalium sulphuricum* potencies showed faster germination compared to their respective controls. Variation within groups was small (SD < 1), indicating high precision and consistency.Among all

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groups, the coefficient of variation for germination time remained low (5.8–11.8%), indicating relatively uniform germination within each treatment and control.

Groups	Sum of Squares	df	Mean Square	F	p	η^2_p
Potencies	59.77	6	9.962	22.49	< .001	0.828
Residuals	12.40	28	0.443			

Table 3. ANOVA Summary Table for Germination Time (Days) across Different Potencies and Control Groups

The ANOVA shows a statistically significant difference among group means ($F(6, 28) = 22.49$, $p < 0.001$). The effect size was large (partial $\eta^2 = 0.83$, Cohen's $f = 2.20$), indicating that approximately 83% of the variance in germination time was explained by the different potencies of *Kalium sulphuricum* and controls.

Potencies vs Control		Mean Difference	SE	df	t	p_{tukey}
3X	Control I	-1.800	0.421	28	-4.277	.003
6X	Control I	-3.000	0.421	28	-7.128	< .001
12X	Control I	-2.000	0.421	28	-4.752	< .001
30C	Control II	-2.000	0.421	28	-4.752	< .001
200C	Control II	-3.800	0.421	28	-9.029	< .001

Table 4. Tukey's HSD post hoc comparison for germination time (days)

Post hoc test shows all potencies (3X, 6X, 12X, 30C, 200C) showed significantly reduced germination time compared to their respective controls ($p < 0.05$). The strongest effect occurred in 6X and 200C, reducing germination by ≈ 3–4 days.The trend indicates a consistent, potency-dependent improvement in germination speed.

2.PLANT HEIGHT

Descriptive	3X	6X	12X	Control 1	30C	200C	Control II

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Statistics							
Mode	34.65	37.08	34.57	33.63	35.19	37.51	28.66
Median	34.50	37.70	34.70	33.90	35.20	37.60	30.00
Mean	33.98	37.78	35.08	34.26	35.34	37.74	30.20
Std. Deviation	1.506	1.455	1.434	0.924	1.396	1.108	2.272
Coefficient of variation	0.044	0.039	0.041	0.027	0.039	0.029	0.075
Skewness	0.011	1.185	-0.057	0.441	1.185	1.591	0.182
Kurtosis	-1.821	1.370	-1.220	-3.107	2.474	2.817	-2.666
Shapiro-Wilk	0.912	0.881	0.955	0.820	0.899	0.839	0.891
P-value of Shapiro-Wilk	.478	.312	.772	.118	.403	.162	.363
Minimum	32.30	36.50	33.20	33.40	33.80	36.80	27.90
Maximum	35.90	40.10	36.80	35.30	37.60	39.60	32.90
Sum	169.9	188.9	175.4	171.3	176.7	188.7	151.0

Table 5. Descriptive Statistics of Plant Height (cm)Across Different Treatment Groups

The descriptive statistics show a strong potency-related gradient in mean plant height, with the highest values in 6X and 200C, intermediate means in 30C and 12X, slightly lower means in 3X and Tablet control, and the minimum in Water control. The coefficient of variation was low across all treatment and control groups (2.7–4.4%), demonstrating a high degree of uniformity in plant height within each group.

Groups	Sum of Squares	df	Mean Square	F	p	η^2_p
Potencies	199.66	6	33.276	14.90	< .001	0.762

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Residuals	62.52	28	2.233			

Table 6. ANOVA Summary Table for Plant Height (cm) across Different Potencies and Control Groups

One-way ANOVA showed a highly significant effect of treatment on plant height, $F(6, 28) = 14.90$, $p < 0.0001$, with partial eta squared $\eta^2 = 0.762$ and Cohen's $f = 1.79$, indicating large effect size. Since the p-value is less than 0.05, the null hypothesis that all treatment groups have equal mean plant height is rejected, and the alternative hypothesis that at least one treatment mean differs significantly from the others is accepted.

