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Effects of compost and compost water extract derived from agricultural wastes on yield and nutritional composition of *Lepidium sativum* microgreens

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Abstract

Purpose: The aim of this study was to evaluate the yield, chlorophyll and carotenoid content, and nutritional profile of *Lepidium sativum* microgreens cultivated with compost, compost water extract, and peat.
Method: Control (100% peat), C100 (100% compost), C50 (50% peat+50% compost), C25 (75% peat+25% compost), and WE100 (100% water extract), WE50 (50% water extract), and WE25 (25% water extract) obtained from compost were used for cultivation of *L. sativum* microgreens under LED (light-emitting diode) light source. Fresh weight of shoot (mg/shoot), fresh yield (kg/m^2), dry biomass (g/m^2), and chlorophyll, carotenoid, and nutrition element content of microgreens were measured. Estimated daily intake (EDI) of macro- and microelements of microgreens was calculated.
Findings: While the highest mean fresh weight of shoot of *L. sativum* microgreens was measured as 27.65 mg/shoot in media of C50, the highest fresh yield and dry biomass of microgreens were measured as 1.870 kg/m^2 and 94.81 g/m^2 in media of WE50. Chlorophyll a content of microgreens cultivated in C100, C25, and WE100 was lower than control (12.48, 12.52, and 14.02 mg 100 g^{-1} FW, respectively). Total chlorophyll content of microgreens in C25 was 14.45 mg 100 g^{-1} FW, which was significantly lower compared to control ($P<0.05$) rather than other media. Chlorophyll b and carotenoid contents in all media were not significantly different compared to those of control. N content of *L. sativum* microgreens cultivated in WE100 was 0.686 g/kg, which was significantly higher than control ($P<0.05$). Contents of Mg, Zn, and Na of microgreens of WE100 were lower compared to those of control (210.44, 3.50, and 32.77 mg/kg respectively). There was not any significant difference in contents of P, K, S, Ca, Fe, Mn, and Cu between microgreens of control and WE100. Total phenol content of microgreens in WE100 was 8.85 mg GAE/g DW, which was higher than control.
Conclusion: There was a very low effect of application of compost water extract on nutrient elements of *L. sativum* microgreens. Their applications increased the yield of *L. sativum* microgreens. The use of compost for higher yields of *L. sativum* microgreens for substitution of peat was very attendant regarding limiting the use of peat materials.

Keywords: compost, water extract, microgreens, *Lepidium sativum*, nutrition elements

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Tarımsal atıklardan üretilen kompost ve kompost sulu özütünün *Lepidium sativum* mikroyeşilliklerinin verim ve besinsel içeriği üzerindeki etkileri

Özet

Amaç: Bu çalışmanın amacı kompost, kompost sulu ekstraktı ve torf ile yetiştirilen *Lepidium sativum* mikroyeşilliklerinin verim, klorofil ve karotenoid içeriğini ve besin profilini değerlendirmektir.
Metod: Kontrol (100% torf), C100 (100% kompost), C50 (50% torf + %50 kompost), C25 (75% torf + %25 kompost) ve komposttan elde edilen WE100 (100% sulu özüt), WE50 (50% sulu özüt) ve WE25 (25% sulu özüt), *L. sativum*

