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EFFECT OF POTASSIUM FERTILIZATION ON OIL PRODUCTIVITY AND SOME CHEMICAL CONSTITUENTS OF *MENTHA SPICATA* AND *MENTHA PIPERITA*

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ABSTRACT: The farm of Cairo Aromatic located in Farafra Oases (New Valley) was subjected to a field experiment through two successive seasons (2022 and 2023) to evaluate the effect of potassium sulfate K_2SO_4 (0.0, 90, 180 and 270 kg/fed) on oil production (volatile oil %, volatile oil yield either per m^2 per cut or per fed per cut and total volatile oil yield per season) and some chemical constituents of spearmint and peppermint. Data showed that all previous traits were significantly augmented with *Mentha spicata* than *Mentha piperita* in all cases, except oil percentage, the superiority was for *Mentha piperita*. Also, such abovementioned parameters were increased with increasing potassium fertilization level, where 270 kg/fed of K_2SO_4 produced the highest values in all cases. Also, potassium fertilizer increased pigments (chlorophyll contents) and N, P and K%. The interaction was significant for all studied parameters in all cases. Interestingly, the combination treatment between the high level of potassium with *Mentha piperita* was the best in essential oil percent, while the highest yield of essential oil due to high level of potassium with *Mentha spicata*.

Keywords: spearmint, peppermint, potassium, volatile oil, pigments

INTRODUCTION

The two species (spearmint and peppermint) under our study are members of the Lamiaceae family. Spearmint is predominantly utilized as a flavoring agent in various global culinary traditions. The primary component of spearmint essential oils is carvone, which contributes to its minty and slightly sweet aroma, making up 60-70% of the oil's composition (De Carvalho and Da Fonseca, 2006). Additionally, it demonstrates various biological characteristics such as antimicrobial and antioxidant properties (Scherer *et al*., 2013).

Peppermint, conversely, is recognized for its medicinal properties. It is distinguished by a rejuvenating taste that comes from its essential oil, containing 30–55% menthol and 14–32% menthone (Kapp *et al*., 2013). The cooling sensation experienced when consuming peppermint is attributed to menthol. Peppermint is known to have antifungal, insecticidal, antiviral, antidiabetic, antimicrobial, and antioxidant properties. Due to these beneficial biological effects and pleasant taste, both spearmint and peppermint are utilized for various medicinal and non-medicinal purposes, including being incorporated into herbal teas within the food industry (McKay and Blumberg, 2006 and Alaşalvar and Çam, 2020).

Potassium is essential for numerous functions within plants, including its involvement in photosynthesis, the activation of enzymes, the synthesis of proteins, the production of secondary metabolites, the regulation of osmotic potential, and serving as a counter ion to both inorganic ions and organic biopolymers (Britto and Kronzucker, 2008). Many authors demonstrated the positive role of potassium on volatile oil production like Zheljazkov and Margina

(1996), Nemeth *et al*. (2012), Chrysargyris *et al*. (2017) and Lothe *et al*. (2021) on mint spp.

The objective of this research was to investigate the effect of potassium on volatile oil production as well as some chemical constituents of the two-mint *spp*. under New Reclaimed soils.

MATERIALS AND METHODS

The farm of Cairo Aromatic positioned in New Valley (Farafra Oases) was targeted to a field experiment during two consecutive seasons of 2022 and 2023 to examine the role of potassium sulfate (control, 90, 180 and 270 kg/fed K_2SO_4) on the oil production as well as some chemical constituents of spearmint and peppermint plants.

The uniformly seedlings of each species were transplanted (February 25th) in hills that were 25 × 25 cm apart, with a density of 16 plants per square meter. Each unit area measured 1 square meter, with dimensions of 1 meter in width and 1 meter in length. Consequently, each replicate plot was 2.5 meters wide and 6 meters long, consisting of 2 main plots measuring 1 meter by 6 meters each, and 4 sub-plots for potassium treatments, each measuring 1 meter by 4 meters. In order to prevent seepage, a 0.5 meter gap was maintained between the main and sub-plots, all of which were irrigated using a pivot irrigation system. As a result, the total number of plants per feddan amounted to 64,000 plants, ensuring optimal growth conditions for the cultivated seedlings.

