INNOVARE JOURNAL OF AGRICULTURAL SCIENCE

Vol 14, Issue 2, 2026

ISSN - 2321-6832

Research Article

STANDARDIZATION OF COMPOST TEA FORMULATION PROTOCOL AND ITS EFFICACY STUDY ON SWEET CORN (*ZEA MAYS* VAR. RUGOSA)

TANKO BAKO[1]*, ADASHU TANKO GANI[2], JAPHET MALUM FLAYIN[3]

[1]Department of Agricultural and Bio-Resources Engineering, Taraba State University, Jalingo, Nigeria. [2]Department of Soil Science and Land Resource Management, Federal University, Wukari, Nigeria. [3]Department of Agricultural and Environmental Engineering, Joseph Sarwuan Tarka University, Makurdi, Nigeria. Email: engbako@gmail.com

Received: 10 November 2025, Revised and Accepted: 15 January 2026

ABSTRACT

Objectives: The present study was conducted with the objective of standardizing the protocol for the development of indigenous compost tea from compost and testing its efficacy in improving sweet corn (*Zea mays* var. Rugosa) yield.

Methods: Intensive laboratory scale studies were conducted to provide the end-users with simple and easy to practice protocol for preparation, storage and field application of compost tea. Compost tea was brewed using different compost to water ratios of 1: 5, 1:10, 1:15 and 1:20, brewing periods of 1, 3, 5 and 7 days, and storage temperatures of 20, 30 and 40°C.

Results: It was found that compost tea brewed over a period of 5 days using compost and water in 1:5 ratio had highest nutritive value. Nitrogen content of compost tea tended to decline immediately after its production and at storage temperatures above 30°C. Findings from field experiments conducted depicted a positive effect of compost tea application on yield enhancement and disease suppression in sweet corn. As regards the yield per plot and per hectare, it was found that plants with the highest level of dilution garnered the heaviest yield and moved downwards in descending orders with the control plants with the lightest yield. In the pest and disease occurrence, dilutions of compost tea of varying levels could be an effective pesticides considering that all plants grow vigorously from its emergence until harvesting as no disease was noticed and few cutworms were only observed during the plants early vegetative growth but disappeared after several applications of compost tea.

Conclusion: The study provided data-based evidence that the use of indigenously developed compost tea would be economical for sweet corn growers and this study will serve as baseline for further research in the field of compost tea development.

Keywords: Compost tea, Organic, Sweet corn, Yield improvement.

 DOI: http://dx.doi.org/10.22159/ijags.2026v14i2.54984. Journal homepage: https://innovareacademics.in/journals/index.php/ijags

INTRODUCTION

Injudicious use of chemical fertilizers to improve yield and net returns from farming has introduced problems of environmental pollution and land degradation (Shah and Wu, 2019). The current era emphasizing sustainability does not permit excessive use of chemical fertilizers and focuses on conservation of land and environment. The high costs of chemical fertilizers are making their use beyond the reach of many small farmers. Situation demands to use chemical and organic fertilizers in conjunction to optimize yield and to conserve land and environment. Organic fertilizers have multiple benefits for the improvement of soil fertility. Organic fertilizers are an essential source for plant nutrients and also act as soil conditioner (Picariello *et al*., 2021).

Large quantities of organic fertilizers like compost are required for field application and there are problems associated with their storage and transportation. Nitrogen (N) is lost rapidly from organic fertilizers like compost and manure (Qiu *et al*., 2021). One viable option is to prepare compost tea as its handling is relatively easy compared to compost. Compost tea is a liquid, nutritionally rich, well-balanced, organic supplement made by steeping compost in water. There are several benefits associated with the use of compost tea. For instance, the use of compost tea reduces transportation costs associated with huge amounts of compost. Compost tea can be applied over a larger area than would be possible by incorporating the same amount of compost in the soil. Compost extracts can improve plant production by decreasing disease incidence, improving plant nutrient status and generally promoting plant growth (González-Hernández *et al*., 2021). Other benefits of using compost tea for plants include increased soil water retention, improved soil fertility, and reduced reliance on the need for chemical pesticides and fertilizers (Zarei *et al*., 2018).

