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Effect of Different Farming Systems and Soil Management Practices on Nutritional Composition of Sweetpotato Greens

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Abstract

Sweetpotato (SP) [*Ipomea batatas* (Lam.) L.] storage roots are consumed worldwide as a carbohydrate-rich staple food and are rich in different nutrients. Like storage roots, SP young leaves and stems (SP greens) are also rich in nutrients. As a non-traditional nutrient-rich leafy vegetable, SP greens have seen increased consumption recently as people are more concerned about their health and seek nutrition and health benefits beyond regular food sources. Three SP varieties (Var) were used to evaluate the effects of farming systems (FS) [conventional (C) and organic (O)] and soil management practices (SMP) [with cover crop (CC) and no cover crops (NCC)] on the nutritional composition of SP greens, and their interactions following RCB design with three replications. FS showed significant differences for all nutritional traits, and SMP showed no significant differences for most of them. There were no differences in Var, Var x FS, Var x SMP, and FS x SMP interactions. In the proximate analysis, Crude protein (CP), Crude fiber (CF), Ash, and Carbohydrate (Carb) showed significant differences between the two FS; conventional farming ranked higher. However, Fat was insignificant. Most of the essential minerals, except Iron (Fe) and Zinc (Zn), showed no differences in FS and SMP. Under FS, essential amino acids (AA) showed a significant difference; however, under SMP, only half the traits showed differences. A significant difference in nutrients was observed between conventional and organic cover crops. However, overall differences in nutritional values were also minimal, supporting earlier reports. Generally, organic farming does not improve overall nutritional quality, but it significantly reduces chemical stack and pesticide residues in produce. This study demonstrates that SP greens are rich in nutrients, suitable as an alternative vegetable, and can be cultivated in any farming system and soil management practice.

Keywords: sweetpotato; leafy greens; protein; amino acids; minerals; health benefits

1. Introduction

Sweetpotato [*Ipomoea batatas* (L.) Lam.] (SP) was domesticated about 5,000 years ago in tropical Central America. Over the last thousand years, it has been dispersed across different countries around the globe [1,2]. It is one of the most essential food crops belonging to the family *Convolvulaceae*. It is consumed worldwide as a carbohydrate-rich staple food in many regions, particularly in Sub-Saharan Africa, China, India, Indonesia, and other parts of Southeast and Southern Asia [3] and it is cultivated in 114 countries around the world [4]. It is tolerant to drought and heat [6,7]. In 2023, China led SP production, accounting for about half of the total output (47.83 mt), followed by Malawi (7.45), Tanzania (4.99), Nigeria (3.94), and USA (1.31 mt) (https://www.atlasbig.com/countries-by-sweet-potato-production, retrieved on 29 November 2025). Sweetpotato is not only a carbohydrate-rich food, but also rich in nutrients, dietary fiber, vitamins, minerals, and a wide variety of bioactive phytochemicals with human health benefits, often hailed as a 'nutrient powerhouse' [3,5]. It has been

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consumed in various ways across countries, and in the United States, SP is an indispensable part of the Thanksgiving meal.

Recently, people have become more interested in knowing the nutritional and health benefits of food, prompting researchers to explore the benefits of non-traditional leafy greens such as SP leaves. Like SP roots, young leaves and stems are also rich in nutritional content (proximate compounds, minerals, and essential amino acids) and health-beneficial bioactive compounds. Ranges of the SP leaf crude protein 16.7-31.1, crude fat 2.1-5.3, crude fiber 9.2-14.3, ash 7.4-14.7, and carbohydrates 42.0-61.4 g /100g DW, [8–10]. Also, they reported that the most abundant micronutrient was K, followed by Ca, P, Fe, and Zn. The distribution of essential amino acids was comparable to that of other traditional green vegetables. Leaves of SP contain a higher quantity of vitamins B2, B3 (Niacin), C, E, biotin, and carotene [11]. In Asia, Africa, and the Pacific Islands, people have traditionally consumed SP leaves because they see them as beneficial sources of essential nutrients and bioactive compounds [12].

Additionally, leaves of SP contain different bioactive components such as polyphenols, flavonoids, and carotenoids that provide several health benefits, and they are linked to antioxidant, anti-inflammatory, antimicrobial, antidiabetic, and anticancer activity, reducing obesity, and improving heart health [13–17]. FAO [18] advocated that consumption of both SP root and leaf could contribute to sustainable solutions for food security.