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mikroyeşilliklerinin LED ışık kaynağı altında yetiştirilmesi için kullanılmıştır. Mikroyeşilliklerin taze sürgün ağırlığı (mg/sürgün), taze verimi (kg/m^2), kuru biyokütlesi (g/m^2), ve klorofil, karotenoid, ve besin elementi içeriği, ölçülmüştür. Makro ve mikro elementlerin tahmini günlük alımları hesaplanmıştır.
Bulgular: *L. sativum* mikroyeşilliklerinin en yüksek taze sürgün ağırlığı 27.65 mg/sürgün olarak C50'de, en yüksek taze verim ve kuru biyokütlesi sırasıyla 1.870 kg/m^2 and 94.81 g/m^2 olarak WE50'de ölçülmüştür. C100, C25, ve WE100'de yetiştirilen mikroyeşilliklerin klorofil a içerikleri kontrole kıyasla düşük bulunmuştur (12.48, 12.52, and 14.02 mg 100 g^{-1} FW, sırasıyla). Diğer bitki yetiştirme ortamlarından ziyade C25'deki mikroyeşilliklerin toplam klorofil içeriği 14.45 mg 100 g^{-1} FW ve anlamlı ölçüde düşük bulunmuştur ($P<0.05$). Tüm bitki yetiştirme ortamlarında klorofil a ve karotenoid içerikleri kontrole kıyasla istatistiksel olarak önemsiz ölçüde farklı bulunmuştur. WE100'de yetiştirilen mikroyeşilliklerin N içeriği 0.686 g/kg ve $P<0.05$ anlamlılık seviyesinde kontrole göre yüksek bulunmuştur. WE100'deki mikroyeşilliklerin Mg, Zn, ve Na içerikleri kontrole kıyasla düşük ve sırasıyla 210.44, 3.50, and 32.77 mg/kg bulunmuştur. Kontrol ve WE100'ün mikroyeşilliklerinin P, K, S, Ca, Fe, Mn, ve Cu içeriklerinde istatistiksel olarak anlamlı farklılık tespit edilmemiştir. WE100'deki mikroyeşilliklerin toplam fenol içeriği kontrole kıyasla yüksek ve 8.85 mg GAE/g DW olduğu tespit edilmiştir.
Sonuç: *L. sativum* mikroyeşilliklerinin besin elementleri üzerinde kompost sulu özütü uygulamasının düşük etkisinin olduğu görülmüştür. Fakat bu uygulamalar *L. sativum* mikroyeşilliklerinin verimini arttırmıştır. Torfun muadili olarak daha yüksek verimli *L. sativum* mikroyeşillikler için kompost kullanımı torf materyallerinin kullanımının azaltılması noktasında son derece dikkat çekicidir.

Anahtar kelimeler: kompost, sulu özüt, mikroyeşillik, *Lepidium sativum*, besin elementleri

1. Introduction

Microgreens have gained significant attention in recent years due to their superior nutritional composition compared to their mature counterparts. For instance, Pinto et al [1] demonstrated that *Lactuca sativa* microgreens contain higher levels of essential minerals (Ca, Mg, Fe, Mn, Zn, Se, and Mo) and lower nitrate (NO_3^-) concentrations than mature lettuce. These crops provide notable health benefits, including antioxidant, anti-inflammatory, antidiabetic, and anticancer properties, attributed to their high polyphenol and vitamin content. Additionally, their short growth cycle (7–21 days) makes them highly efficient [2]. Commonly cultivated microgreen species include *Lepidium sativum*, *L. sativa*, *Brassica oleracea*, *B. nigra*, *Raphanus sativus*, *Eruca sativa*, *Ocimum basilicum*, *Helianthus annuus,* etc. [3].

Peat moss is a widely used growing medium for seedlings and potted plants in soilless agriculture due to its favorable physicochemical properties. However, its excessive use leads to the degradation of peatlands, which are great sources of CO_2. Beyond environmental concerns, the costs associated with peat extraction, processing, and transportation have spurred demand for sustainable, affordable, and locally accessible alternatives [4]. Organic substitutes such as compost, spent mushroom substrate, cellulose, coconut fiber, wood fiber, biochar, paper waste, rice husks, hazelnut husks, etc., are being explored. While coconut fiber is a popular peat alternative, its cost and limited local availability remain constraints [5]. One of the cheapest organic substitutes is compost obtained from agricultural waste. They contain nutrient elements for plant production, are soil amendments for maintaining soil biology through their microorganisms [6], and can be easily used for plant growth media.

We aimed to evaluate the effects of compost (derived from hazelnut pruning wastes, vegetable wastes, dry leaves, spent coffee grounds, and chicken manure), water extract obtained from compost, and peat on the yield, chlorophyll and carotenoid content, and nutritional profile of *Lepidium sativum* microgreens.