Previous studies demonstrated positive effects of compost tea on improving the yield and quality of various field and horticultural crops. It has been reported that compost tea increased peach fruit yield and quality by increasing the concentration of nitrogen in leaves (Stino *et al*., 2010). Increase in biomass of forage plants was attributed to increase in the height of plant, fresh and dry weight of aerial parts, flowers, number of branches, and suckers under the combined application of yeast and compost tea (Azza *et al*., 2010). It has been reported positive effect of compost tea on the germination and growth of green gram (Suganthi and Jayanandhan, 2015). The findings of a field experiment conducted in Egypt revealed that integrated application of compost tea, biochar amendments and magnetic iron ore can be used for economical production of wheat and maize in saline soil without adverse effect on soil properties (Amer, 2016).

Compost tea is a relatively new liquid organic fertilizer product in Nigeria. The quality of product may be influenced by multiple factors including the amount of compost and water used, duration of brewing and the storage conditions (Morales-Corts *et al*., 2018). In Nigeria, scientific information is lacking on protocols for the formulation of compost tea. There was dire need that protocols for the development of compost tea to be optimized through conducting indigenous research. Furthermore, the effectiveness of compost tea needs to be evaluated in planned experiment to suggest practical and easy-to-use measures to the end-users. Keeping in view the existing knowledge gap and importance of the issue, the present study was designed with the

objective to standardize the protocol for the large-scale production of compost tea and to test the response of sweet corn towards field application of indigenously developed compost tea.

METHODS

Field experiment on sweet corn (*Zea mays* var. Rugosa) was carried out at the Teaching and Research Farm of the Taraba State University, Jalingo, Nigeria, in 2024. The study site is geographically coordinated at latitude 8° 53' and 34.2672" North and longitude 11° 22' and 37.74" East. This experiment was performed to evaluate the effect of compost tea on sweet corn production.

Plant material

Seeds of sweet corn (Meilan F1 Hybrid) were planted in the field on flat beds. The experimental area was prepared into flat beds by plowing, harrowing, and leveling; each plot measures 2 m × 2 m (4 m^2). The seeds were planted in May 2024 at a distance of 0.3 m × 0.3 m. The experiment was designed in complete randomized blocks with three replicates. Soil samples were collected from 0 to 30 cm before sowing to characterize the site for physico-chemical properties.

Experimental treatments

i. No treatment (negative control)
ii. 500 kg ha^{-1} nitrogen, phosphorus, and potassium (NPK) fertilizer (Positive Control) (Sidiky *et al*., 2019; Donald *et al*., 2021)
iii. 1 kg of compost per 5 L of water compost tea
iv. 1 kg of compost per 10 L of water compost tea
v. 1 kg of compost per 15 L of water compost tea
vi. 1 kg of compost per 20 L of water compost tea.

Compost production

Compost was prepared from local plants and animal wastes available at the University under natural conditions using the Active Zone-Yield composter (in-vessel system), where all or part of composting takes place in a reactor without supplemental application of any chemical or biological substrate. The passively aerated composting technique was used for the preparation of compost. The materials used include cow dung, poultry droppings, and water leaf (*Talinum triangulare*) in a ratio 5:5:1. Turning of the compost was done weekly and water was added when the moisture content level fell below 40%. This was done to create a conducive environment for microbes to hasten the decomposition of materials. The process took a month for complete digestion of the material.

