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# Effect of Spraying of Algazon and Licorice Root Extract on Chemical Traits of Myrtus (*Myrtus communis* L.)

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***Abstract:*** This study was conducted at University of Basrah, Karmat Ali site, during 2018-2019. The experiment was conducted using Randomized Complete Block Design, with two factors, the first factor was organic fertilizer (ALGAZON) with (0, 1.5 and 3 ml $L^{-1}$), second was licorice root extract (0, 3 and 6) g $L^{-1}$, by five. The experiment was conducted to evaluate the spraying with organic fertilizers (ALGAZON) and licorice root extract on chemical traits of Myrtus (*Myrtus communis* L.). Sprinkle with licorice root extract at 6 g $L^{-1}$, resulted a significant increase on phosphorous and potassium concentration. The interaction between the organic fertilizers (ALGAZON) spraying treatments was 3 ml $L^{-1}$ and licorice root extract 6 g $L^{-1}$, were a significant increase on total chlorophyll, total dissolved carbohydrates in the leaves and the concentrate of nitrogen, phosphorous and potassium compared to the comparison plants that gave the lowest values. The greater the effect, when the higher the concentrations.

***Keywords***: Algazon, licorice root, Vegetative traits, Myrtus, *Myrtus communis*

*Myrtus communis* L., belongs to Myrtaceae Asian family, includes 150 genera and more than 5,500 species. Myrtus is naturally cultivated around the world and native to the northern Mediterranean (Jamshidi-Kia et al 2018). Sea weed extract is one of the most important recently used organic fertilizers to improve plant growth with high efficiency. Algazon extract, which is extract from brown algae (*Ascophyllum nodosum*), belongs to the Fucaceae family**,** characterized by its dark color, which ranges between brown and almost black and contains high content of humic compounds such as polyphenols or fluorotenins. The brown algae. is one of the organic fertilizers which contains major, minor and rare elements**,** such as N, K, P, Co, Mg, Br, Mo, Zn, Cu, and Fe (Eyras et al 2008). This experiment was conducted to determine the effect of organic fertilizer Algazon and Licorice root extract, in improving the chemical traits of myrtus plant.

## MATERIAL AND METHODS

This study was conducted at University of Basrah, Karmat Ali during 2018-2019, to determine the effect of spraying of organic fertilizers (ALGAZON) and licorice root extract on some chemical traits of Myrtus (*Myrtus communis* L.). The two years old, were transported to large size plastic pots, 30 cm in diameter and 30 cm in depth, capacity of 12.5 kg of soil with peat moss. The height of the plants was 55 cm. The various physical and chemical properties of soil (Table 1, 2).

Experiment was conducted in randomized complete block design, with two factors, Algazon marine algae, extracted from brown seaweed (*Ascceufelume nodosum*), of Aljoud Company was used at concentrations of 0, 1, 5 and 3 ml $L^{-1}$ and licorice root extract with concentrations 0, 3 and 6 g $L^{-1}$. Licorice root extract was prepared, by melting 3 and 6 g separately in a liter of warm distilled water, at a temperature of 32°C. The spraying was done in the early morning until completely wet with five application at interval of 30 days, starting from 17 October 2018 (Table 5). An 8-liter manual sprinkler was used after adding the spreader (Tween- 20) at a concentration of 0.01% of the spray solutions, for reducing surface tension and increasing the adhesion of the material to the leaves. The chemical traits of the leaf content were measured, included total chlorophyll (mg 100 $g^{-1}$), total soluble carbohydrates (mg 100 $g^{-1}$) and the percentage of nitrogen, phosphorous and potassium.

## RESULTS AND DISCUSSION

The plants sprayed with the organic fertilizer Algazon extract at 3 ml $L^{-1}$ was significantly superior in total chlorophyll and total dissolved carbohydrates in leaves, being 94.73 mg 100 $g^{-1}$ and 86.43 mg $g^{-1}$ respectively, than lower concentration and control. The organic fertilizer helps to absorb nutrients, especially the major and minor elements from the leaves, which is reflected in increased total chlorophyll, more efficient photosynthesis and also the extract contains betaine, important in preventing the

decomposition of chlorophyll tincture (Mackinnon et al 2010). The licorice root extract indicated significant increase when spraying plants at of 6 g $L^{-1}$ on total chlorophyll and content of total dissolved carbohydrates in leaves, the highest values were 93.38 mg 100 $g^{-1}$ and 82.74 mg $g^{-1}$ respectively, compared to the comparison treatment that gave the lowest values of 76.82 mg 100 $g^{-1}$ and 67.22 mg $g^{-1}$. The increased chlorophyll may be attributed to mineral elements in licorice extract (Table 4). The, licorice root extract contain nitrogen, magnesium, and iron nutrients which help in synthesis of the chlorophyll molecule, thus increasing the efficiency of photosynthesis. Guloom Faraj (2012) and with Al-Mahdawe (2015) observed similar in chrysanthemum plants (*Calendula officinalis* L). The licorice root extract contain amino acids, sugar and mineral elements which vital role in physiological processes (Al-Ajeeli 2005, Hammadi and Abbas 2012, Lazm et al 2013, Al-Rubaie 2014). The spraying with organic fertilizer Algazon concentration of 3 ml $L^{-1}$ with licorice root extract concentration of 6 g $L^{-1}$ significantly increased the total chlorophyll and total soluble carbohydrate content (103.85 and 95.60 mg $g^{-1}$, respectively).