2. Materials and methods

2.1. Obtaining of plant growing medium components

Compost obtained from hazelnut pruning wastes, vegetable wastes, dry leaves, spent coffee grounds, and chicken manure and peat were utilized as plant growing medium components for the cultivation of *L. sativum* microgreens. Peat was purchased from the company of Klasmann-Deilmann. Compost was produced by aerobic composting for 180 days in a 1 m^3 compost unit at Recycling of Agricultural Wastes to Industry Application and Research Center (DÜTAGAM). Physicochemical and biological properties of compost and peat were listed in Table 1. Phytotoxicity tests of compost and peat were performed with *L. sativum* seeds due to their sensitivity to compost applications [7]. Seed germination index (SGI) was calculated by the following formula:

SGI: (A*B)/(C*D)
A: number of seeds germinated in extract
B: mean root length in extract
C: number of seeds germinated in control
D: mean root length in control

Table 1. Physicochemical and biological properties of plant growing medium components for the cultivation of *Lepidium sativum* microgreens. Values after "±" indicate standard deviation

Physicochemical and biological properties	**Plant growing medium components**	
	Peat	Compost
pH	7.31±0.11	7.88±0.19
EC (mS/cm)	0.321±0.031	0.868±0.045
Organic matter (%)	92.34±0.21	76.82±1.52
Ash (%)	7.66±0.21	23.18±1.52
TOC	53.69±0.12	44.66±0.88
C/N	449.43±36.66	90.62±2.85
N (%)	0.11±0.04	0.49±0.07
P (%)	0.04±0.00	0.29±0.00
K (%)	0.20±0.00	1.15±0.00
S (mg/kg)	812.50±8.40	856.4±3.9
Ca (%)	2.03±0.00	2.08±0.00
Mg (mg/kg)	2223.7±11.10	4516.6±16.80
Zn (mg/kg)	10.37±0.06	158.26±0.84
Fe (mg/kg)	774.4±2.70	2357.2±16.50
Mn (mg/kg)	61.24±0.20	412.10±1.45
Cu (mg/kg)	23.30±0.19	35.81±0.20
Na (mg/kg)	202.4±1.81	757.0±1.60
MB (ug C/g)	35±12	192±23
SGI (%)	142.70 ± 14.69	111.13 ± 7.53

EC: electrical conductivity, TOC: Total organic carbon, N: nitrogen, P: phosphorus, K: potassium, Ca: calcium, Mg: magnesium, S: sulfur, Zn: zinc, Fe: iron, Mn: manganese, Cu: copper, Na: sodium, MB: microbial biomass, SGI: seed germination index.

2.2. Cultivation of *Lepidium sativum* microgreens

Plant growing media were prepared with peat and compost, as their ratios are shown in Table 2. Control media (C) consisted of 100% peat. C100 (100% compost), C50 (50% peat+50% compost), and C25 (75% peat+25% compost) were growing media prepared with peat and compost. Water extracts (WE100 (100% water extract), WE50 (50% water extract), and WE25 (25% water extract)) obtained from compost were used with 100% peat. Stock water extract was prepared with compost in a 1:10 (v:v) ratio. The solid matter content of the compost was 0.5 kg. Solution was shaken for two h at 22°C and filtered with coffee filter paper. The pH and EC values of the extract after filtration were 7.62 and 0.521 mS/cm, respectively. *Lepidium sativum* (garden cress) microgreens were cultivated in an aluminium tray (20 cm length, 14 cm width, 3.5 cm deep) with four replicates per plant growing media. The reason of selecting *L. sativum* microgreens was their common use as a model species in the literature for microgreen cultivation. Four grams (8.9 seeds/cm^2) of *L. sativum* seeds were sown in each tray. The cultivation period was continued for 15 days in the growth chamber. Temperature, light, and moisture were stayed at 22/18 ± 2°C (day and night), 150 ± 4 µmol m^{-2} s^{-1} for 12 h per day, and approximately 60 ± 5 %, respectively. Light was measured by LI-COR (LI-6800) photosynthesis machine. LED (light-emitting diode) was used as a light source (SOL grow light, 600W) for the microgreen cultivation. All growing media were watered with only tap water except for WE100, WE50, and WE25. 50 ml water extracts were applied to WE100, WE50, and WE25 at the beginning of cultivation. Microgreens were harvested upon the development of the first true leaves at the end of cultivation, and the weight of microgreens was measured [8]. Mean fresh weight of shoot (mg/shoot), fresh yield (kg/m^2), and dry biomass (g/m^2) of microgreens were calculated according to Poudel et al [9]. Chlorophyll and carotenoid content of microgreens was measured according to Thepsilvisut et al [10]. Briefly, 1 gram of fresh microgreens was chopped and added to 10 mL of 80% acetone for the dark incubation at 4°C for 24 h. Supernatant of samples was collected after centrifugation at 5000 rpm for 5 min. Absorbance readings of supernatants were recorded at 645, 663, and 470 nm with a UV spectrophotometer. Chlorophyll and carotenoid contents were calculated with the absorbances by using the formulas in Thepsilvisut et al [10]. Nutrient elements of microgreens cultivated with WE100 and control were measured due to its higher yield than C100, C50, and C25 and being control, respectively. The standard procedure of ISO 22036:2024 was used for the measurements of total phosphorus (P), potassium (K), sulfur (S), calcium (Ca), magnesium (Mg), iron (Fe), manganese (Mn), zinc (Zn), molybdenum (Mo), and sodium (Na) of microgreens and plant growing medium components by ICP-OES. All nutritional element contents were calculated on a fresh weight basis. Total nitrogen (N) of those was determined by Kjeldahl method. Total phenol content of microgreens was measured by spectrophotometric method with gallic acid equivalents (GAE). Estimated daily intake (EDI) of macro- and microelements of microgreens was calculated by the mineral content of fresh microgreens ($M_{microgreen}$; mg/g fresh weight basis) times the average daily consumption of microgreens for adults ($DC_{microgreen}$; 22.5 g day^{-1}) as in the following formula [1]: EDI: $M_{microgreen}$ x $DC_{microgreen}$