After harvesting sweetpotato storage roots, SP vines have been used as an alternative forage to feed livestock (cattle, goats, sheep, and pigs) in many Asian and African countries, including China, India, Indonesia, Korea, the Philippines, and Kenya. Overall, an 80:20 leaf-to-root ratio improves rumen fermentation efficiency and potentially reduces methane emissions in rumen production systems [19–21]. Sweetpotato can be used as a dual-purpose crop: roots and young leaves for human consumption, and roots and vines for livestock feed.

One member of the genus *Ipomoea* is water spinach (*Ipomoea aquatica*), also known as 'Kangkong' or 'Ong choy', a semi-aquatic tropical vegetable primarily grown and used in East, South, and Southeast Asia as a culinary ingredient.

The general objective of this research is to explore the impact of farming systems (conventional and organic) and cultural practices (cover crops and no-cover crops) on the nutritional composition of sweetpotato leaves and, to promote SP leaves as a healthy vegetable.

2. Materials and Methods

2.1. Plant Materials

Three sweetpotato varieties, Covington, Murasaki, and White Bonita, were used in this study. Slips of all three varieties were transplanted into the field in the second week of June 2025 to observe the effect of farming systems and soil management practices on storage root production. The study was conducted at two different farms owned by Lincoln University of Missouri (LU), under two different farming systems (FS), one with conventional farming and the other with an organic farming setup. Typically, LU George Washington Carver Research Farm (CFm) (38°30′N, 92°15′W, and elevation 170 m), Jefferson City, MO, was used as a conventional farm. Another farm, Alan T. Busby Farm (BF) (38°32′N, 92° 80′W) is a certified organic farm located in Jefferson City, MO, within 9 miles of CFm and used as an organic farm. Individual plot size was 180 sq m (six-row plot, 3-row for cover crop and 3-row for no cover crop treatment, and each row 10 m long and row-to-row distance 3 m). Each location received two soil management practices (SMP): one with cover crops (CC) and another no cover crop (NCC), in a RCBD with three replications. Soil characteristics of both the farms are presented in Table 1.

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Table 1. Soil properties of two different farming systems, conventional and organic farms.

Parameter	Conventional farming (Carver farm)	Organic farming (Busby farm)
Soil type	Silty loam	Silty loam
Soil pH	6.8-7.0	6.6-7.0
Organic matter (%)	1.9-3.8	2.8-3.1
Cation exchange capacity (meq/100g)	6.8-7.5	6.9-8.1

A mustard cover crop (*Brassica juncea*) was planted at both locations (three randomly assigned rows were planted with cover crop and three rows did not have cover crop planted in them) in the fall of 2024 and incorporated into the soil as green manure in the middle of May 2025, about 4 weeks before transplanting sweetpotato slips in June. Approximately 5 weeks after transplanting, about 300 g of fresh, tender vine tops (approximately 20-25 cm long vines with 3-4 fully expanded leaves) were collected from each plot for analysis of proximate, amino acid, and mineral compositions (Figure 1). Commonly, people consume sweetpotato young shoots (including leaves, petioles, and stems) as a vegetable, which are sold in the market. Therefore, we followed similar sampling procedures. After harvesting, they were washed with distilled water and allowed to air-dry at room temperature for an hour. The washed air-dried samples were later dried in an oven at 40°C for three days. Each sample was separately ground into fine powder using a grinder (Cyclotec Mill Foss 1093, USA) and stored in a cold, dry place until analysis.