During preparation of the soil for planting, 12 tons per fed compost (obtained from Konoz company) was added. Calcium triple phosphate (15.5 % P_2O_5) was added at 200 kg/fed + 50 kg sulfur (98% S)/fed. Nitrogen was added at 150 kg ammonium sulphate (20.5% N)/fed at three equal doses (one week after potassium fertilization for each dose).

Four levels of potassium fertilization (control, 90, 180, and 270 kg/fed potassium sulfate/fed) for both mint species were split into three equal doses with a 45-day interval, starting from the 15th of March in both seasons. Mint harvesting was conducted three times with a 43-day interval, starting on the 27th of April in both seasons. The Physical and chemical properties of the used soil in Cairo Aromatic farm, Farafra Oasis (New valley) were show in Table (a), according to ICARDA (2013).

Experiment layout:

A randomized complete block design in a split plot with three replications was followed. Mint species (*spearmint* and *peppermint*) were arranged in the main plots (A), while four levels of potassium fertilization (control, 90, 180 and 270 kg potassium sulfate/fed) were occupied in sub plots (B).

Data recorded:

Volatile oil production:

1. Essential oil percentage (%).
2. Essential oil yield/m^2 (ml).

Table a. Physical and chemical properties of the used soil before planting of mint during the two successive growing seasons of 2022 and 2023.

Soil Character	2022	2023	Soil Character	2022	2023
	Physical properties			**Exchangeable nutrients**	
Sand (%)	77.13	75.28	**Ca^{++} (meq/l)**	6.51	6.45
Silt (%)	14.45	14.57	**Mg^{++} (meq/l)**	6.03	6.00
Clay (%)	8.42	10.15	**Na^{+} (meq/l)**	7.12	7.07
Soil texture	Sandy	Sandy	**K^{+} (meq/l)**	1.65	1.57
	Chemical properties			**DTPA-Extractable nutrients**	
pH (1:2.5)	8.31	8.33	**Fe (ppm)**	0.35	0.33
E.C. (dS/m)	2.04	2.06	**Cu (ppm)**	0.07	0.06
O.M. (%)	0.03	0.04	**Zn (ppm)**	0.14	0.12
$CaCO_3$ (%)	9.98	10.06	**Mn (ppm)**	0.26	0.25

3. Essential oil yield (l/fed/cut).
4. Essential oil yield (l/fed/season).

The essential oil percentage was determined according to the method described by the Egyptian Pharmacopoeia (1984), and then the essential oil yield per plant and per feddan was calculated.

Chemical constituents (in the third cut):

1. Photosynthetic pigments (mg/g f.w.) according to Fadl and Sari El–Deen (1979).
2. Nitrogen, phosphors and potassium percentages according to ICARDA (2013).

Statistical analysis:

The data collected for each characteristic was organized into tables and subjected to statistical analysis using MSTAT-C (1986). Subsequently, the LSD test was utilized to compare the means of the different treatments.

RESULTS AND DISCUSSION

Volatile oil production:

Regardless the impact of all treatments, data in Tables (1 to 3) proved that all essential oil production (essential oil %, essential oil yield per m^2 per cut and per fed per cut) were increased from the 1^{st} cut to 3^{rd} cut in both seasons.

Mentha piperita significantly increased essential oil percent during the three cuts and per season than *Mentha spicata*. On the other hand, essential oil yield/m^2/ either per cut or per fed and total essential oil yield per season were considerably increased in *Mentha spicata* comparing with *Mentha piperita*, in both seasons Tables (1 to 4). Total essential yield reached 12.638 and 14.601 l) in *Mentha spicata*. While, in *Mentha piperita* recorded 10.938 and 11.658 l) in the first and second seasons, respectively.