Table 2. Ratios of plant growing medium components and compost water extract

Plant growing media	**Components (v/v %)**	
	Peat	Compost
Control (C)*	100	-
C100*	-	100
C50*	50	50
C25*	75	25
WE100	100	-
WE50	100	-
WE25	100	-

WE100, WE50, and WE25 were only watered with 100%, 50%, and 25% water extract of compost, respectively. * watered with only tap water, v: volume

2.3. Statistical analysis

Differences between mean fresh weight of shoot, fresh yield, dry biomass, chlorophyll a, chlorophyll b, total chlorophyll, and carotenoid contents of microgreens were analyzed by one-way analysis of variance using the GraphPad Prism 6 statistical program. Differences between means were compared using Tukey's multiple-comparison test with a significance level of $P<0.05$. Differences between mean nutrient elements and total phenol contents of microgreens (control and WE100) were analyzed by unpaired t-test at $P < 0.05$.

3. Results

Seed germination index of peat and compost were compared to distilled water and calculated as 142.70% and 111.13%, respectively (Table 1).

Lepidium sativum microgreens were cultivated with compost and its water extract. Mean fresh weight of shoot, fresh yield, and dry biomass of microgreens are shown in Table 3. While the mean fresh weight of shoot of microgreens was significantly higher in media of C50 and C25 compared to the control ($P<0.05$), those of C100, WE100, WE50, and WE25 were not significantly different. There was no difference between fresh yield and dry biomass of microgreens in media of compost (C100, C50, and C25) and control. Fresh yield of microgreens was higher and significantly different in the media of WE100 ($P<0.01$), WE50 ($P<0.01$), and WE25 ($P<0.05$) compared to the control. Dry biomass of microgreens was significantly higher in media of C100, C50, and C25 ($P<0.05$) compared to control media. When the highest mean fresh weight of shoot of microgreens was measured as 27.65 mg/shoot in media of C50, the highest fresh yield and dry biomass of *L. sativum* microgreens were measured as 1.870 kg/m^2 and 94.81 g/m^2 in media of WE50.

Table 3. Effect of plant growing media and treatments of compost water extract on *Lepidium sativum* microgreen cultivation. **: $P<0.01$, *: $P<0.05$, ns: not significant. Values after "±" indicate standard deviation

Plant growing media	**Mean fresh weight of shoot (mg/shoot)**	**Fresh yield (kg/m^2)**	**Dry biomass (g/m^2)**
Control	22.00±1.82	1.272±0.14	72.09±10.50
C100	23.00±2.37 ns	1.458±0.211 ns	83.33±10.96 ns
C50	27.65±0.28 *	1.240±0.162 ns	83.02±6.37 ns
C25	27.45±1.34 *	1.392±0.217 ns	80.61±2.44 ns
WE100	25.67±1.79 ns	1.838±0.09 **	91.19±4.20 *
WE50	24.17±1.77 ns	1.870±0.095 **	94.81±2.97 *
WE25	24.38±2.43 ns	1.774±0.096 *	94.69±3.64 *

