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Effect of Magnetized Water on Some Growth Characters of Mint Plant (*Minta piperita* L.)

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Abstract

Pot experiments were carried out at Faculty of Education, Alzaiem Alazhari University to study the effect of magnetized water on some growth parameters of Mint plant for two successive seasons (2014-2015). The experiments were set as a completely randomized design with five treatments and three replications. Results showed a significant difference (P=0.05) in shoot length, number of leaves, moisture content, crude protein, crude fiber and ether extract. The dry matter and ash content did not show significant difference. The Nitrogen free extract (NFE) indicated a significant decrease and the control value was higher than the values of the ether treatments in both seasons (2014-2015).

Keywords: Minta peperita, Magnetized water, Crude protein, crude fiber

INTRODUCTION

Plants have important role in the earth and the study of the environmental factors that affect plant growth is essential issue. Electro-magnetic field are part of environmental factors that affect plant over many years. The effects of static magnetic fields on plant

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have been the subject of different research studies (Hirota *et al*., 1999). The technology of magnetic water has widely studied and adopted in the field of agriculture in many countries, but in Sudan the available studies and application of magnetic water in agriculture is very limited, therefore, the present study aimed to study the effect of magnetic water on some growth parameters of peppermint plant (*Minta piperita* L.).

MATERIALS AND METHODS

Plant material:

Peppermint seedlings of one year old, having 14 leaves and 12cm in length were selected for this experiment. The experiment was arranged as a completely randomized design with five treatments and three replications for each treatment.

The treatments were as follows:

1.Normal seedling irrigated with tap water and considered as a control (T_1).
2.Normal seedling irrigated with magnetized water (T_2).
3.Normal seedling irrigated with two times magnetized water (T_3).
4.Normal seedling irrigated with four times magnetized water (T_4).
5.Normal seedling irrigated with six times magnetized water (T_5).
The soil used in this experiment was light clay soil.

Magnetic device:

The device used for water treatment was funnel shaped obtained from the local agent of Magnetic technologies L.L.C. Model Na, MFLa, Dubai, U.A.E.

Parameters measured:

The plant height, number of leaves were taken monthly for three months.The chemical constituents recorded at the end of the experiment.

Statistical analysis:

All data relating plant height, number of leaves were tabulated and statistically, analyzed using analysis of variance (ANOVA) according to Gomez and Gomez (1984).

RESULTS AND DISCUSSION

Table (1) showed the shoot length and number of leaves of mint plant in the years 2014 and 2015. A significant difference (P=0.05) was observed at one, two and three moths after start of experiment (ASE) in the first year (2014). However, in the second year, a non-significant difference was observed one month after start of experiment, but a significant increase was observed at two and three months after start of experiment. The increase in the number of leaves was significant at 1, 2 and 3 months after start of experiment in the first and second year (2015, 2016) except treatments (T_2 and T_3) at two and three months after start of experiment in the year 2015. These results concur with results of Aladjadjiyan (2002), Atak *et al.* (2003), Nasher (2008) and Mohmood and Usman (2014). These results may be attributed to the role of magnetic treatment of water in increasing absorption and assimilation of nutrients consequently increasing plant growth of shoot length and number of leaves.

The constituents of mint plant showed a significant increase in moisture content, crude protein, crude fiber and ether extract in both years results (2014 and 2015) (Table 2). However a non-significant difference was observed in dry matter and ash content. On the other hand a significant decrease was observed in nitrogen free extract (NFE) in both years. Similar results were reported by Amer *et al*. (2014) who found high significant increase in yield and content of protein and oil of soya bean irrigated with magnetic water compared with those irrigated with normal water. These results were confirmed by the results of Singureanu *et al*. (2015) who found high accumulation of menthol, eugend, sucalyptol, linalool and other components in *Minta piperta* L. treated by high pulsatile electromagnetic and ultra sound pulsatile fields.

Table (1): The effect of magnetized water on shoot length and number of leaves of mint plant (2014-2015).

		Shoot length (cm)			Number of leaves		
		Months after start of experiment					
		1	2	3	1	2	3
2014	T_1	20.47	24.11	30.30	16.00	22.00	24.30
	T_2	23.60	28.27	33.40	17.22	25.66	26.44
	T_3	24.60	28.40	33.40	17.27	25.90	26.98
	T_4	24.80	29.46	33.80	17.66	26.00	27.33
	T_5	24.90	29.60	34.40	18.77	26.30	29.99
	LSD	1.81	3.09	3.06	1.66	1.81	2.68
2015	T_1	20.20	24.05	29.05	15.60	21.73	24.70
	T_2	21.05	26.60	30.40	17.70	24.55	26.20
	T_3	23.50	28.22	37.60	18.10	25.00	26.40
	T_4	23.60	28.60	32.50	18.60	25.60	27.00
	T_5	23.64	29.40	32.70	18.30	25.70	28.40
	LSD	4.38	2.55	3.23	2.68	2.29	2.29

Table (2): The effect of magnetized water on constituents of mint plant in the years 2014-2015

		Moisture content	Dry matter (%)	Crude protein (%)	Crude fiber (%)	Ether extract (%)	Ash (%)	NFE (%)
2014	T_1	82.09	92.66	11.20	22.85	0.78	15.98	41.85
	T_2	83.06	92.73	12.25	24.43	2.82	16.82	36.41
	T_3	83.69	92.86	14.88	25.80	3.85	17.32	31.01
	T_4	84.26	92.85	15.58	26.26	3.88	17.46	29.97
	T_5	85.01	92.50	16.10	27.51	4.11	17.74	27.40
	LSD	1.81	1.98	1.81	2.68	1.41	1.96	2.43
2015	T_1	81.80	92.67	11.18	22.82	076	15.94	41.97
	T_2	83.12	92.95	12.31	24.44	2.80	16.80	36.40
	T_3	83.70	92.97	14.91	25.81	3.85	17.33	30.83
	T_4	84.31	92.86	15.60	26.27	3.90	17.38	29.71
	T_5	85.11	92.87	16.12	27.50	4.12	17.76	27.37
	LSD	1.81	2.68	1.81	2.29	1.41	2.29	1.81

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