Standardization of protocol for the development of aerobic compost tea

Study on optimum ratio of compost and water for the formulation of compost tea

Compost tea was prepared using different ratios of compost and water (1:5, 1:10, 1:15, and 1:20). For this purpose, 4 plastic drums were taken and, after thorough washing, these were filled with 5, 10, 15, and 20 L water and were placed under the shed. The drums were left uncovered for 3–4 h so that chlorine present in water (if any) may escape out. Some quantity of molasses as a microbial food starter was put in each drum. Four jute bags were taken and 1 kg well-prepared compost was put in each of them. Special-sized jute bags (1×2 feet) for said purpose were arranged from the local market. These jute bags containing compost were immersed in water in such a way that they remained suspended and did not touch the bottom of the drums to facilitate proper aeration through the compost present in the jute bags. Water in the plastic drums was aerated by pump to avoid odor in the finished product as well as to ensure sustained supply of oxygen to microbes. Top of each drum was kept covered by a plastic lid during the process of tea formation to avoid losses of nitrogen through volatilization (Plate 2). After extraction (3 days), samples of compost tea from each drum were collected for determining the contents of carbon (C), nitrogen (N), phosphorus (P), potassium (K), zinc (Zn), and iron (Fe) as well as to assess the optimum ratio of compost and water for formulating compost tea. Microbiological properties of the compost tea were also evaluated.

Study on optimum duration for brewing of compost tea

Optimum duration for brewing of compost tea was determined in a study that involved compost tea preparation using compost and water in 1:5 ratio over a period of 1, 3, 5, and 7 days and subsequent analysis for nitrogen (N) and potassium (K) contents.

Study on selection of optimal storage conditions for compost tea

Compost tea (1:5) brewed over 5 days was stored in plastic bottles at 20, 30, and 40°C, and changes in nitrogen content were recorded over an interval of 15 days for 2 months (60 days) with an objective to identify optimum temperature and duration for storage of compost tea.

Analysis of chemical properties of compost tea

The percentages of carbon (C) and nitrogen (N) were measured using an EA3100 Elemental Analyzer (Eurovector SRL, Pavia, PV, Italy). Concentrations of phosphorus, potassium, iron, and zinc (P, K, Fe, and Zn) were determined after digestion with nitric acid and hydrogen peroxide (4/1 L/L), using an Agilent 7700 Series ICP-MS (Agilent Technologies, Santa Clara, CA, USA). All measurements were performed in triplicate (Mot *et al*., 2024).

Analysis of microbial activity in compost tea

Compost tea samples were taken after each brewing cycle for analysis of microbial acitivity. A 10-fold serial dilution of each sample was prepared. Active bacteria and active fungi were assessed using a 1:10 dilution under Epifluorescence Microscopy at ×40 and ×20 objective, respectively (Pant *et al*., 2011). All measurements were performed in triplicate.

Response of sweet corn to various concentrations of compost tea

Determination of plant growth parameters

The plant growth data collected at the vegetative stage (75–85 days from planting) are plant height, plant girth, number of leaves, leaf area, and leaf area index. Four plants were selected at random from each plot and tagged for growth measurements. Plant height was measured using a measuring tape. Plant girth was measured using vernier calipers. The number of leaves per plant was determined by physical counting.

Determination of plant yield parameters

At the early dough stage (75–85 days from planting), the ears were manually harvested. Four ears from each plot were taken randomly at harvest and were husked to measure ear parameters as weight of ear, length of ear, and diameter of ear. The weight of ear was measured using a digital weighing balance, the length of ear was measured using a steel tape, and diameter of ear measured using vernier calipers.

Statistical Analysis

The results were subjected to mono-factorial variance analysis (analysis of variance) and the significance of differences ($p \leq 0.05$) among means was determined with Fisher's least significant difference test. Statistical analysis was performed using the Statistical Package for the Social Sciences version 19.0 for Windows.

RESULTS AND DISCUSSION

Soils of experimental fields were mainly sandy loam in texture, having 0.92% organic matter, 1.45 g/kg total Nitrogen, 6.33% Available P, 2.52 cmol (+) kg^{-1} Ca, 1.34 cmol (+) kg^{-1} Mg, 0.25 cmol (+) kg^{-1} K, 0.21 cmol (+) kg^{-1} Na, and pH of 6.74.