Potencies vs Controls		Mean Diff (cm)	SE	t	p_tukey
3X	Control I	-0.28	0.945	-0.296	1.000
6X	Control I	3.52	0.945	3.725	0.014
12X	Control I	0.82	0.945	0.868	0.975
30C	Control II	5.14	0.945	5.439	<0.001
200C	Control II	7.54	0.945	7.978	<0.001

Table 7. Tukey's HSD post hoc comparison for Plant Height (cm)

Tukey's HSD post hoc test showed that 6X was significantly higher than Tablet control (mean difference ≈ 3.5 cm, $p < 0.05$), whereas 3X and 12X did not differ significantly from Tablet ($p > 0.05$).Both 30C and 200C were significantly higher than Water control (mean differences ≈ 5.1 cm and 7.5 cm, respectively; $p < 0.001$), confirming that centesimal potencies produced greater plant height than the control.

3.DAYS TO FLOWER INITIATION

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Descriptive Statistics	3X	6X	12X	Control I	30C	200C	Control II
Mode	38.74	36.08	38.73	39.83	39.18	37.13	44.58
Median	38.00	36.00	38.00	40.00	39.00	37.00	44.00
Mean	37.80	36.20	38.00	40.60	39.20	36.80	43.40
Std. Deviation	1.789	1.483	1.000	1.342	0.837	1.095	1.817
Coefficient of variation	0.047	0.041	0.026	0.033	0.021	0.030	0.042
Skewness	0.052	-0.552	0.000	0.166	-0.512	-1.293	-0.567
Kurtosis	-2.324	0.868	-3.000	-2.407	-0.612	2.917	-2.231
Shapiro-Wilk	0.894	0.956	0.821	0.852	0.881	0.828	0.867
P-value of Shapiro-Wilk	.377	.777	.119	.201	.314	.135	.254
Minimum	36.00	34.00	37.00	39.00	38.00	35.00	41.00
Maximum	40.00	38.00	39.00	42.00	40.00	38.00	45.00
Sum	189.0	181.0	190.0	203.0	196.0	184.0	217.0

Table 8. Descriptive Statistics of Days to Flower Initiation across Different Treatment Groups and Control Groups

All seven groups have n = 5 with tight standard deviations (about 0.8–1.8 days) and clear mean differences: 6X (36.20 days), 200C (36.80), 3X (37.80), 12X (38.00), 30C (39.20), Tablet (40.60), and Water (43.40). Lower means in all potencies compared with both Tablet and Water controls show that every potency, including 3X and 30C, accelerates flowering by around 4–7

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days relative to water.The coefficient of variation was very low across all treatments and controls (2.6–4.1%), indicating highly uniform flowering behaviour within each group.

Groups	Sum of Squares	df	Mean Square	F	p	η^2_p
Potencies	184.69	6	30.781	16.08	< .001	0.775
Residuals	53.60	28	1.914			

Table 9. ANOVA Summary Table for Days to Flower Initiation across Different Potencies and Control Groups

The one-way ANOVA for days to flower initiation showed a highly significant effect of treatment, with F (6, 28) = 16.08 and p < 0.001. The effect size was large, with partial eta squared $\eta^2p = 0.775$, which corresponds to Cohen's f ≈ 1.86. Since the p-value is well below 0.05 and the effect size is high, the null hypothesis that all treatment groups have equal mean days to flower initiation is rejected, and the alternative hypothesis that at least one treatment mean differs significantly from the others is clearly supported.

Potencies vs Controls		Mean Difference	SE	df	t	p_{tukey}
3X	CONTROL I	-2.800	0.875	28	-3.200	.047
6X	CONTROL I	-4.400	0.875	28	-5.028	< .001
12X	CONTROL I	-2.600	0.875	28	-2.971	.078
30C	CONTROL II	-4.200	0.875	28	-4.800	< .001
200C	CONTROL II	-6.600	0.875	28	-7.542	< .001

Table 10. Tukey's HSD post hoc comparison for Flower Initiation across Different Potencies and Control Groups

The post hoc results indicate that 3X and especially 6X are significantly better than Tablet control in promoting earlier flower initiation, while both 30C and 200C are highly significantly better than Water control, with 200C showing the greatest effect and12X is not statistically significant when compared with its corresponding control in this set of comparisons.