Essential oil percent in *Mentha piperita* is about 1-3.9%, however, *Mentha spicata* contains about 0.004-2.1%. This difference in essential oil percent depending on species, cultivar, region to another, used parts (leaves, whole plant with or without flower), stage and method of extraction (Charles, 2013a; Charles, 2013b; Nair, 2022a and Nair, 2022b).

Data in the same Tables showed that increasing potassium rates from 90 to 270 kg K_2SO_4 resulted in a significant increase for all previous traits. Therefore, the high level of K caused the highest values. Such increase of essential oil yield per feddan reached (70.75 and 73.80%) in the first and second seasons respectively, for 270 kg K_2SO_4 treatment over the control.

In fact, potassium accelerates vegetative growth, increased herbage, consequently, more production of secondary metabolic including essential oil. Also, potassium plays a vital role in transporting such products from synthesis organs to storge glands.

In close to our results those obtained by Zheljazkov and Margina (1996), Jeliazkova *et al*. (1999) and Nemeth *et al*. (2012) on peppermint; Chrysargyris *et al*. (2017) on spearmint, Lothe *et al*. (2021) on *Mentha arvensis* L., Rao *et al*. (2007), Ahmed *et al*. (2011), Najafian and Zahedifar (2018) and Danaee and Abdossi (2021) on basil; Singh *et al*. (2007), Puttanna *et al*. (2010) and Radwan *et al*. (2017) on rosemary, Rashmi and Singh (2008), Singh *et al*. (2012), El-Mahrouk *et al*. (2018) and Mahmoud *et al*. (2023) on lemongrass; Said-Al Ahl *et al*. (2009) on oregano, Younis *et al*. (2010) on fennel, Sharafzadeh (2011) on *Thymus vulgaris*, El-Leithy *et al*. (2013) on *Marrubium vulgare*, Abdou *et al*. (2014) on marjoram, Abd El-Razik *et al*. (2015) on chervil, Ibrahim (2019) on chamomile and Mohamed and Ghatas (2021) on *Achillea millefolium*.

In all cases, the combination effect between *Mentha spp.* and potassium fertilization levels was significant for all studied parameters. The essential oil yield per feddan (16.285 and 19.088 l) was achieved from *Mentha spicata* fertilized with 270 kg K_2SO_4. Also, for *Mentha piperita*, can produce (14.350 and 15.343 l) under the same level of potassium (270 kg K_2SO_4).

Table 1. Effect of potassium fertilization on essential oil (%) of *Mentha spicata* and *Mentha piperita* during the three cuttings in both growing seasons (2022 and 2023).

Potassium fertilization treatments (kg/fed) (B)	*Mentha* species (A)					
	M. spicata	*M. piperita*	Mean (B)	*M. spicata*	*M. piperita*	Mean (B)
	First season (2022)			Second season (2023)		
			First cut			
Control (K_0)	0.68	1.01	0.84	0.68	1.02	0.85
K_1 (90 K_2SO_4/fed)	0.69	1.12	0.90	0.69	1.14	0.91
K_2 (180 K_2SO_4/fed)	0.70	1.19	0.94	0.70	1.20	0.95
K_3 (270 K_2SO_4/fed)	0.72	1.20	0.96	0.72	1.21	0.97
Mean (A)	0.69	1.13	0.91	0.70	1.14	0.92
$LSD_{0.05}$	A: 0.13	B: 0.05	AB: 0.08	A: 0.13	B: 0.05	AB: 0.10
			Second cut			
Control (K_0)	0.70	1.17	0.93	0.70	1.18	0.94
K_1 (90 K_2SO_4/fed)	0.71	1.20	0.95	0.72	1.20	0.96
K_2 (180 K_2SO_4/fed)	0.72	1.21	0.97	0.72	1.22	0.97
K_3 (270 K_2SO_4/fed)	0.74	1.23	0.98	0.74	1.24	0.99
Mean (A)	0.72	1.20	0.96	0.72	1.21	0.96
$LSD_{0.05}$	A: 0.20	B: 0.02	AB: 0.04	A: 0.08	B: 0.02	AB: 0.04
			Third cut			
Control (K_0)	0.76	1.21	0.98	0.76	1.21	0.98
K_1 (90 K_2SO_4/fed)	0.76	1.26	1.01	0.76	1.26	1.01
K_2 (180 K_2SO_4/fed)	0.77	1.27	1.02	0.77	1.28	1.02
K_3 (270 K_2SO_4/fed)	0.79	1.38	1.08	0.79	1.38	1.08
Mean (A)	0.77	1.28	1.02	0.77	1.28	1.02
$LSD_{0.05}$	A: 0.30	B: 0.03	AB: 0.06	A: 0.30	B: 0.03	AB: 0.06