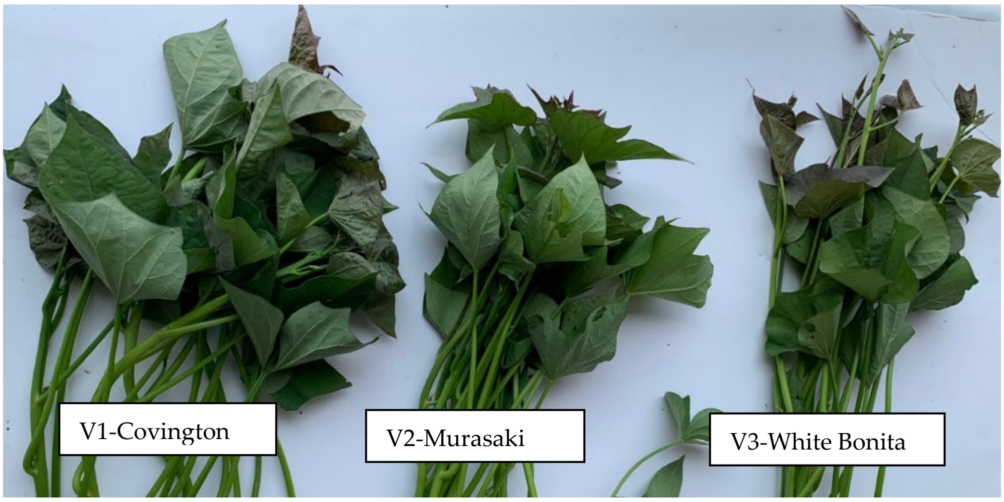

Figure 1. About a month-old fresh leafy green of three sweetpotato varieties, V1-Covington, V2-Murasaki, and V3- White Bonita.

2.2. Nutritional Analysis (Proximate, Amino Acids, and Minerals)

Estimated proximate components, such as crude protein, crude fat, crude fiber, moisture, and ash in dried SP greens powder were determined following the methods defined by the Association of Official Analytical Chemists (AOAC) [22]. The proximate analysis was carried out at the Agricultural Experiment Station Chemical Laboratories (AESCL) of the University of Missouri, Columbia, Missouri, USA (https://aescl.missouri.edu). The nitrogen content was determined by the Kjeldahl method following AOAC method 984.13 (A–D). Crude fat and crude fiber were assessed following the AOAC methods 920.39 (A) and 978.10, respectively.

The carbohydrate content was calculated using the following equation:

Carbohydrate (%) = 100% − % (crude protein + crude fat + ash + moisture)

The essential amino acids were estimated using the AOAC method 982.30E (a and b). The selected minerals were calculated following the AOAC method 985.01 (A, B, and C) by Inductively

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Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). Both the above analyses were completed at AESCL of the University of Missouri.

2.3. Statistical Analysis

An analysis of variance (ANOVA) for SP greens for different nutritional traits was performed using the SAS 9.4 statistical software [23]. Tukey's honestly significant difference (HSD) test was used at the $p \leq 0.05$ significance level to determine differences among trait variables. Pearson's correlation analysis was performed using R 4.5.2 software.

3. Results and Discussion

The analysis of variance (ANOVA) for SP varieties (Var), farming systems (FS), soil management practices (SMP), and their interactions (Var x FS, Var x SMP, and FS x SMP), proximate components, amino acids, and minerals are presented in Supplementary Table S1. There was a significant difference in FS and SMP, but not Var. The results are presented in four treatment combinations (Two FS x two SMP = total 4), such as (i) Conventional (C) FS x cover crop (CFS x CC), (ii) Conventional FS x no cover crop (CFS x NCC), (iii) Organic (O) FS x cover crop (OFS x CC), and (iv) Organic FS x no cover crop (OFS x NCC). Also, the results are presented separately for the two FS and the two SMP. After five weeks of planting, 15-20 cm-long, soft and succulent young shoots (including leaves, petioles, and stems) were harvested for analysis. Usually, people eat young sweetpotato shoots (including leaves, petioles, and stems) as a vegetable. With increased growth, shoots become fibrous and tough, and later shoot harvesting may negatively affect storage root production.

3.1. Proximate Analysis

We analyzed the proximate components (crude protein, crude fat, crude fiber, and ash) of SP greens of three varieties under four different treatment combinations mentioned above and the results are presented in Figure 2. CP, CF, Ash and Carb showed a significant difference between two FS (CFS = CC + NCC and OFS = CC + NCC), however there was no difference in Fat. There was a significant difference in Pro and Carb content between cover and no-cover crop practices in conventional FS.