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4.NUMBER OF FRUITS PER PLANT

Descriptive Statistics	3X	6X	12X	Control 1	30C	200C	Control II
Mode	14.00	17.00	15.00	11.18	14.00	17.00	11.73
Median	14.00	17.00	15.00	11.00	14.00	17.00	11.00
Mean	13.60	17.40	14.60	11.20	14.40	16.60	11.00
Std. Deviation	1.140	1.140	1.140	0.837	1.140	1.140	1.000
Coefficient of variation	0.084	0.066	0.078	0.075	0.079	0.069	0.091
Skewness	-0.405	0.405	-0.405	-0.512	0.405	-0.405	0.000
Kurtosis	-0.178	-0.178	-0.178	-0.612	-0.178	-0.178	-3.000
Shapiro-Wilk	0.961	0.961	0.961	0.881	0.961	0.961	0.821
P-value of Shapiro-Wilk	.814	.814	.814	.314	.814	.814	.119
Minimum	12.00	16.00	13.00	10.00	13.00	15.00	10.00
Maximum	15.00	19.00	16.00	12.00	16.00	18.00	12.00
Sum	68.00	87.00	73.00	56.00	72.00	83.00	55.00

Table 11. Descriptive Statistics of No. of Fruits per plants across Different Treatment Groups and Control Groups.

The means show a clear potency gradient in number of fruits per plant: 6X gives the highest yield, followed by 200C, then 12X and 30C at an intermediate level, with 3X above both tablet and water controls, which have the lowest fruit numbers. Standard deviations are small and very similar between groups.The coefficient of variation was low in all groups (7.8–9.1%), reflecting relatively uniform fruiting among plants within each treatment and control.

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Groups	Sum of Squares	df	Mean Square	F	p	η^2_p
potencies	178.74	6	29.790	25.43	< .001	0.845
Residuals	32.80	28	1.171			

Table 12. ANOVA Summary Table for No. of Fruits per Plant across Different Potencies and Control Groups

The one-way ANOVA shows a highly significant treatment effect on number of fruits per plant, $F(6,28) = 25.43$, $p < 0.001$, indicating that at least one *Kalium sulphuricum* potency differs in mean yield from the others. The associated effect size is very large, with partial eta squared $\eta^2 = 0.8449$ (84.49% of variance explained) and Cohen's $f \approx 2.33$, which is more than five times larger than the conventional large effect threshold, confirming that potency is the dominant factor determining fruit production in this experiment. So null hypothesis is rejected and alternate hypothesis is accepted

Potencies vs Controls		Mean Difference	SE	df	t	p_{tukey}
3X	CONTROL I	2.400	0.685	28	3.506	.023
6X	CONTROL I	6.200	0.685	28	9.057	< .001
12X	CONTROL I	3.400	0.685	28	4.967	< .001
30C	CONTROL II	3.400	0.685	28	4.967	< .001
200C	CONTROL II	5.600	0.685	28	8.181	< .001

Table 13. Tukey's HSD post hoc comparison for No. of Fruits per Plants

Tukey's HSD post hoc test shows that 6X produces significantly more fruits than 12X, 30C, 3X, tablet control, and water control, while being statistically similar only to 200C, placing 6X at the top of the potency hierarchy. The analysis also shows that 200C is significantly superior to 3X and both controls, and that 12X and 30C each yield significantly more fruits than tablet and water.

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DISCUSSION

The present study evaluated the effects of five potencies of *Kalium sulphuricum* (3X, 6X, 12X, 30C, and 200C) on the growth and developmental parameters of Solanum melongena under placebo-controlled experimental conditions. The findings demonstrated that *Kalium sulphuricum*positively influenced seed germination, vegetative growth, flowering, and fruit production when compared with the control groups. Among the tested potencies, 6X and 200C consistently produced the most favourable responses across all evaluated parameters, indicating that these potencies exerted the greatest influence on the growth and development of brinjal under the conditions of the present study.