Standardization of protocol for the development of aerobic compost tea

Study on optimum ratio of compost and water for the formulation of compost tea

Table 1 shows the effects of compost: water ratio on chemical properties of compost tea. The results showed that all the chemical properties of compost tea evaluated tend to increase with increase in concentration of compost tea. The statistical analysis also indicated

Table 1: Effects of compost: water ratio on chemical properties of compost tea

Treatment	Chemical parameters of compost tea (%)					
	C	N	P	K	Zn	Fe
1 kg 5 L^{-1} Compost tea	5.72[a]	3.22[a]	1.16a	1.53[a]	0.0186[a]	0.0452[a]
1 kg 10 L^{-1} Compost tea	4.15[b]	2.54[b]	0.98[b]	1.21[b]	0.0125[b]	0.0283[b]
1 kg 15 L^{-1} Compost tea	3.62[c]	2.18[c]	0.72[c]	1.14[c]	0.0104[c]	0.0157[c]
1 kg 20 L^{-1} Compost tea	2.88[d]	1.87[d]	0.69[c]	1.03[d]	0.0087[d]	0.0119[d]
p-value	0.000	0.000	0.000	0.000	0.000	0.000
F-$LSD_{0.05}$	0.0188	0.2071	0.0565	0.0282	0.0000	0.0000

Column means with the same letters are not significantly different (p≤0.05)

significant differences in the determined chemical parameters of compost tea across concentrations. Organic carbon concentration in compost tea formulations ranged between 2.88% and 5.72%. The highest organic carbon (5.72%) was found in compost tea formulated by using compost and water in 1:5 ratio. Nitrogen concentration in compost tea formulations ranged from 1.87 to 3.22%. The highest Nitrogen content (3.22%) was found in compost tea formulated by using compost and water in 1:5 ratio. Phosphorus concentration in compost tea formulations varied from 0.69% to 1.16%. The highest phosphorus content was found in compost tea brewed using compost and water in 1:5 ratio. Potassium concentrations varied from 1.03% to 1.53% with the highest potassium content found in compost tea brewed using compost and water in 1:5 ratio. Zinc concentration in various formulations of compost tea ranged from 0.0087% to 0.0186%. The highest concentration of zinc (0.0186%) was found in compost tea formulated by using compost and water in 1:5 ratio. Iron concentration in compost was detected in the range of 0.0119–0.0452%. The highest concentration of iron (0.0452%) was found in compost tea having compost and water in 1:5 ratio.

Table 2 shows the effects of compost: water ratio on microbial population in compost tea. Microbial load in compost tea tended to decrease with increasing amounts of water in various formulations of compost tea. The colony-forming unit (CFU) count for compost tea at concentration 1:5–1:20 ranged from 6.9×10^{11} to 4.2×10^{11} CFU/mL for total bacteria count and ranged from 9.9×10^{4} to 6.5×10^{4} CFU/mL for total fungal count. Compost tea at 1:5 ratios exhibited the highest CFU count, followed by 1:10, 1:15, and 1:20. This suggests that higher compost tea concentrations support greater microbial activity. The statistical analysis also indicated significant differences in CFU counts across concentrations.

Study on the optimum duration for brewing of compost tea

Table 3 shows the effects of brewing duration on N (%) and P (%) of compost tea. Nitrogen concentration in compost tea was initially low in the first 3 days of brewing (2.30–2.48%), it was highest (3.66%) after 5 days of brewing and then it tended to decline to 2.89% after 7 days of brewing. Potassium content during brewing tended to increase till the 5th day of brewing and afterwards, it declined over time. The highest potassium content (1.82%) was found in compost tea brewed for 5 days.

Study on the selection of optimal storage conditions for compost tea

Table 4 shows the effect of storage conditions on nitrogen (%) concentration in compost tea. Nitrogen content in stored compost tea tended to reduce over time and with increasing temperatures. Relatively higher nitrogen contents (2.19–3.18%) were found in compost tea stored at low temperature (20°C) over a period of 60 days. The nitrogen content in compost tea stored at higher temperature (40°C) was relatively lesser (1.94–2.37%) than the tea stored at low temperatures. The statistical analysis also showed that nitrogen content of compost tea reduces significantly (p≤0.05) with time at different storage temperatures.