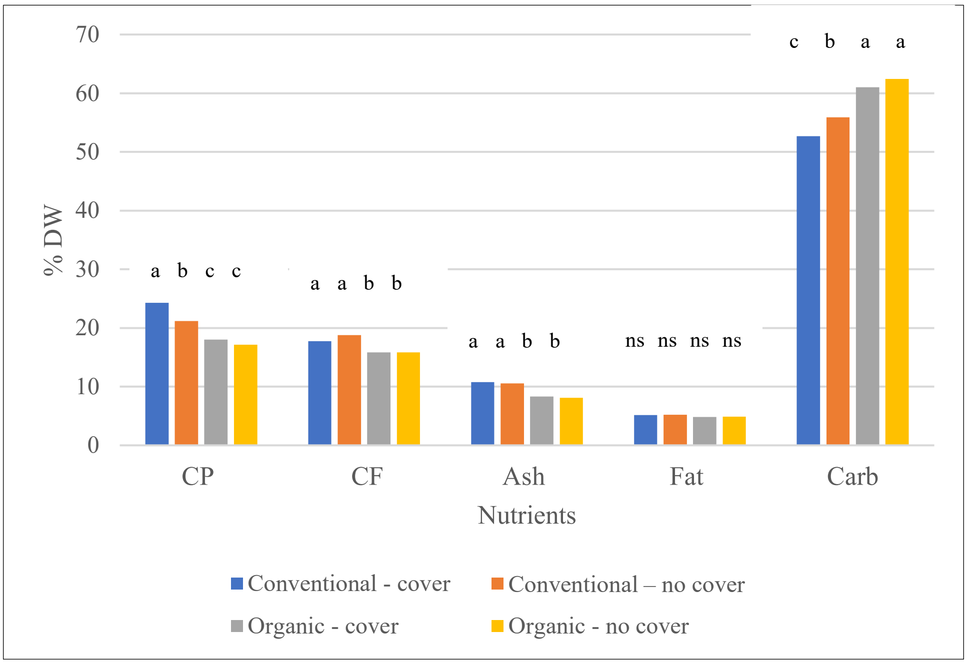

Figure 2. Interaction of two FS (conventional and organic) with two SMP (cover crops and no cover crops) on the nutritional composition of sweetpotato greens. Different letters suggest significant differences among the

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means within the same nutrient group indicated by Tukey's HSD test at $p \leq 0.05$. DW = dry weight; CP = crude protein; CF = crude fiber; Carb = carbohydrate; ns = not significant.

The two FS showed significant variation for all nutritional traits (CP, CF, Ash, Fat and Carb), and SMP showed no significant differences for most of the traits except Pro and Carb (Table 2). In this study, across the FS and SMP, CP content varied from 17.6 to 22.7% with a mean of 20.2, which is comparable (with minor variation) to earlier findings (16.2 to 31.1% DM) [8,9,24,25]. Chuang et al. [26] reported that SP leaves can contribute a considerable amount of high-quality Pro to the human diet, as they contain a substantial amount of CP (13.7-17.2%) and amino acids (AAs). Ranges of Fat 4.8 to 5.2% and Ash content 8.3 to 10.7% are like earlier findings, 2.1 to 5.3% and 9.6 to 11.1%, respectively. However, CF 15.8 to 18.3% and Carb 54.3 to 61.7% were higher than reported values, 5.2 to 14.3% and 42 to 61.4%, respectively. The gross energy content (357.8 kcal) was at the lower end of earlier reports (351.3 to 415.3 kcal per 100 g). The above studies were conducted outside the USA, where the growing environment and varieties differed from those used in this study. The CP content of a common leafy green, spinach, ranges from 30.0 to 32.2 g per 100 g DW [27,28], a little higher than SP greens.

Table 2. Individual effect of farming systems (conventional and organic) and soil management practices (cover crops and no cover crops) on proximate components in sweetpotato greens.

Variables[1] (g/100 g DW)	**Farming systems** (FS)		**Soil management practices** (SMP)		**Mean LS**
	Conventional (C) (CC + NCC)	**Organic (O)** (CC + NCC)	**Cover crop** (CC) (C + O)	**No cover crop** (NCC) (C + O)	
CP	22.73a[2]	17.59b	21.14a	19.19b	20.16
CF	18.26a	15.83b	16.78ns	17.31ns	17.04
Ash	10.67a	8.34b	9.67ns	9.35ns	9.50
Fat	5.17a	4.85b	4.99ns	5.04ns	5.01
Carbo	54.29b	61.71a	56.85b	59.15a	58.00

[1] DW = dry weight; CP = crude protein; CF = crude fiber; Carb = carbohydrate; C = conventional; O = organic; CC = cover crop; NCC = no cover crop; LS = least square. [2] Different letters in pairs of columns for both farming systems and soil management practices separately suggest significant differences among the means within a row, indicated by Tukey's HSD test at $p \leq 0.05$.