Germination time

Seed germination is one of the most critical stages in crop establishment, as rapid and uniform germination contributes to improved seedling establishment and subsequent plant growth. In the present study, all tested potencies of *Kalium sulphuricum* reduced the germination time compared with the control groups. The greatest reduction was observed in the 6X and 200C groups, while the remaining potencies also showed improvements of varying magnitude.

The observed enhancement in germination suggests that *Kalium sulphuricum* may favour early physiological processes associated with seed germination. Earlier seedling emergence enables plants to establish more rapidly and utilise available water, nutrients, and light more efficiently during the initial stages of growth. Improved germination may therefore contribute to enhanced vegetative development and overall crop performance.

Plant height

Plant height is an important indicator of vegetative growth and overall plant vigour. The present study demonstrated that *Kalium sulphuricum* promoted plant growth, with the greatest increase in plant height observed in the 6X and 200C groups. The remaining potencies also produced greater plant height than the control groups, although to a lesser extent.

Enhanced vegetative growth is generally associated with improved canopy development and greater photosynthetic capacity, which may subsequently support reproductive development and crop productivity. The consistently greater plant height observed in the 6X and 200C groups

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indicates that these potencies produced the most favourable vegetative response under the experimental conditions of the present study.

Days to first flower initiation

Flower initiation represents the transition from vegetative to reproductive growth and is an important determinant of crop productivity. In the present study, treatment with *Kalium sulphuricum* advanced flowering compared with the control groups. The earliest flower initiation was observed in the 6X and 200C groups, whereas the remaining potencies also reduced the time to flowering to varying extents.

Earlier flowering is advantageous because it allows earlier fruit set and may extend the productive period of the crop. The findings of the present study therefore suggest that *Kalium sulphuricum,* particularly the 6X and 200C potencies, may favour timely reproductive development in *Solanum melongena.*

Number of fruits per plant

Fruit yield is one of the most important indicators of agricultural productivity. In the present study, all tested potencies of *Kalium sulphuricum* increased the number of fruits per plant compared with the control groups. The highest fruit production was observed in the 6X group, followed closely by the 200C group, while the remaining potencies also produced greater yields than the controls.

The improvement in fruit production observed in the treated groups may be associated with the combined effects of enhanced germination, improved vegetative growth, and earlier flowering. Better crop establishment and timely reproductive development are likely to have contributed to the increased fruit yield recorded in the present study. The consistently superior performance of the 6X and 200C potencies across all evaluated parameters suggests that these potencies produced the most favourable overall response under the experimental conditions.

The present study contributes experimental evidence regarding the effects of different potencies of *Kalium sulphuricum* on the growth and development of *Solanum melongena.* The improvements observed in germination, plant height, flowering, and fruit yield indicate the potential of *Kalium sulphuricum* as an agrohomoeopathic intervention for plant growth under

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controlled experimental conditions. These findings contribute to the growing body of research in agrohomoeopathy and provide a basis for further investigations involving different crop species, environmental conditions, and larger field trials to better understand its potential applications in sustainable agriculture.

CONCLUSION

The present placebo-controlled study demonstrated that *Kalium sulphuricum* positively influenced the growth and development of *Solanum melongena* under the experimental conditions of the study. All tested potencies showed improvements in one or more developmental parameters compared with the control groups, with the 6X and 200C potencies consistently producing the most favourable effects on germination time, plant height, days to first flower initiation, and number of fruits per plant. These findings provide experimental evidence that different potencies of *Kalium sulphuricum* may influence plant growth and productivity in brinjal.

The study contributes to the growing body of research in agrohomoeopathy by providing objective experimental data on the effects of *Kalium sulphuricum* on multiple developmental stages of *Solanum melongena*. However, the findings should be interpreted within the limitations of the study, including the small sample size, pot-based cultivation, and evaluation at a single experimental site. Further investigations involving larger field trials, different crop species, diverse environmental conditions, and longer study periods are required to validate these findings and further explore the potential applications of agrohomoeopathy in sustainable agriculture.

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