



Impact of Blessing Energy Treatment on the Morphological Development and Yield Performance of Green Zucchini (*Cucurbita pepo* L.)

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Abstract: Background: As the demand for sustainable agricultural practices increases, non-invasive complementary and alternative techniques are being explored to enhance crop productivity without chemical intervention. This study investigated the impact of exogenous spiritual blessing energy treatment (SBET) on the growth dynamics and reproductive output of Green Zucchini (*Cucurbita pepo* L.). Method: An open-field experimental study was conducted to evaluate the effects of SBET on zucchini plants growth, morphology, and productivity. Seeds and plot were subjected to specific SBET from a distance for a duration of 4 minutes in a single exposure. Growth parameters, including plant height, leaf area, and stem diameter, etc. were measured throughout the farming period. Yield performance was assessed based on the number of fruits per plant, average fruit weight, and total marketable yield at harvesting. Results: Most of qualitative morphological traits were positively remarkably altered in the treatment group compared to the control. Different phenological traits such as plant height, number of nodes per plant, and leaf width were increased by 34.10% ($p = 0.001$), 101.08% ($p \leq 0.001$), and 33.81% ($p = 0.001$), respectively, compared to the control. Moreover, fruit length, seed width, and seed count per fruit were significantly increased by 33.53% ($p \leq 0.001$), 44.68% ($p = 0.004$), and 37.02% ($p \leq 0.001$), respectively, compared to the control. Furthermore, at the end of harvesting total fruit yield (tons per hectare) were improved by 25.36% in the treatment group compared to the control. Conclusion: The application of exogenous SBET (Trivedi Effect[®]) serves as a potent physical priming agent that positively modulates the physiological and morphological development of *Cucurbita pepo* L.

Keywords: *Cucurbita pepo* L., spiritual blessing, morphological development, crop yield, sustainable agriculture, plant physiology

INTRODUCTION

Cucurbita pepo L., commonly known as Green Zucchini, represents one of the most economically significant horticultural crops within the Cucurbitaceae family. Recent agricultural assessments highlight that zucchini production has increasingly threatened by soil degradation, chemical dependency, and the escalating volatility of climate-induced stressors [1, 2]. Singh et al., 2007, reported that strategic interventions and protective cultivation for sustainable cucurbit production in semi-arid regions [3, 4]. While conventional breeding and synthetic fertilizers have historically bolstered yields, the deleterious environmental footprint of agrochemicals has prompted a paradigm shift toward

non-invasive, biophysical priming techniques [5]. Among these emerging technologies, the application of exogenous biofield energy stimulation has gained scientific traction as a novel method to modulate plant physiological processes without altering the genetic blueprint. Biofield energy, defined within the framework of an "energetic continuum" between biophysical forces and biological systems, was increasingly recognized as a catalyst for cellular and metabolic reorganization [6]. This stimulation was hypothesized to interact with the endogenous electromagnetic signatures of plant tissues, potentially enhancing nutrient uptake and stress resilience.

Recent reporting guidelines for biofield research have standardized the methodological rigor required for such investigations, emphasizing the need for reproducible, non-contact protocols to measure tangible phenotypic outcomes [7]. In the context of seed priming, physical trigger like low electromagnetic field exposure had already demonstrated the capacity to establish a "stress memory," optimizing germination and early-stage biomass accumulation [8]. Despite the documented success of other physical modalities, the specific impact of exogenous biofield stimulation on the morphological, phenological, and yield performance of other agricultural crops like bottle gourd [9], bitter melon [10], corn [11], cucumber [12], while *Cucurbita pepo* remains insufficiently explored so far. The present study aimed to bridge this gap by evaluating the efficacy of exogenous spiritual blessing (biofield) energy treatment on Green Zucchini in an open-field environmental condition. By analysing key performance indicators, including plant height, leaf area, flowering synchrony, and fruit weight, this research seeks to validate that remote blessing (SBET) might be a sustainable, chemical-free alternative for enhancing horticultural productivity.