The spraying with fertilizer Algazon with a concentration of 3 ml $L^{-1}$, resulted a significant increase in the percentage of nitrogen, phosphorous and potassium, gave the highest values of 3.52, 0.31 and 2.27%, respectively, compared to control (2.35, 0.27 and 2.09%, respectively) (Table 7). The increased nitrogen component may be attributed to the role of compost extract in increasing the efficiency of nutrient uptake, in addition to what these extracts contain nutrients and amino acids (Abdul-Ameer et al 2011). This may be due to the increase in phosphorous in the leaves due to the compost extract which contains phosphorous and essential component of nucleic acids and sinter, which increases the vital activities, which is reflected positively in the increased availability of phosphorus in the soil (Habib and Zaghloul 2012) and may be attributed to compost, which contains major nutrients, including potassium, which stimulates a large number of enzymes, increases the amount of energy generated necessary to absorb many nutrients (Garcia et al 2004). The compost extract also containing zinc (Table 4) which helps to absorb elements, including potassium ( Altaee 2014, Muhammad et al 2018) .The spray with licorice root extract at 6 g $L^{-1}$ increased the phosphorus and potassium( 0.35 and 2.44%) compared to all other concentrations and lowest was 0.24 and 1.91% in control. The licorice extract at 6 g $L^{-1}$ also resulted in significant increase in the percentage of nitrogen (3.17%) compared to control (2.74%). The increase in these traits may be due to the chlorophyll content of the leaves, which may have increased nitrogen uptake to meet the plant's need for this

**Table 1.** Some physical and chemical properties of the soil

| Properties | Value |
|---|---|
| Electrical conductivity (ds $m^{-1}$) | 1.53 |
| pH | 7.49 |
| Total nitrogen (mg $L^{-1}$) | 0.87 |
| Available phosphorus | 17.75 |
| Available potassium | 22.15 |
| Organic matter (%) | 0.42 |
| Physical soil properties (%) | |
| Sand | 50.94 |
| Silt | 29.05 |
| Clay | 20.01 |
| Soil texture | Sandy clay |

**Table 2.** Chemical properties of the irrigation water

| Properties | Value |
|---|---|
| pH | 7.6 |
| Bicarbonate | 41.2 mg $L^{-1}$ ( ppm) |
| Sulphate | 18.3 mg $L^{-1}$ |
| Sodium | 21.9 mg $L^{-1}$ |
| Calcium | 3.6 mg $L^{-1}$ |
| Magnesium | 19.0 mg $L^{-1}$ |
| Potassium | 1.00 mg $L^{-1}$ |
| Chloride | 50.2 mg $L^{-1}$ |
| Fluoride | 0.02 mg $L^{-1}$ |
| Nitrate | 6.8 mg L-1 |

**Table 3.** Some components of Algazon seaweed extract used in the study

| Organic fertilizer (Algazon) composition | Extract (%) | Organic fertilizer (Algazon) composition | Extract (%) |
|---|---|---|---|
| N | 7.80 | Indole acetic acid | 0.002 |
| P | 3.90 | Phosphorus oxide $p_2o_5$ | 0.5 |
| K | 13 | Alanine | 0.026 |
| MO | 0.4 | Phytin | 0.003 |
| Fe | 0.1 | Menthol | 0.001 |
| Zn | 0.5 | Organic matter | 6.00 |
| $K_2O$ | 4% | Carbohydrate and Vitamins | 16-12% |
| Mg | 32 ppm | Glytamic acid | 0.0019 |
| Mn | 31 ppm | Fats | 7-11% |
| Cu | 12.6 ppm | Auxins, cytokinins and gibberlins | 28-32% |
| | | Proteinz | 50-55% |