3.2. Minerals

The least square means (mg/100 g DW) of the essential minerals, such as calcium (Ca), potassium (K), magnesium (Mg), phosphorus (P), cupper (Cu), iron (Fe), manganese (Mn), and zinc (Zn) under different treatment combinations are presented in Table 3a, and individual results for the two FS and the two SMP are presented in Table 3b. The most abundant minerals are K (mean 3048, ranges 2330-3645 mg/100 g), followed by Ca (mean 960.5, ranges 853.6-1064.6) (Table 3a). The values of the other two critical minerals Mg (average 415.0 mg/100 g, range 404.6-424.8) and P (average 415.0 mg/100 g, range 393.6-429.3). The average value of other minerals, Cu 1.4 (ranges 1.3-1.5), Fe 5.5 (ranges 4.2-6.9), Mn 5.0 (ranges 4.5-5.6), and Zn 2.3 mg/100 g (ranges 2.0-2.7). Our findings agree with the mineral composition reported earlier [8–10,25,26]. The two FS showed significant variation in K, Cu, Fe, and Zn, but no significant variation in Ca, Mg, P, and Mn. However, in two SMP, no significant differences were observed for most traits, except Fe and Zn (Table 3b).

In developing countries, especially in Asia and Africa, children and women are the victims of nutritional deficiency. They need foods with higher levels of micronutrients like Ca, P, and K, which help develop strong bones and teeth and, later, help reduce osteoporosis, arthritis, and tooth decay. A comparison between SP greens and spinach, a common leafy vegetable, shows a comparable amount of Ca (1139-1631), P (453-473), and K (3144-4250 mg per 100 g) [28–30]. Hence, SP greens may contribute to nutritional security in developing countries.

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Table 3a. Interactive effect of farming systems (conventional and organic), and soil management processes (cover crops and no cover crops) on minerals content in sweetpotato greens.

Variables[1] (mg/100g DW)	Conventional x cover crop (C x CC)	Conventional x no cover crop (C x NCC)	Organic x cover crop (O x CC)	Organic x no cover crop (O x NCC)	Mean LS
Ca	894.10ns[2]	853.60ns	1029.70ns	1064.60ns	960.5
K	3622.20a	3645.60a	2593.30b	2330.00b	3048.0
Mg	424.78ns	421.89ns	409.78ns	404.56ns	415.3
P	429.33a	417.22ab	417.89ab	393.56b	414.5
Cu	1.28b	1.29b	1.45ab	1.53a	1.4
Mn	5.59ns	5.24ns	4.57ns	4.46ns	5.0
Fe	6.96a	6.12b	4.51c	4.20c	5.4
Zn	2.68a	2.30b	2.21b	2.03b	2.3

[1]DW = dry weight; Ca = calcium; K = potassium; Mg = magnesium; P = phosphorus; Cu = copper; Mn = manganese; Fe = iron; Zn = zinc. C = conventional; O = organic; CC = cover crop; NCC = no cover crop; LS = least square. [2]Different letters suggest significant differences among the means within a row indicated by Tukey's HSD test at $p \leq 0.05$.

Table 3b. Individual effect of farming systems (conventional and organic), and soil management practices (cover crops and no cover crops) on mean value of minerals content in sweetpotato greens.

Variables[1,2] (mg/100g DW)	Farming systems (FS)		Soil management practices (SMP)	
	Conventional (C) (CC + NCC)	Organic (O) (CC + NCC)	Cover crop (CC) (C + O)	No cover crop (NCC) (C+ O)
Ca	873.83ns	1047.11ns	961.89ns	959.06ns
K	3633.9a	2461.7b	3107.8ns	2987.2ns
Mg	423.33ns	407.17ns	417.28ns	413.22ns
P	423.28ns	405.72ns	423.61ns	405.39ns
Cu	1.28b	1.49b	1.36ns	1.41ns
Mn	5.42ns	4.66ns	5.08ns	5.00ns
Fe	6.54a	4.35b	5.73a	5.16b
Zn	2.50a	2.12b	2.45a	2.17b

[1]DW = dry weight; Ca = calcium; K = potassium; Mg = magnesium; P = phosphorus; Cu = copper; Mn = manganese; Fe = iron; Zn = zinc; CC = cover crop; NCC = no cover crop. [2] Different letters in pairs of columns for both farming systems and soil management methods separately suggest significant differences among the means within a row, indicated by Tukey's HSD test at $p \leq 0.05$.

3.3. Amino Acids

The mean values (mg/100 g DM) of different essential amino acids (EAAs) under different treatment combinations are presented in Table 4a.