MATERIALS AND METHODS

Study Site

Investigations were conducted at Bhandarwadi (Sindhudurg), situated within the Konkan agro-climatic zone, Maharashtra, India (15° 37' -16° 40' N, 73° 19' -74° 13' E; elevation 26 m). The region experiences high summer thermal regimes and temperate winters, with peak temperatures reaching 41-43°C during the pre-monsoon period. Stochastic precipitation patterns frequently induce acute moisture deficits, potentially impairing essential plant physiological processes across various ontogenetic stages of crop growth and yield stabilization under these distinct tropical coastal maritime environments.

Seed Details and Design

Summer squash (*Cucurbita pepo* L. cv. Sunny House-Hybrid) seeds (purity: 95%; Lot: NUP-48962595; Label: 03001) were procured from Namdeo Umaji Agritech (India) Pvt. Ltd. Specimens were divided into two experimental cohorts: an untreated control group (CONGZUG) and a biofield energy treated group (BTGZUG) subjected to Spiritual Blessing Energy Treatment (SBET). To isolate the effects of SBET, identical agronomic protocols for irrigation, fertilization, and pest management were maintained uniformly across both experimental groups for the entire duration of this study.

Field Layout

A Randomized Complete Block Design (RCBD) was utilized to evaluate two primary treatments across three blocks. Treatment assignment was randomized within blocks to ensure experimental rigor. Six experimental units were established with each plot was measured 8 m² plots (4.0 m × 2.0 m) were established with 1.0 × 1.0 m spacing. One-meter buffers separated replicates, while 0.5 m paths divided plots, totaling a 60.0 m² study area. Following thorough site clearance, NPK fertilizer (50:100:50 kg/ha) was incorporated into the soil pre-sowing to ensure uniform nutrient availability.

Spiritual Blessing Energy Treatment-BET (Prayer) Strategy

The control group of seeds and plots, called the untreated or control green zucchini group (CONGZUG), did not receive any treatment. The blessing/biofield energy treated green zucchini group (BTEGPG) of seeds and land received spiritual blessings energy treatment (SBET/Trivedi Effect[®]) for about four minutes from a spiritual biofield energy healing practitioner, Ms. Alice Branton who has more than 12 years of experience. This treatment was performed *via* the remote/distance mode of a web-conference platform from Florida, USA, the day before planting. The practitioner delivered the SBET/Prayers by remotely transmitting divine energy to the seeds and the land. The blessing included prayers and holding hands over the seeds and land from remotely, at a temperature of 28 ± 2 °C and relative humidity of 65 ± 5%. During this time, the healer focused on channeling divine energy to the treated seeds and land.

Assessment of Soil

Prior to trial initiation, composite topsoil was collected from 30 cm deep of each plot using a systematic five-point sampling protocol. Samples were air-dried, sieved through a 2-mm mesh, and stored at 4 °C until physicochemical analysis. Soil texture was determined *via* the qualitative feel method [13], while pH was measured potentiometrically in a 1:2 (w/v) soil-water suspension using a calibrated electrode to ensure analytical accuracy.

Seed Plantation and Management

Direct sowing preceded a one-week manual irrigation phase to ensure optimal seedling establishment. Thereafter, moisture was managed *via* a drip irrigation system featuring self-compensating emitters (0.5 m spacing; 3 L/h discharge flow rate). Basal fertilization consisted of 50:100:50 kg/ha N:P:K using urea, single superphosphate (SSP), and muriate of potash (MOP). While the full SSP and MOP doses plus 50% urea were applied pre-sowing, the remaining nitrogen was side-dressed on day 21. To manage pest pressure, chlorpyrifos 50% + cypermethrin 5% (Hamla 550; Gharda Chemicals Ltd., India) was applied at 2 mL/L across all treatments.

Plant Growth Parameters

For assessing morpho-physiological parameters, five zucchini specimens were randomly selected within each experimental unit. Qualitative attributes examined comprised leaf

blade dimensions, margins, and pigmentation, including lobing frequency, corolla coloration, fruit morphology, exocarp hue, mesocarp tinting, and rind properties. Seed coloration, magnitude, and morphology were likewise catalogued. Quantitative indices encompassed plant stature (cm), canopy diameter (cm), primary ramification and nodal counts, foliar density, plus blade dimensions (cm). Phenological and productivity metrics involved days until 50% anthesis, fruit mass (g), length (cm), and equatorial diameter (cm). Additionally, fruit count per individual, cumulative yield (t/ha), and seed metrics (length and width in cm) were precisely determined to ensure a comprehensive profiling of these green zucchini accessions throughout the vegetative cycle.