Table 2. Effect of potassium fertilization on essential oil yield (ml/m^2/cut) of *Mentha spicata* and *Mentha piperita* during the three cuttings in both growing seasons (2022 and 2023).

Potassium fertilization treatments (kg/fed) (B)	*Mentha* species (A)					
	M. spicata	*M. piperita*	Mean (B)	*M. spicata*	*M. piperita*	Mean (B)
	First season (2022)			Second season (2023)		
			First cut			
Control (K_0)	0.300	0.253	0.276	0.551	0.267	0.409
K_1 (90 K_2SO_4/fed)	0.327	0.311	0.319	0.618	0.332	0.475
K_2 (180 K_2SO_4/fed)	0.418	0.394	0.406	0.788	0.417	0.602
K_3 (270 K_2SO_4/fed)	0.524	0.445	0.484	1.045	0.476	0.760
Mean (A)	0.392	0.351	0.372	0.751	0.373	0.562
$LSD_{0.05}$	A: 0.020	B: 0.015	AB: 0.030	A: 0.030	B: 0.018	AB: 0.036
			Second cut			
Control (K_0)	0.717	0.566	0.641	0.744	0.602	0.673
K_1 (90 K_2SO_4/fed)	0.806	0.682	0.744	0.849	0.720	0.784
K_2 (180 K_2SO_4/fed)	0.913	0.837	0.875	0.951	0.893	0.922
K_3 (270 K_2SO_4/fed)	1.179	1.018	1.099	1.232	1.088	1.160
Mean (A)	0.904	0.776	0.840	0.944	0.826	0.885
$LSD_{0.05}$	A: 0.080	B: 0.050	AB: 0.100	A: 0.090	B: 0.055	AB: 0.110
			Third cut			
Control (K_0)	1.438	1.212	1.325	1.503	1.286	1.395
K_1 (90 K_2SO_4/fed)	1.711	1.410	1.561	1.790	1.497	1.644
K_2 (180 K_2SO_4/fed)	1.937	1.684	1.811	2.034	1.810	1.922
K_3 (270 K_2SO_4/fed)	2.368	2.124	2.246	2.495	2.272	2.384
Mean (A)	1.864	1.608	1.736	1.956	1.716	1.836
$LSD_{0.05}$	A: 0.110	B: 0.070	AB: 0.140	A: 0.108	B: 0.080	AB:0.160

Table 3. Effect of potassium fertilization on essential oil yield (l/fed/cut) of *Mentha spicata* and *Mentha piperita* during the three cuttings in both growing seasons (2022 and 2023).