The highest amounts of EAAs were observed under the CCC system (8.67%), followed by the CNCC (7.70), OCC (6.61), and the lowest one in ONCC (6.35%) systems (Table 4a). Among the EAAs, leucine yielded the highest amount (1.68%), followed by lysine (1.34%), and the lowest was in methionine (0.39%). Between the two FS, the conventional FS showed a significant difference from the organic FS for all essential AAs (Table 4b). However, in the SMP, most of the EAAs under CC practices showed significant differences for His, Lys, Met, and Val, but no differences for the remaining AAs (Ile, Leu, Phl, and Try (Table 4b). In SMP, CC yielded the higher amount if total EAAs, 7.63 than the NCC, 6.98%.

Our results were similar (except for a few individual AAs, such as methionine) to earlier publications [8,26], but differed from Tang et al. [10]. The methionine content in this study (0.39%) matched that of Ishida et al. [31] (0.34%) but was lower than that reported by Tang et al. (0.63%). In contrast, methionine content was very low (0.08%) in other reports [8,26]. The CP and AAs contents

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differ across the previous experiments, which may be due to variations in the use of different types of sample tissues, such as leaves, leaves and stalks, and leaves, stalks, and stems. Tang et al. [10] reported that the pure green SP leaf tips protein (24.0%) was significantly higher than that of the purplish-green type (20.5%). Similarly, the AA content was higher in pure green than purplish-green leaf tips.

Table 4a. Interactive effect of farming systems (conventional and organic farming) and soil management processes (cover crops and no cover crops) on essential amino acids (EAAs) content in sweetpotato greens.

Variables[1] (g/100 g DW)	**Conventional x cover crop** (C x CC)	**Conventional x no cover crop** (C x NCC)	**Organic x cover crop** (O x CC)	**Organic x No cover crop** (O x NCC)	**Mean LS**
Histidine (His)	0.48a[2]	0.42b	0.36c	0.35c	0.40
Isoleucine (Ile)	0.98a	0.88b	0.75c	0.72c	0.83
Leucine (Leu)	1.68a	1.50b	1.30c	1.25c	1.43
Lysine (Lys)	1.34a	1.19b	1.05b	1.00b	1.15
Methionine (Met)	0.39a	0.35b	0.31bc	0.30c	0.34
Phenylalanine (Phe)	1.14a	1.01b	0.83c	0.80c	0.95
Threonine (Thr)	0.93a	0.83b	0.72c	0.69c	0.79
Tryptophan (Thr)	0.41a	0.35b	0.30c	0.29c	0.34
Valine (Val)	1.32a	1.17b	0.99c	0.95c	1.11
Total	8.67	7.70	6.61	6.35	

[1] DW = dry weight; C = conventional; CC = cover crop; NCC = no cover crop; O = organic. [2] Different letters suggest significant differences among the means within a row indicated by Tukey's HSD test at $p \leq 0.05$.

Table 4b. Individual effect of farming system (conventional and organic farming) and soil management practices (cover crops and no cover crops) on essential amino acids (EAAs) content in sweetpotato greens.

Variables[1] (g/100 g DW)	**Farming systems (FS)**		**Soil management practices (SMP)**	
	Conventional (C) (CC + NCC)	**Organic (O)** (CC+ NCC)	**Cover crop (CC)** (C + O)	**No cover crop (NCC)** (C + O)
Histidine (His)	0.45a[2]	0.36b	0.42a	0.37b
Isoleucine (Ile)	0.93a	0.74b	0.87ns	0.80ns
Leucine (Leu)	1.59a	1.28b	1.49ns	1.38ns
Lysine (Lys)	1.26a	1.03b	1.19a	1.10b
Methionine (Met)	0.37a	0.31b	0.35a	0.32b
Phenylalanine (Phe)	1.07a	0.82b	0.98ns	0.91ns
Threonine (Thr)	0.88a	0.70b	0.82ns	0.72ns
Tryptophan (Trp)	0.38a	0.30b	0.36ns	0.32ns
Valine (Val)	1.27a	0.97b	1.15a	1.06b
Total	6.93	6.51	7.63	6.98

[1] DW = dry weight. C = conventional; O = organic; CC = cover crop; NCC = no cover crop. [2] Different letters in pairs of columns for both farming systems and soil management methods separately suggest significant differences among the means within a row, indicated by Tukey's HSD test at $p \leq 0.05$.