Yield Parameters

The green zucchini (*Cucurbita pepo*) fruits were harvested at full physiological maturity. Morphological traits, specifically length and diameter, were measured with electronic calipers, whereas individual fresh weight was quantified by a precision analytical balance. To evaluate agronomic performance, five plants were randomly sampled within each net plot. Cumulative yields were determined in kilograms and subsequently converted into tonnes per hectare (t/ha) to facilitate standardized yield extrapolation.

Data Analysis

Data are presented as mean \pm standard error of the mean (SEM). Intergroup comparisons were evaluated using unpaired Student's t-tests within the SigmaPlot (v14.0) environment. Statistical significance was defined as $p < 0.05$.

RESULTS

Soil Properties Analysis

The physicochemical features of sandy loamy soil were evaluated. Water-holding capacity (WHC) was higher in the BTGZUG than in the CONGZUG. It was observed that levels of ion exchangeable cations, such as calcium, magnesium, and sodium were improved in the BTGZUG compared to the CONGZUG (Data not shown).

Morphology of Green Zucchini Plants

The morphological characteristic features of green zucchini plant from seed germination to matured fruits, random representative images are depicted in Figure 1.

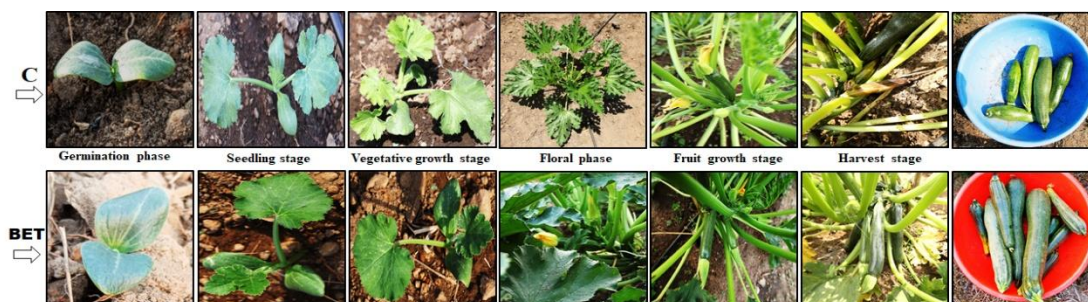


Figure 1: Representative images illustrated the changes in vegetative growth characteristics of green zucchini at different stages. C: Control group; BET: Blessing/biofield energy treatment group.

Morphological Characteristics of Green Zucchini

CONGZUG exhibited green leaf blades, whereas BTGZUG displayed dark green foliage. Floral pigmentation also differed; CONGZUG and BTGZUG displayed yellow and bright yellow corollas, respectively. Upon physiological maturity, zucchini fruit exocarps were dark green in BTGZUG and green in CONGZUG. Morphologically, CONGZUG displayed non-uniformly cylindrical fruits, contrasting with the uniformly cylindrical BTGZUG phenotype. Epicarp coloration was deep green in BTGZUG and green in CONGZUG. Seed phenotypes likewise diverged; CONGZUG seeds were light cream, while BTGZUG seeds were cream.

Table 1: Effects of spiritual blessing (biofield) energy treatment (SBET) on qualitative vegetative parameters of green zucchini.