Potassium fertilization treatments (kg/fed) (B)	*Mentha* species (A)					
	M. spicata	*M. piperita*	Mean (B)	*M. spicata*	*M. piperita*	Mean (B)
	First season (2022)			Second season (2023)		
				First cut		
Control (K_0)	1.199	1.010	1.104	2.204	1.067	1.636
K_1 (90 K_2SO_4/fed)	1.309	1.245	1.277	2.474	1.328	1.901
K_2 (180 K_2SO_4/fed)	1.674	1.577	1.625	3.152	1.668	2.410
K_3 (270 K_2SO_4/fed)	2.094	1.781	1.938	4.179	1.902	3.040
Mean (A)	1.569	1.403	1.486	3.002	1.491	2.247
$LSD_{0.05}$	A: 0.090	B: 0.070	AB: 0.140	A: 0.110	B: 0.085	AB:0.170
				Second cut		
Control (K_0)	2.866	2.264	2.565	2.976	2.407	2.692
K_1 (90 K_2SO_4/fed)	3.224	2.728	2.976	3.395	2.879	3.137
K_2 (180 K_2SO_4/fed)	3.651	3.349	3.500	3.803	3.570	3.686
K_3 (270 K_2SO_4/fed)	4.717	4.072	4.394	4.928	4.354	4.641
Mean (A)	3.615	3.103	3.359	3.775	3.303	3.539
$LSD_{0.05}$	A: 0.120	B: 0.085	AB: 0.170	A: 0.132	B: 0.071	AB: 0.142
				Third cut		
Control (K_0)	5.753	4.850	5.301	6.013	5.144	5.578
K_1 (90 K_2SO_4/fed)	6.844	5.640	6.242	7.161	5.989	6.575
K_2 (180 K_2SO_4/fed)	7.747	6.737	7.242	8.138	7.239	7.688
K_3 (270 K_2SO_4/fed)	9.474	8.497	8.986	9.981	9.087	9.534
Mean (A)	7.455	6.431	6.943	7.823	6.865	7.344
$LSD_{0.05}$	A: 0.850	B: 0.685	AB: 1.370	A: 1.100	B: 0.821	AB: 1.642

Table 4. Effect of potassium fertilization on essential oil yield (l/fed/season) of *Mentha spicata* and *Mentha piperita* during the three cuttings in both growing seasons (2022 and 2023).

Potassium fertilization treatments (kg/fed) (B)	*Mentha* species (A)					
	M. spicata	*M. piperita*	Mean (B)	*M. spicata*	*M. piperita*	Mean (B)
	First season (2022)			Second season (2023)		
Control (K_0)	9.818	8.124	8.971	11.192	8.618	9.905
K_1 (90 K_2SO_4/fed)	11.378	9.614	10.496	13.030	10.195	11.613
K_2 (180 K_2SO_4/fed)	13.073	11.663	12.368	15.092	12.476	13.784
K_3 (270 K_2SO_4/fed)	16.285	14.350	15.318	19.088	15.343	17.215
Mean (A)	12.638	10.938	11.788	14.601	11.658	13.129
$LSD_{0.05}$	A: 1.011	B: 0.888	AB: 1.760	A: 1.228	B: 0.905	AB: 1.010

Chemical constituents:

1. Chlorophyll a, b and carotenoids:

Data in Table (5) showed that chlorophyll a, b and carotenoids content were increased in *Mentha piperita* than *Mentha spicata* during both seasons. This increase in pigments content may be due to the own cultivar characters (Charles, 2013a and b; Nair, 2022a and b and Abdou *et al*., 2024).

Results in the same Table indicated that all three used levels of potassium fertilizer significantly enhanced the contents of the abovementioned treats comparing with control. The highest contents were achieved with the treatment of high level of potassium (135 kg K_2O/fed).

Potassium fertilization enhanced the contents of pigments as emphasized by Danaee and Abdossi (2021) on sweet basil, Akram *et al*. (2009) on *Helianthus annuus*, Abd El-Razik *et al*. (2015) on chervil, Heikal (2017) on *Salvia farinacea*, Ibrahim (2019) on *Matricaria chamomilla*, L., Rahimi *et al*. (2021), on summer savory and Noor El-Deen and Abou El-Ghit (2022) on *Hibiscus rosa-sinensis*.

Table 5. Effect of potassium fertilization on chlorophyll a, b and carotenoids content (mg/g f.w.) of *Mentha spicata* and *Mentha piperita* during the third cutting in both growing seasons (2022 and 2023).