3.4. Trait Correlation

In this study, Pro showed a significant positive correlation with Fe (r = 0.83), Ash (r = 0.80), Fib (r = 0.40), Fat (r = 0.37), and a significant negative correlation with Carb (r = -0.98) (Figure 3). Carb showed a significant negative correlation with Fe (r = -0.85), Ash (r = -0.88), Fib (r = -0.46), and Fat (r = -0.41). Ca showed a significant positive correlation (r = 0.77) with Mg. In this study, a negative correlation (r = -0.90) was observed between Pro and Carb, supported by earlier findings in quinoa [19].

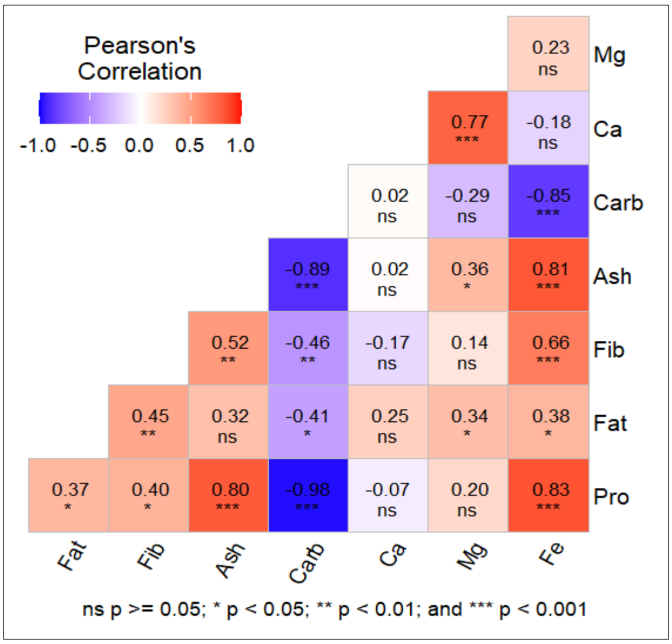

Figure 3. Pearson's correlation coefficient (*r*) shows the relationship between nutritional traits of SP greens (Pro = crude protein; Fat = crude fat; Fib = crude fiber; Ash = ash; Carb = carbohydrate; Ca = calcium; Mg = Magnesium, Fe = iron).

SP greens are not only rich in nutritional values but also good sources of bioactive compounds, such as polyphenols, flavonoids, and carotenoids. These compounds possess antioxidant, anticancer, antidiabetic, antimicrobial effects thus promoting human and heart health [5,9,11,14]. Additionally, Jahurul and Islam [5] summarized the potential health benefits of bioactive compounds from SP storage roots and leaves in both in vivo and in vitro studies. These benefits include anti-diabetic, anti-inflammatory, anti-cancer, cardioprotective, anti-obesity, and anti-microbial activities.

4. Conclusions

A significant variation in nutrient levels was observed between conventional and organic farming systems and between the use of cover crops. However, overall differences in nutritional values were minimal and compatible with previous findings. Generally, organic foods do not improve overall dietary quality, but they significantly reduce chemical load and pesticide residues. This study found that, like other leafy vegetables, SP greens are rich in nutrients. It may be suitable as an alternative, non-conventional vegetable, especially in areas where SP is grown most and where the scarcity of fresh vegetables is common.

Supplementary Materials: The following supporting information can be downloaded at the website of this paper posted on Preprints.org. Table S1 containing the analysis of variance (ANOVA) of proximate components, amino acids, and minerals.

Author Contributions: W.K.: Validation, funding acquisition, writing, review & editing, supervision, investigation, methodology, and resources. S.P.: Conceptualization, writing – original draft, review & editing, software, formal analysis, methodology, and resources. G.N.; U.K.: Field work, and leaf tissues processing.

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Data Availability Statement: The original contributions presented in the study are included in the article/Supplementary Material. Further inquiries can be directed to the corresponding author.

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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.

Abbreviations

The following abbreviations are used in this manuscript:

SP	Sweetpotato
FS	Farming Systems
C	Conventional
CFS	Conventional FS
O	Organic
OFS	Organic FS
SMP	Soil management practices
CC	Cover crop
NCC	No cover crop
CP	Crude protein
CF	Crude fiber
Carb	Carbohydrate
EAA	Essential Amino Acids
DW/DM	Dry weight/Dry matter

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