Vegetative trait	Control group (CONGZUG)	Treated group (BTGZUG)
Leaf size and shape	Large and palmately lobed	Large and palmately lobed
Leaf blade margin	Dentate (pointed teeth)	Dentate (pointed teeth)
Leaf blade colour	Green	Dark green
Number of lobes in leaf blade	5 lobes	5 lobes
Flower colour	Yellow	Bright yellow
Colour of mature fruit (at harvesting)	Green	Dark green
Fruit freshness	Green color, smooth, glossy skin	Green color, smooth, glossy skin
Fruit shape	Non-uniform cylindrical	Uniformly cylindrical
Fruit skin colour	Green	Deep green
Fruit flesh flavour and taste	Mild earthy, and nutty	Mild sweet, and creamy
Fruit flesh texture	Spongy	Less spongy
Fruit flesh colour	Off white	White
Seed colour	Light cream	Cream
Seed size and shape	Small and oval	Medium and oval

Small, oval seeds characterized CONGZUG, whereas BTGZUG produced medium-sized, oval seeds. Organoleptic evaluation revealed a mild, sweet, creamy flavor in BTGZUG mesocarps, whereas CONGZUG presented mild earthy and nutty notes. Internal texture was spongy in CONGZUG, while BTGZUG was notably less porous. Mesocarp color was white in BTGZUG and off white in CONGZUG. Conversely, vegetative traits such as leaf size and architecture (large and palmately lobed), margin morphology (dentate with acute teeth), lobation (5 lobes), and fruit freshness indicators (green pigmentation, smooth, glossy skin) were identical across both cultivars, indicating that genetic variation between these

accessions primarily manifests in reproductive and mature fruit characteristics rather than primary vegetative development or standard architectural features observed during the vegetative phase within the experimental population sampled for this specific phenotypic characterization and comparative analysis of the zucchini.

Phenology and Yield of Green Zucchini

Compared to the untreated green zucchini group (CONGZUG), biofield energy treated green zucchini group (BTGZUG) exhibited a marked enhancement in both development and morphology.

Table 2: Impact of blessing energy treatment on the phenological development and productivity of *Cucurbita pepo* (Green Zucchini)

Vegetative trait	Control group (CONGZUG)	Treated group (BTGZUG)	P Value
Days to germination	7-9	7-8	-
Germination percentage	87.16 ± 1.28	98.69 ± 1.17	$p = 0.003$
Plant height (cm)	54.63 ± 1.56	73.26 ± 1.78	$p = 0.001$
Spreading of leaves (cm)	71.36 ± 2.18	85.66 ± 2.21	$p = 0.010$
Number of primary branches/plants	7.67 ± 0.47	9.79 ± 0.16	$p = 0.013$
Number of nodes/plants	8.34 ± 0.57	16.77 ± 0.31	$p \leq 0.001$
Number of leaves per plant	13.64 ± 1.78	17.92 ± 1.17	$p = 0.115$
Leaf length (cm)	20.78 ± 0.35	26.17 ± 0.35	$p \leq 0.001$
Leaf width (cm)	18.04 ± 0.24	24.14 ± 0.72	$p = 0.001$
Days to first bud initiation	21.37 ± 0.15	22.37 ± 0.19	$p = 0.014$
Days to first male flower appearance	27.57 ± 1.67	25.75 ± 1.62	$p = 0.478$
Days to first female flower appearance	34.37 ± 1.51	30.79 ± 1.22	$p = 0.139$
Days to 50% flowering	40.27 ± 1.18	38.46 ± 1.21	$p = 0.345$
Number of male flowers	9.45 ± 0.49	12.59 ± 0.31	$p = 0.006$
Number of female flowers	7.24 ± 0.29	8.63 ± 0.38	$p = 0.044$
Days to fruit harvest	44.16 ± 1.57	45.24 ± 1.55	$p = 0.650$
Fruit weight (g)	522.74 ± 3.17	671.75 ± 2.86	$p \leq 0.001$
Crop duration (days)	65.56 ± 1.78	61.98 ± 1.20	$p = 0.171$
Fruit length (cm)	20.31 ± 0.47	27.12 ± 0.48	$p \leq 0.001$
Fruit diameter (cm)	11.57 ± 0.15	14.05 ± 0.16	$p \leq 0.001$
100-seed weight (gm)	11.76 ± 0.04	13.04 ± 0.07	$p \leq 0.001$
Seed length (cm)	1.32 ± 0.03	1.48 ± 0.01	$p = 0.007$
Seed width (cm)	0.47 ± 0.03	0.68 ± 0.02	$p = 0.004$
Seed count/fruit	54.43 ± 1.28	74.58 ± 0.42	$p \leq 0.001$
Number of fruits per plant	3.79 ± 0.36	4.72 ± 0.82	$p = 0.358$
Fruit yield/plant (kg/plant)	2.19 ± 0.58	3.20 ± 0.13	$p = 0.165$
Fruit yield (kg)	20.15	25.26	-
Fruit yield/sq. m plot (kg/sq. m)	0.84	1.05	-
Fruit yield/hectare (ton/ha)	8.40	10.53	-