Potassium fertilization treatments (kg/fed) (B)	*Mentha* species (A)					
	M. spicata	*M. piperita*	Mean (B)	*M. spicata*	*M. piperita*	Mean (B)
	First season (2022)			Second season (2023)		
			Chlorophyll a content in fresh weight (mg/g)			
Control (K_0)	2.895	3.041	2.968	2.904	3.112	3.008
K_1 (90 K_2SO_4/fed)	3.040	3.222	3.131	3.049	3.288	3.169
K_2 (180 K_2SO_4/fed)	3.192	3.383	3.288	3.202	3.452	3.327
K_3 (270 K_2SO_4/fed)	3.351	3.519	3.435	3.361	3.590	3.476
Mean (A)	3.120	3.291		3.129	3.361	
$LSD_{0.05}$	A: 0.045	B: 0.032	AB: 0.064	A: 0.048	B: 0.035	AB: 0.070
			Chlorophyll b content in fresh weight (mg/g)			
Control (K_0)	0.765	1.011	0.888	0.767	1.017	0.892
K_1 (90 K_2SO_4/fed)	0.813	1.072	0.943	0.816	1.078	0.947
K_2 (180 K_2SO_4/fed)	0.864	1.125	0.995	0.867	1.132	1.000
K_3 (270 K_2SO_4/fed)	0.917	1.171	1.044	0.920	1.178	1.049
Mean (A)	0.840	1.095		0.843	1.101	
$LSD_{0.05}$	A: 0.015	B: 0.011	AB: 0.022	A: 0.017	B: 0.013	AB: 0.026
			Carotenoids content in fresh weight (mg/g)			
Control (K_0)	1.165	1.211	1.188	1.168	1.214	1.191
K_1 (90 K_2SO_4/fed)	1.213	1.274	1.244	1.217	1.275	1.246
K_2 (180 K_2SO_4/fed)	1.264	1.313	1.289	1.268	1.326	1.297
K_3 (270 K_2SO_4/fed)	1.317	1.338	1.328	1.321	1.352	1.337
Mean (A)	1.240	1.284		1.244	1.292	
$LSD_{0.05}$	A: 0.022	B: 0.019	AB: 0.038	A: 0.025	B: 0.021	AB: 0.042

The interaction between main and sub-plots was significant for chlorophyll a, b and carotenoids in both seasons relative to control. It is noticed that the high level of fertilizer of potassium resulted in the highest pigments of *M. Piperita* or *M. spicata* (Table 5).

2. Nitrogen, phosphorus and potassium percentages:

It is interesting to mention that statistically significant for the percentages of N, P and K in both seasons due to main, sub-plots and the interaction them comparing with control (Table 6).

Mentha piperita registered higher percentages than *Mentha spicata*. These elements % were increased with rising potassium fertilization rate. Moreover, high level of potassium gave the highest percentages of these three nutrients either in *Mentha piperita* or *Mentha spicata*.

Fertilization treatments enhanced uptake and content of N, P and K. Such fact was emphasized by

Results in the same Table indicated that all three used levels of potassium fertilizer significantly enhanced the contents of the abovementioned treats comparing with control. The highest contents were achieved with the treatment of high level of potassium (135 kg K_2O/fed).

Potassium fertilization enhanced the percentage and uptake of such three elements as emphasized by Singh *et al*. (2007) on rosemary plants; Singh *et al*. (2012) on lemongrass; Heikal (2017) on *Salvia farinacea*; Mohamed and Ghatas (2021), on *Achillea millefolium*; Dzida *et al*. (2018) and Danaee and Abdossi (2021) on basil; and Rahimi *et al*. (2021), on summer savory.

Table 6. Effect of potassium fertilization on N, P and K (%) in dry herb of *Mentha spicata* and *Mentha piperita* during the third cutting in both growing seasons (2022 and 2023).