Table 2: Effects of compost: water ratio on microbial population in compost tea

Compost to water ratio	Active bacteria (CFU/mL)	Active fungi (CFU/mL)
1:5	6.9×10^{11a}	9.9×10^{4a}
1:10	6.1×10^{11b}	7.9×10^{4b}
1:15	5.6×10^{11c}	7.0×10^{4c}
1:20	4.2×10^{11d}	6.5×10^{4d}
p-value	0.000	0.000
F-$LSD_{0.05}$	9.4×10^{9}	941.421

CFU: Colony-forming unit. Column means with the same letters are not significantly different (p≤0.05)

Table 3: Effects of brewing duration on n (%) and *P* (%) content of compost tea

Brewing duration (days)	Parameters of compost tea	
	N (%)	P (%)
1	2.30[d]	1.07[d]
3	2.48[c]	1.36[c]
5	3.66[a]	1.82[a]
7	2.89[b]	1.53[b]
p-Value	0.000	0.000
F-$LSD_{0.05}$	0.0941	0.0188

Column means with the same letters are not significantly different (p≤0.05)

Table 4: Effect of storage conditions on nitrogen (%) concentration in compost tea

Storage duration (days)	Storage temperatures (°C)		
	20	30	40
1	3.18[a]	2.64[a]	2.37[a]
15	2.79[b]	2.56[b]	2.28[b]
30	2.55[c]	2.40[c]	2.16[c]
45	2.31[d]	2.24[d]	2.00[d]
60	2.19[e]	2.08[e]	1.94[e]
p-Value	0.000	0.000	0.000
F-$LSD_{0.05}$	0.0651	0.0325	0.0569

Column means with the same letters are not significantly different (p≤0.05)

Response of sweet corn to various concentrations of compost tea

Effects of compost: water ratio on growth parameters of sweet corn

The results (Table 5) showed that compost tea concentration had a significant (p≤0.05) positive effect on the plant height, stem girth, and number of leaves. The 1 kg/5 L compost tea treatment had the tallest plant (198.78 cm) and statistically higher than other treatments while the control (no treatment) recorded the shortest plant (145.88 cm) and was statistically lower than other treatments. The 1 kg/5 L compost tea treatment had the highest stem girth (3.89 cm) and statistically higher than other treatments and the control (no treatment) recorded lowest

Table 5: Effects of compost: water ratio on growth parameters of sweet corn

Treatment	Sweet corn growth parameters		
	Plant height (cm)	Stem girth (cm)	Number of leaves
Control (no-treatment)	145.88[f]	3.34[f]	8.64[f]
500 kg/ha NPK fertilizer	195.47[b]	3.82[b]	10.83[a]
1 kg 5 L^{-1} compost tea	198.78[a]	3.89[a]	10.78[b]
1 kg 10 L^{-1} compost tea	177.50[c]	3.76[c]	9.75[c]
1 kg 15 L^{-1} compost tea	164.56[d]	3.65[d]	9.28[e]
1 kg 20 L^{-1} compost tea	162.39[e]	3.49[e]	9.56[d]
p-value	0.000	0.000	0.000
F-$LSD_{0.05}$	0.0000	0.0291	0.0292

NPK: Nitrogen, phosphorus, and potassium. Column means with the same letters are not significantly different (p≤0.05)

Table 6: Effects of compost: water ratio on yield parameters of sweet corn

Treatment	Sweet corn yield parameters		
	Ear mass (g)	Ear length (cm)	Ear diameter (cm)
Control (no-treatment)	283.74[f]	17.19[e]	3.20[e]
500kg/ha NPK fertilizer	369.85[b]	22.15[a]	4.92[a]
1 kg 5 L^{-1} compost tea	371.33[a]	22.11[a]	4.88[a]
1 kg 10 L^{-1} compost tea	350.55[c]	21.46[b]	4.65[b]
1 kg 15 L^{-1} compost tea	331.33[d]	20.90[c]	4.39[c]
1 kg 20 L^{-1} compost tea	323.47[e]	19.66[d]	3.85[d]
p-value	0.000	0.000	0.000
F-$LSD_{0.05}$	0.0000	0.0734	0.1453