Data represented as mean ± SEM (n = 5); $p \leq 0.05$ vs. control green zucchini group (CONGZUG) using Student's *t*-test.

All comparisons were made based on the control group data. Germination rates and plant height improved by 13.23% ($p = 0.003$) and 34.10% ($p = 0.001$), respectively. Leaf spreading also showed a significant gain of 20.04% ($p = 0.010$) in the BTGZUG compared to

the CONGZUG. Number of primary branches per plant and number of nodes per plant were significantly increased by 27.64% ($p = 0.013$) and 101.08% ($p \leq 0.001$). Furthermore, indicators of photosynthetic potential were substantially boosted; the leaf length and leaf width were surged by 25.94% ($p \leq 0.001$) and 33.81% ($p = 0.001$), respectively, in the BTGZUG compared to the CONGZUG. Compared with the CONGZUG, the treated group (BTGZUG) exhibited a marked improvement in reproductive priming parameters, with male and female flower counts increasing by 33.23% ($p = 0.006$) and 19.20% ($p = 0.044$), respectively. Fruit weight, fruit length, and fruit diameter in the BTGZUG was significantly improved than the CONGZUG, showing increments of 28.51% ($p \leq 0.001$), 33.53% ($p \leq 0.001$), and 21.43% ($p \leq 0.001$). Furthermore, seed length, seed width, seed count per fruit, and 100-seed weight were substantially higher in the BTGZUG by 12.12% ($p = 0.007$), 44.68% ($p = 0.004$), 37.02% ($p \leq 0.001$), and 10.88% ($p \leq 0.001$), respectively, compared to the CONGZUG. Ultimately, these improvements culminated in a 25.36% surge in total fruit yield (tons per hectare) relative to the control.

DISCUSSION

The application of spiritual blessing (biofield) energy treatment (SBET) on green zucchini treatment group (BTGZUG) resulted in a substantial enhancement in both germination rates and plant height, suggesting that the treatment may influence the intrinsic metabolic pathways of the seeds. This observation was consistent with the findings of Dela Cruz et al. 2025 [14], which highlight how external stimuli can significantly boost early seedling vigour and developmental architecture. The significant expansion in leaf spreading, leaf length, and leaf width in the BTGZUG indicates a superior canopy development, which likely optimized light interception and photosynthetic efficiency. Such morphological shifts in leaf characteristics were similarly documented by Putra et al. 2024, where they established that increased leaf area was a primary driver for biomass accumulation [15]. The extraordinary increase in the number of nodes per plant and increase in primary branches suggest a fundamental shift in the plant's structural branching pattern. This type of vigorous vegetative growth often serves as a prerequisite for high reproductive output, as explored by Soniya and Arivazhagan, 2023 [16]. In terms of reproductive priming, the BTGZUG showed a marked increase in both male and female flower counts, indicating an enhanced transition from the vegetative to the reproductive phase. These results align with the observations of Dobhal et al. 2022 [17], which posits that increased floral frequency was a direct result of improved nutrient mobilization following energy-related priming. Furthermore, the significant improvements in fruit weight, fruit length, and fruit diameter in the treated group (BTGZUG) underscore the efficacy of the biofield energy treatment in enhancing sink strength and dry matter partitioning. Similar yield component improvements were reported by Sajid et al. 2022 [18]. The superior seed metrics observed, including a significant increase in seed width and seed count, indicate that the SBET extended its influence to the embryonic development of the plant. These findings were supported by the research of Srimathi et al. 2011, which suggests that seed quality was intrinsically linked to the parent plant's physiological status during anthesis [19]. Ultimately, a significant surge in total fruit yield (tons per hectare) demonstrates the cumulative impact of improved germination, vegetative vigor, and reproductive efficiency. This significant yield enhancement mirrors the outcomes discussed by Singh et al. 2019 [20], proving that integrated improvements in growth parameters are essential for maximizing horticultural output.