**Table 4.** Some licorice root components used in the study for the 2018-2019 season

| Mineral elements | Value (mg $g^{-1}$) | Amino acids | Value (mg $kg^{-1}$) | Another components | Percent |
|---|---|---|---|---|---|
| Nitrogen | 20.23 | Lysine | 5.800 | Glycyrrhizin | 3.093 |
| Phosphorus | 21.26 | Histidine | 7.600 | sucrose | 1.570 |
| Potassium | 47.20 | Phenyl alanine | 19.900 | Glucose | 3.841 |
| Magnesium | 2.16 | Methionine | 4.200 | Gibberellin | 0.620 |
| Iron | 0.036 | Cysteine | 21.600 | Tannin | 3.660 |
| Zinc | 50.20 | Glycine | 7.810 | Crude fiber | 24.420 |
| Copper | 5.00 | Glutamic acid | 21.600 | Protein | 5.200 |
| Selenium | 7.80 | Aspartic acid | 16.900 | Oil | 3.750 |
| Cobalt | 0.53 | Threonine | 14.300 | Humidity | 12.000 |
| Manganese | 5.00 | Arginine | 1.200 | Total ash | 7.850 |

**Source:** Al-Rubaie 2014

**Table 5.** Effect of spraying of Algazon and licorice root extract on total chlorophyll and total dissolved carbohydrates in leaves of myrtus (*Myrtus communis* L.)

| Algazon (ml $L^{-1}$) | Licorice (g $L^{-1}$) | Total chlorophyll (mg 100 $g^{-1}$) | Total dissolved carbohydrates ($mg^{-1}$ gm) |
|---|---|---|---|
| 0 | 0 | 65.79 a | 59.21 a |
| | 3 | 71.09 b | 63.14 b |
| | 6 | 82.30 c | 72.14 c |
| 1.5 | 0 | 78.18 a | 64.21 a |
| | 3 | 84.57 b | 70.91 b |
| | 6 | 93.99 c | 80.48 c |
| 3 | 0 | 86.48 a | 78.24 a |
| | 3 | 93.85 b | 85.46 b |
| | 6 | 103.85 c | 95.60 c |
| LSD (0.05) | | 5.19 | 4.42 |
| Algazon | 0 | 73.06 a | 64.83 a |
| | 1.5 | 85.58 b | 71.87 b |
| | 3 | 94.73 c | 86.43 c |
| LSD (0.05) | | 3.00 | 2.55 |
| Licorice | 0 | 76.82 a | 67.22 a |
| | 3 | 83.17 b | 73.17 b |
| | 6 | 93.38 c | 82.74 c |
| LSD (0.05) | | 3.00 | 2.55 |

The different letters indicate significant differences between the averages under the probability level 0.05

**Table 6.** Effect of spraying of Algazon and licorice root extract nitrogen, phosphorus and potassium contents in leaf of myrtus (*Myrtus communis* L )

| Algazon (ml $L^{-1}$) | Licorice (g $L^{-1}$) | Nitrogen (%) | Phosphorus (%) | Potassium (%) |
|---|---|---|---|---|
| 0 | 0 | 2.08 a | 0.22 a | 1.79 a |
| | 3 | 2.36 b | 0.27 b | 2.12 b |
| | 6 | 2.60 c | 0.32 c | 2.35 c |
| 1.5 | 0 | 2.69 a | 0.23 a | 1.94 a |
| | 3 | 2.83 b | 0.28 b | 2.09 b |
| | 6 | 3.28 c | 0.35 c | 2.42 c |
| 3 | 0 | 3.44 a | 0.26 a | 1.98 a |
| | 3 | 3.49 b | 0.31 b | 2.27 b |
| | 6 | 3.64 c | 0.37 c | 2.55 c |
| LSD (0.05) | | 0.057 | 0.019 | 0.027 |
| Algazon | 0 | 2.35 a | 0.27 a | 2.09 a |
| | 1.5 | 2.94 b | 0.29 b | 2.16 b |
| | 3 | 3.52 c | 0.31 c | 2.27 c |
| LSD (0.05) | | 0.033 | 0.011 | 0.015 |
| Licorice | 0 | 2.74 a | 0.24 a | 1.91 a |
| | 3 | 2.90 b | 0.28 b | 2.16 b |
| | 6 | 3.17 c | 0.35 c | 2.44 c |
| LSD (0.05) | | 0.033 | 0.011 | 0.015 |

The different letters indicate significant differences between the averages under the probability level 0.05

element which encouraged vegetative and root growth, increasing the ability of the leaves to absorb large quantities of nitrogen to meet requirements (Table 5) Al-Dulaimi and Jumaa (2012) also observed similar trend in grape seedlings. The spraying with organic fertilizer concentration of 3 ml $L^{-1}$ and spraying with licorice extract 6 g $L^{-1}$ resulted in a significant increase in the percentage of nitrogen, phosphorous and potassium (3.64, 0.37 and 2.55%, respectively) as compared to control (2.08, 0.22 and 1.79%, respectively). The plant's response to the high concentrations of spraying with organic fertilizer Algazon and licorice root extract, which reflected positively on the increase of some of the chemical traits of Myrtus.

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