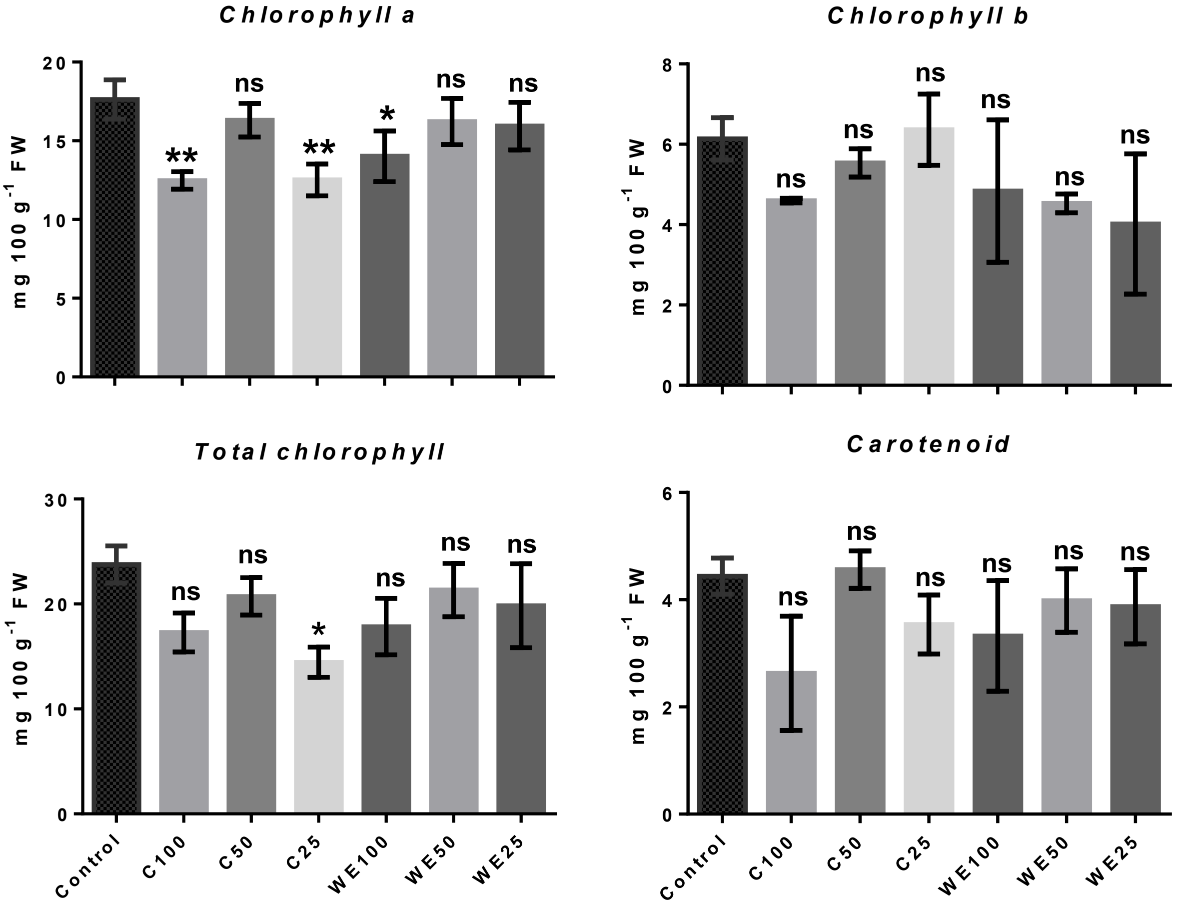

Figure 1. Effect of plant growing media and treatments of compost water extract on chlorophyll a, chlorophyll b, total chlorophyll, and carotenoid content of *Lepidium sativum* microgreens. **: *P<0.01*, *: *P<0.05*, ns: not significant

Figure 1 shows the chlorophyll a, chlorophyll b, total chlorophyll, and carotenoid content of *L. sativum* microgreens cultivated with compost and its water extracts. Chlorophyll a content of microgreens cultivated in C100, C25, and WE100 was 12.48, 12.52, and 14.02 mg 100 g^{-1} FW, which were significantly lower than the control at the significant levels of *P<0.01*, *P<0.01*, and *P<0.05*, respectively. On the other hand, the difference was not significant in those of C50, WE50, and WE25. The total chlorophyll content of microgreens in all media except for C25 and the chlorophyll b and carotenoid contents in all media were not significantly different compared to those of the control. Total chlorophyll content of microgreens in C25 was 14.45 mg 100 g^{-1} FW, which was significantly different compared to the control (*P<0.05*).