CONCLUSION

The application of SBET (Trivedi Effect®) to green zucchini (BTGZUG) group significantly enhanced both vegetative and reproductive performances compared to the untreated control group (CONGZUG). Notable improvements in germination, photosynthetic surface area, and branching architecture suggest an optimized developmental framework that directly supports an increased reproductive priming. These morphological and physiological advancements culminate in superior fruit and seed quality, ultimately resulting in a substantial increase in total crop yield. Therefore, blessing energy treatment represents a potent non-invasive approach for maximizing the agricultural productivity and morphological vigor of green zucchini crops.

Abbreviations

SBET: spiritual blessing energy treatment; CONGZUG: control green zucchini group; BTGZUG: biofield energy-treated green zucchini group; SSP: single super phosphate; MOP: muriate of potash.

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Conflict of Interests

Author AB was employed by Trivedi Global, Inc. NRP, TBG, and VDK were employed by Shree Angarsiddha Shikshan Prasarak Mandal's College of Agriculture, Sangulwadi, Mohitewadi, Maharashtra, India. Authors SM and SJ were employed by Trivedi Science Research Laboratory Pvt. Ltd.

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REFERENCES

- [1]. Savvas D, Magkana P, Yfantopoulos D, Kalozoumis P, Ntatsi G. Growth and nutritional responses of zucchini squash to a novel consortium of six *Bacillus* sp. strains used as a biostimulant. *Agronomy*, 2024; 14(2): 362. <https://doi.org/10.3390/agronomy14020362>
- [2]. El Bilali H, editor. XVI International Scientific Agriculture Symposium "AGROSYM 2025", Jahorina, 2025: Book of Proceedings [Internet]. East Sarajevo: Faculty of Agriculture; 2025. p. 1121. Available from: https://agrosym.ues.rs.ba/article/showpdf/BOOK_OF_PROCEEDINGS_2025_FINAL.pdf
- [3]. Singh B, Kumar M, Sirohi NPs. Protected cultivation of cucurbits under low-cost protected structures: a sustainable technology for peri-urban areas of northern INDIA. *Acta Horticulturae*, 2007; 731: 267-272. <https://doi.org/10.17660/ActaHortic.2007.731.36>