NPK: Column means with the same letters are not significantly different (p≤0.05)

stem girth (3.34 cm) and was statistically lower than other treatments. The 500kg/ha NPK fertilizer treatments recorded the highest number of leaves of 10.83 which is statistically higher than other treatments while control (no treatment) plots had the lowest number of leaves of 8.64 which is statistically lower than other treatments. This is in agreement with Dania *et al*. (2018) who studied the effect of solid and liquid tea compost on the growth, yield of *Amaranthus cruentus* and soil properties in Ekpoma, Delta State. Thus, compost tea could be used as an agent for promoting plant growth in organic cultivation of crops.

Effects of compost: water ratio on yield parameters of sweet corn

The results of the effects of compost tea concentration on the yield parameters of sweet corn (Table 6) showed that compost tea concentration had a significant (p≤0.05) positive effect on ear mass, ear length, and ear diameter of sweet corn. The 1 kg of compost per 5 L of water compost tea treatment produced the highest ear mass (371.33 g) and statistically higher than other treatments while the control (no treatment) recorded the lowest ear mass (283.74 g) and statistically lower than other treatments. The results showed that treatment of 1 kg of compost per 5 L of water compost tea produced sweet corn ear length and ear diameter similar to the ear length and ear diameter produced by mineral (NPK) fertilizers without significant differences between them. The superior treatments of 1 kg of compost per 5 L of water compost tea over 1 kg of compost per 10 L of water compost tea, 1 kg of compost per 15 L of water compost tea and 1 kg of compost per 20 L of water compost tea treatments can be attributed to its superiority in stimulating vegetable growth of plants, resulting in an increase in photosynthesis and better carbohydrate construction, thus improved yield and ear characteristics of sweet corn. These results are consistent with those obtained by Kim *et al.* (2015) who investigated the effect of aerated compost tea on the growth promotion of lettuce, soybean, and sweet corn in organic cultivation and reported that application of aerated compost tea from organic compost based using MOVR (the mixture of rice straw compost, vermicompost, and Hinoki cypress bark compost) to the root zone increased the plant

Fig. 1: Simple compost tea production unit used to standardize the protocol

shoot and root growths and yield of the red leaf lettuce, sweet corn, and soybean. They mentioned that application of compost teas leads to the production of plants vigor growth, higher nutrient uptake, more tolerant of stress conditions, better in the productivity, and yield quality. Thus, compost tea could be used as an agent for promoting plant growth and yield in organic cultivation of crops.

CONCLUSION

Sustainable sweet corn production in Nigeria is constrained by high cost of chemical fertilizers and non-availability of indigenously developed organic fertilizer products. The present study optimized the protocol for the preparation of compost tea from locally available compost. Findings from the current study revealed that compost tea brewed over a period of 5 days by using compost and water in 1:5 ratio usually has higher nitrogen content and microbial load. It was also revealed that nitrogen contents of compost tea tended to decline over time as well as with increase in storage temperatures beyond 20°C. It is suggested to use freshly brewed compost tea for better results in the enhancement of growth and suppression of diseases. Efficacy studies on the effect of compost tea depicted that better sweet corn yield was achieved under treatments receiving high concentrations of compost tea. The main effect of compost tea was suppression of plant pathogens as relatively less disease scales were recorded in treatments receiving compost tea. Preliminary results revealed positive effects of the application of indigenously developed compost tea on the growth and yield of sweet corn. These findings had considerable significance in providing baseline data sets for the local production of a liquid biofertilizer product in the form of compost tea. Research on improving the nutritive value of compost tea using indigenous organic sources of plant nutrition is needed to improve the use efficiency of compost teas.

AUTHORS' CONTRIBUTION

The first author designed and directed the project, second author performed the experiments, and third author carried out the experimental data analysis.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHORS' FUNDING

This study was carried out with the support of the Tertiary Education Trust Fund, National Research Fund (TETF/ES/DR and D-CE/NRF2023/SETI/AFS/00546/VOL.1) Grant, 2023, Nigeria.