The contents of N, P, K, S, Ca, Mg, Zn, Fe, Mn, Cu, and Na of *L. sativum* microgreens in control and WE100 were listed in Table 4. While the N content of microgreens cultivated in WE100 was 0.686 g/kg, significantly higher than the control at the significant level of *P<0.05*; the contents of Mg, Zn, and Na of those were 210.44, 3.50, and 32.77 mg/kg, lower at the significant levels of *P<0.01*, *P<0.01*, and *P<0.0001*, respectively. On the other hand, the difference was not significant in those for P, K, S, Ca, Fe, Mn, and Cu. Total phenol content of microgreens in WE100 was 8.85 GAE/g DW, significantly higher than the control at the significant level of *P<0.05* (Table 4).

Estimated daily intake (EDI) of nutrient elements with the consumption of *L. sativum* microgreens was listed in Table 5. While EDI of N (15.432 mg/day) and P (6.822 mg/day) was higher and those of K (49.652 mg/day), Ca (5.728 mg/day), Mg (4.735 mg/day), Zn (0.079 mg/day), Fe (0.104 mg/day), Mn (0.061 mg/day), and Na (0.737 mg/day) were lower in microgreens of WE100 compared to control, those of Cu (7.00 µg/day) were not different between WE100 and control.

Table 4. Effect of treatment of compost water extract on nutrient elements and total phenols of *Lepidium sativum* microgreens. ****: $P<0.0001$, **: $P<0.01$, *: $P<0.05$, ns: not significant. Values after "±" indicate standard deviation

Nutrient elements and phenol content	**Control**	**WE100**
N (g/kg)	0.482±0.051	0.686±0.084 *
P (g/kg)	0.295±0.034	0.303±0.040 ns
K (g/kg)	2.456±0.034	2.207±0.035 ns
S (g/kg)	0.408±0.028	0.388±0.020 ns
Ca (mg/kg)	290.79±8.22	254.58±2.01 ns
Mg (mg/kg)	229.28±1.94	210.44±1.84 **
Zn (mg/kg)	4.35±0.10	3.50±0.04 **
Fe (mg/kg)	4.70±0.20	4.64±0.10 ns
Mn (mg/kg)	3.09±0.07	2.69±0.03 ns
Cu (mg/kg)	0.32±0.01	0.33±0.02 ns
Na (mg/kg)	46.05±0.37	32.77±0.37 ****
Total phenol content (mg GAE/g DW)	6.06±0.37	8.85±0.61 *

Table 5. Effect of treatment of compost water extract on estimated daily intake of nutrient elements. RDA: Recommended dietary allowance. AI: Daily adequate intake

Estimated daily intake	**Control**	**WE100**	(RDA) or (**AI**) [11]	
			Men	Women
N (mg/day)	10.848	15.432	-	-
P (mg/day)	6.636	6.822	700	700
K (mg/day)	55.261	49.652	4700	4700
Ca (mg/day)	6.543	5.728	**1000**	**1000**
Mg (mg/day)	5.159	4.735	420	420
Zn (mg/day)	0.098	0.079	11	8
Fe (mg/day)	0.106	0.104	8	18
Mn (mg/day)	0.07	0.061	**1.3**	**1.8**
Cu (µg/day)	7.00	7.00	900	900
Na (mg/day)	1.036	0.737	1500	1500

4. Conclusions and discussion

Phytotoxicity test is a very basic method to determine the phytotoxic effect of composts or any plant growing media [12]. Seed germination index should be above 80% to show that it is not phytotoxic. In this study, seed germination index of compost and peat that we used was more than 80%, and the results indicated that these growing medium components were not phytotoxic (Table 1).