- [4]. Ahmad Z, Niyazi S, Firdoos A, Wang C, Manzoor MA, Ramakrishnan M, Upadhyay A, Ding Y. Enhancing plant resilience: Nanotech solutions for sustainable agriculture. *Heliyon*, 2024; 10(23): e40735. <https://doi.org/10.1016/j.heliyon.2024.e40735>
- [5]. Lamichhane JR, Dachbrodt-Saaydeh S, Kudsk P, Messéan A. Toward a reduced reliance on conventional pesticides in European agriculture. *Plant Disease*, 2016; 100(1): 10-24. <https://doi.org/10.1094/PDIS-05-15-0574-FE>
- [6]. Sá R, Pignataro NG. Integrating energy fields: a biophysical model to support Traditional Chinese Medicine. *International Journal of Complementary & Alternative Medicine*, 2026; 19(1): 1-11. <https://doi.org/10.15406/ijcam.2026.19.00755>
- [7]. Hammerschlag R, Sprengel M, Baldwin AL. Biofield therapies: guidelines for reporting clinical trials. *Global Advances in Integrative Medicine and Health*, 2024; 13: 27536130231202501. <https://doi.org/10.1177/27536130231202501>
- [8]. Karamian R, Kalantarian S. Seed laser priming enhances defensive responses in milk thistle under heavy metal toxicity. *Scientific Reports*, 2005; 15(3): 892-908. <https://doi.org/10.1038/s41598-025-54321-x>
- [9]. Trivedi MK, Phutankar NR, Kadam VD, Gaikwad TB, Mondal S, Jana S. Exploring the role of spiritual blessing energy treatment in enhancing growth and yield of bottle gourd (*Lagenaria siceraria* L.). *Journal of Agricultural Economics, Extension and Rural Development*, 2026; 14(3): 13-20. <https://doi.org/doi.org/10.54978/jaeerd>
- [10]. Trivedi MK, Trivedi D, Branton A, Kadam VD, Phutankar NR, Gaikwad TB, Mondal S, Jana S. Morphological attributes and yield of *Momordica charantia* (bitter gourd) under the application of spiritual blessing/biofield energy treatment (BET). *Journal of Farming*, 2026; 1(3): 1-11. <https://doi.org/10.14302/issn.3070-2232.jf-26-6051>
- [11]. Trivedi MK, Kadam VD, Phutankar NR, Gaikwad TB, Mondal S, Jana S. Assessing the morphological and phenological attributes of corn/maize (*Zea mays* L.) influenced by spiritual blessing energy treatment (SBET). *Journal of Agriculture and Forest Meteorology Research*, 2026; 8(1): 598-604.
- [12]. Trivedi MK, Phutankar NR, Kadam VD, Gaikwad TB, Mondal S, Jana S. Enhancement of vegetative growth and fruit yield in cucumber (*Cucumis sativus* L.). *Open Access Journal of Agricultural Research*, 2026; 11(2): 000390. <https://doi.org/10.23880/oajar-16000390>
- [13]. Richer-de-Forges AC, Arrouays D, Chen S, Dobarco MR, Libohova Z, Roudier P, Minasny B, Bourennane H. Hand-feel soil texture and particle-size distribution in central France. relationships and implications. *CATENA* 2022; 213: 106155. <https://doi.org/10.1016/j.catena.2022.106155>
- [14]. Dela Cruz SMD, Rosales RJG, Gregorio-Balbas MBS, Balbas CBAA, Pascua GFS. Effect of seed priming in squash on germination and seedling vigor. *Crop Research*, 2025; 60 (3, 4): 179-184. <https://doi.org/10.31830/2454-1761.2025.CR-1015>
- [15]. Putra DNH, Widaryanto E, Karyawati AS. Optimizing watering strategies: enhancing zucchini (*Cucurbita pepo* L.) growth and yield through phase specific water management. *International Journal of Environment, Agriculture and Biotechnology*, 2024; 9(6): 188-194. <https://doi.org/10.22161/ijeab>
- [16]. Soniya T, Arivazhagan E. Impact of plant growth regulators on growth and yield of summer squash (*Cucurbita pepo* L.). *Crop Research*, 2023; 58(5 & 6): 228-232. <https://doi.org/10.31830/2454-1761.2023.CR-929>
- [17]. Dobhal A, Pant SC, Chandola JC, Panwar A, Kumar V. Effect of plant growth regulator on growth, yield, quality and economic of summer squash (*Cucurbita pepo* L. Var. Pattypan) in

mid hills of Uttarakhand. *International Journal of Plant & Soil Science*, 2022; 34(24): 855-862. <https://doi.org/10.9734/ijpss/2022/v34i242708>

- [18]. Sajid MB, Sarker KK, Monshi FI, Sultana S, Monika MA, Bhuiyan MSU. Assessing the genetic diversity of squash (*Cucurbita pepo* L.) genotypes based on agro-morphological traits and genetic analysis: Evaluation of squash genetic diversity. *Journal of Horticultural Sciences*, 2022; 17(1): 51-62. <https://doi.org/10.24154/jhs.v17i1.1245>
- [19]. Srimathi P, Jayakumar R, Sastri G. Seed development and maturation in vegetables - an overview. 2011; In book: *Seed Physiology of Crops*, 125-135, Sathish Serial Publishing House, Delhi.
- [20]. Singh U, Topno SE, Krishnan N, Bahadur V. Performance of zucchini (*Cucurbita pepo* L.) in terms of growth and yield as affected by planting dates and spacing levels. *Green Farming*, 2019; 10(6): 730. <https://doi.org/10.37322/GreenFarming/10.6.2019.730-733>