REFERENCES

Amer, M. M. (2016). Effect of biochar, compost tea and magnetic iron ore application on some soil properties and productivity of some field crops under saline soils conditions at north Nile delta. *Egyptian Journal of Soil Science, 56*(1), 169-186.

Azza, A., El-Din, E., & Hendawy, S. F. (2010). Effect of dry yeast and compost tea on growth and oil content of borago officinalis plant. *Research Journal of Agriculture and Biological Sciences, 6*(4), 424-430.

Dania, S. O., Oshokhayamhe, B. I., & Uche, A. L. (2018). Effect of solid and liquid tea compost on the growth, yield of *Amaranthus cruentus* and soil properties in Ekpoma, delta state. *Nigerian Journal of Soil Science*, *28*(2), 102-108.

González-Hernández, A. I., Suárez-Fernández, M. B., Pérez-Sánchez, R., Gómez-Sánchez, M. Á., & Morales-Corts, M. R. (2021). Compost tea induces growth and resistance against R*hizoctonia solani* and *Phytophthora capsici* in Pepper. *Agronomy, 11*, 781.

Kim, M. J., Shim, C. K., Kim, Y. K., Hong, S. J., Park, J. H., Han, E. J., Kim, J. H., & Kim, S. C. (2015). Effect of aerated compost tea on the growth promotion of lettuce, soybean, and sweet corn in organic cultivation. *The Plant Pathology Journal*, *31*(3), 259-268.

Morales-Corts, M. R., Pérez-Sánchez, R., & Gómez-Sánchez, M. A. (2018). Efficiency of garden waste compost teas on tomato growth and its suppressiveness against soilborne pathogens. *Scientia Agricola, 75*, 400-409.

Mot, A., Pârvulescu, O. C., Ion, V. A., Molosag, A., Dobrin, A., Bădulescu, L., Orbeci, C., Egri, D., Dobre, T., Løes, A. K., Cabell, J., Salifoglou, A., Matsia, S., Letelier-Gordo, C. O., Răducanu, C., & Mocanu, A. (2024). Preparation, characterization, and testing of compost tea derived from seaweed and fish residues. *Agronomy*, *14*, 1919.

Pant, A., Radovich, T. J. K., Hue, N. V., & Arancon, N. Q. (2011). Effects of vermicompost tea (aqueous extract) on pak choi yield, quality, and on soil biological properties. *Compost Science and Utilization*, *19*(4), 279-292.

Picariello, E., Pucci, L., Carotenuto, M., Libralato, G., Lofrano, G., & Baldantoni, D. (2021). Compost and sewage sludge for the improvement of soil chemical and biological quality of Mediterranean agroecosystems. *Sustainability, 13*(1), 26.

Qiu, Z., Li, M., Song, L., Wang, C., Yang, S., Yan, Z., & Wang, Y. (2021). Study on nitrogen-retaining microbial agent to reduce nitrogen loss during chicken manure composting and nitrogen transformation mechanism. *Journal of Cleaner Production*, *285*, 124813.

Shah, F., & Wu, W. (2019). Soil and crop management strategies to ensure higher crop productivity within sustainable environments. *Sustainability, 11*, 1485.

Stino, R. G., Fayed, T. A., Ali, M. M., & Alaa, S. A. (2010). Enhancing fruit quality of Florida prince peaches by some foliar treatments. *Journal of Horticultural Science and Ornamental Plants, 2*, 38-45.

Suganthi, A., & Jayanandhan, D. (2015). Effect of tea compost on the growth of *Vigna radiata* (L.) *International Journal of Applied Research, 1*(12), 968-972.

Zarei, M., Abadi, V. A. J. M., & Moridi, A. (2018). Comparison of vermiwash and vermicompost tea properties produced from different organic beds under greenhouse conditions. *International Journal of Recycling of Organic Waste in Agriculture, 7*(1), 25-32.