In our previous study, fresh yield of *L. sativum* microgreens cultivated in compost obtained from spent coffee grounds was found to be the highest at 1.908 kg/m^2 [13]. While Di Gioia et al [14] found the fresh yield of *L. sativum* microgreens at 0.994 kg/m^2, fertilized with nutrient solution that contained micro- and macronutrient elements, Signore et al [15] found those at 1.3 kg/m^2. In this study, fresh yield of that in compost water extract was higher than those of compost, and it was found to be 1.870 and 1.838 kg/m^2 at WE50 and WE100, respectively. Possible reasons for the higher yield at WE100 could be increased activities and soluble organic compounds in compost water extracts. Aqueous extracts were included microorganisms have benefits for nutrients and also phytohormone availability for plants [16]. Dry biomass of *L. sativum* microgreens was found at 40.64 and 66.3 g/m^2 by previous studies [14], [15]. In our study, we measured the value of 94.81 g/m^2 at WE50. Mean fresh weight of shoot for *L. sativum* microgreen was reported as 30.22 mg by Di Gioia et al [14]. We determined that this value was highest at 27.65 mg at C50.

Chlorophyll a content of sunflower and water-spinach microgreens was found to be 18.69 and 32.79 mg 100 g^{-1} FW at cultivation by a mixture of coconut coir dust and leaf compost and only coconut coir dust, respectively [10]. While chlorophyll a content was reported to be 100-120 mg 100 g^{-1} FW in *L. sativum* microgreens that were fertilized with 1% *Ecklonia maxima* seaweed [17], [18], in this study, we found that chlorophyll a content of *L. sativum* microgreens was 17.63 mg 100 g^{-1} FW, the highest at control. On the other hand, Ardashiri and Zare-Bavani [17] found that chlorophyll b, total chlorophyll, and carotenoid content of *L. sativum* microgreens were 30-35, 150-160, and 20-25 mg 100 g^{-1} FW, respectively. In this study, we calculated these values as 6.362, 23.76, and 4.562 mg 100 g^{-1} FW, the highest at C25, control, and C50, respectively. Lower chlorophyll b, total chlorophyll, and carotenoid content of *L. sativum* microgreens in this study than in the literature could be the consequence of light intensity, which is measured as 350 µmol m^{-2} s^{-1} in Ardashiri and Zare-Bavani [17], 150 µmol m^{-2} s^{-1} in our current study.

While Di Gioia et al [14] found the N content of *L. sativum* microgreens to be 2.78 g/kg FW, in this study, we measured the N content of *L. sativum* microgreens at WE100 as 0.686 g/kg FW. P and K contents of *L. sativum* leaves were found at 0.0036 and 1.656 g/kg FW by Hassan et al [19]; those contents of *L. sativum* microgreens were at 0.50 g/kg FW by Di Gioia et al [14], and we found the P content at 0.303 g/kg FW in *L. sativum* microgreens cultivated at WE100 and the K content at 2.456 g/kg FW in *L. sativum* microgreens of control. While Di Gioia et al [14] found the S content of *L. sativum* microgreens at 0.60 g/kg FW, in this study, we measured the value at 0.408 g/kg FW in the control. Hassan et al [19] found the Ca, Mg, Zn, Fe, Mn, Cu, and Na contents at 742.07, 143.74, 2.04, 56.81, 5.14, 0.35, and 126.31 mg/kg FW, respectively. We measured the contents of Ca, Mg, Zn, Fe, Mn, and Na as 290.78, 229.28, 4.35, 4.70, 3.09, and 46.04 mg/kg FW in *L. sativum* microgreens of control, respectively, and the content of Cu as 0.33 mg/kg FW in those of WE100. Jambor et al [20] found the total phenolic content of *L. sativum* leaves at 94.10 mg GAE/g DW, and Gupta and Gupta [21] found those of *L. sativum* seeds at 270.34 mg GAE/g DW. In this study, we measured the total phenolic content of *L. sativum* microgreens at 8.85 mg GAE/g DW.

In conclusion, although the application of compost and its water extract increased the yield of *L. sativum* microgreens, their effects on nutrient composition were minimal. Nevertheless, these findings are noteworthy, as they highlight the potential of compost to substitute peat in achieving higher yields while maintaining similar nutrient levels. Future studies could investigate the effects of composts and their water extracts on other microgreen species.

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Author contributions: Faik CEYLAN designed the research study, performed the research, and analyzed the data. Recai ARSLAN and Çağlar AKÇAY performed the research. All authors read and approved the final manuscript. All authors give final approval of the version to be published.

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