Potassium fertilization treatments (kg/fed) (B)	*Mentha* species (A)					
	M. spicata	*M. piperita*	Mean (B)	*M. spicata*	*M. piperita*	Mean (B)
	First season (2022)			Second season (2023)		
			Nitrogen (%)			
Control (K_0)	1.29	1.32	1.31	1.31	1.36	1.34
K_1 (90 K_2SO_4/fed)	1.55	1.75	1.65	1.58	1.79	1.69
K_2 (180 K_2SO_4/fed)	1.87	1.91	1.89	1.91	2.00	1.96
K_3 (270 K_2SO_4/fed)	2.24	2.38	2.31	2.28	2.42	2.35
Mean (A)	1.74	1.84		1.77	1.89	
$LSD_{0.05}$	A: 0.08	B: 0.05	AB: 0.10	A: 0.010	B: 0.08	AB: 0.16
			Phosphorus (%)			
Control (K_0)	0.14	0.16	0.15	0.16	0.18	0.17
K_1 (90 K_2SO_4/fed)	0.17	0.19	0.18	0.18	0.21	0.20
K_2 (180 K_2SO_4/fed)	0.20	0.22	0.21	0.22	0.24	0.23
K_3 (270 K_2SO_4/fed)	0.24	0.28	0.26	0.25	0.31	0.28
Mean (A)	0.19	0.21		0.20	0.24	
$LSD_{0.05}$	A: 0.02	B: 0.01	AB: 0.02	A: 0.03	B: 0.02	AB: 0.04
			Potassium (%)			
Control (K_0)	1.25	1.29	1.27	1.33	1.35	1.34
K_1 (90 K_2SO_4/fed)	1.56	1.61	1.59	1.65	1.78	1.72
K_2 (180 K_2SO_4/fed)	1.74	1.79	1.77	1.85	1.87	1.86
K_3 (270 K_2SO_4/fed)	2.18	2.24	2.21	2.31	2.40	2.36
Mean (A)	1.68	1.73		1.79	1.85	
$LSD_{0.05}$	A: 0.05	B: 0.03	AB: 0.06	A: 0.06	B: 0.04	AB: 0.08

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تأثير التسميد البوتاسي على إنتاجية الزيت وبعض المكونات الكيميائية لنوعي النعناع البلدي والنعناع الفلفلي

محمود عبدالهادي حسن عبده ، عماد الدين توفيق أحمد ، محمود صبحي سلام علي
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أقيمت تجربة بمزرعة شركة القاهرة للبذور والنباتات الطبية والعطرية الواقعة بواحة الفرافرة (الوادي الجديد) خلال موسمين متتاليين (٢٠٢٢ و٢٠٢٣) لتقييم دور سلفات البوتاسيوم (الكنترول، ٩٠، ١٨٠ و٢٧٠ كجم سلفات بوتاسيوم) على إنتاج الزيت (النسبة المئوية للزيت الطيار، محصول الزيت للمتر المربع في الحشة، محصول الزيت الطيار للفدان في الحشة، محصول الزيت الطيار للفدان في الموسم) وبعض المكونات الكيميائية للنعناع البلدي والنعناع الفلفلي. أظهرت البيانات أن جميع الصفات السابقة زادت بشكل معنوي مع النعناع البلدي عن النعناع الفلفلي في جميع الحالات، باستثناء نسبة الزيت، حيث كان التفوق للنعناع الفلفلي. كما زادت جميع المقاييس المذكورة أعلاه بزيادة مستوى التسميد بالبوتاسيوم، حيث أنتج

٢٧٠ كجم سلفات بوتاسيوم أعلى القيم في جميع الحالات. كان التفاعل معنويًا لجميع الصفات المدروسة في جميع الحالات. ومن المثير للاهتمام أن معاملة التداخل بين المستوى العالي من البوتاسيوم مع النعناع الفلفلي كانت الأفضل في نسبة الزيت العطري، بينما كانت أعلى إنتاجية للزيت العطري عند المستوى العالي من البوتاسيوم مع النعناع البلدي.