

## THE ROLE OF HUMIC ACID AND MAGNESIUM IN THE GROWTH AND CHEMICAL QUALITIES OF THE ROSEMARY PLANT, *ROSMARINUS OFFICINALIS* L.

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**ABSTRACT :** The experiment was carried out in the wooden canopy of the Agricultural Research Station, Faculty of Agriculture, University of Basra during the season 2019/2020 with the aim of studying the impact of humic acid and magnesium on the growth and the chemical qualities of rosemary plant. The experiment was carried out with the design of split panels (Split - Plot Design) with two factors, the first factor humic acid with three concentrations (0, 3.5, 7) ml L<sup>-1</sup> and the second factor magnesium with three concentrations (0, 1.5, 3) g L<sup>-1</sup>. The results showed that spraying the rosemary plant with humic acid a concentration of 7 ml L<sup>-1</sup> gave the highest significant increase in all the qualities of vegetative growth represented by plant height, stem diameter and the percentage of dry matter (47.82 cm, 8.77 mm, 73.61%), respectively. The leaf content of total chlorophyll and carotene increased (9.23, 37.84) mg. 100 g soft weight<sup>-1</sup> respectively. Magnesium spraying gave a concentration of 3 g L<sup>-1</sup> higher significant increase in plant height, stem diameter and percentage of phenols in the leaves (47.83 cm, 8.67 mm, 0.287%), respectively. The overlap of spraying with humic acid at a concentration of 7 ml L<sup>-1</sup> with magnesium concentration of 3 g L<sup>-1</sup> gave a significant increase in all vegetative growth qualities represented by plant height, stem diameter and percentage of dry matter (48.18 cm, 9.06 mm, 74.68%), respectively and the percentage of phenols in the leaves increased (0.294 %). While the overlap between humic acid spraying a concentration of 7 ml L<sup>-1</sup> with magnesium spraying in all its concentrations gave a significant increase in the leaf content of total chlorophyll and carotene.

**Key words :** Humic acid, magnesium, *Rosmarinus officinalis* L.

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### INTRODUCTION

Rosemary plant *Rosmarinus officinalis* L is a herbaceous plant belonging to the oral family Labiatae. Rosemary has been used since ancient times to improve and strengthen memory and is used in the treatment of epilepsy, dizziness and anti-inflammatory cases. It contains flavonoids (epignin, diosmin) as well as tannic acid and rosmarine, and has an alarming effect because it contains rosemerein as well as volatile oil at 1-2% of its components are purenol, camphene, camphor and seniol (Chevalier, 2003). The cultivation of medicinal and aromatic plants in general, and rosemary plant in particular is one of the alternative economic crops that have recently spread because of the suitability of the natural and environmental conditions for their cultivation, in addition to the good economic return resulting from them. Therefore, attention must be paid to encouraging and developing the cultivation of this plant for its strategic

role in future agricultural development. Because of includes tannins, vitamin B1, B2, B3, B6, B9, vitamin C and minerals such as calcium, iron, potassium and zinc. It is on antioxidants and contains volatile oil, which includes boronol, camphene, camphor, seniol and linalol. It also contains flavonoids and rosmarinyic acid. It is used as a seasoning, appetizing and a taste enhancer and in sweets, salads, meat and their products, as well as fish and vegetables, soup work and preserve canned meat and fish products. Pure oil is used in the manufacture of cosmetics, perfumes and shampoos to strengthen hair and freshness of the skin of the face and hands in women and in the manufacture of soap and other detergents for his distinctive smell. Modern agriculture tends to move away from all pollutants by resorting to the use of natural materials such as organic and biological fertilizers instead of chemical fertilizers (EL-Akabawy, 2000). One of these organic fertilizers used is humic acid, which is one of the

absorption by the plant and its effect on increasing plant growth, dry and soft weight (Hendawy, 2008). In addition, the improvement in physical, chemical and biological properties as a result of adding organic nutrients and improving root growth (Arancon *et al.*, 2006 and Khaled and Fawy, 2011) leads to creating more ideal conditions in the root zone and increasing the chance of absorbing ready-made nutrients with their abundance, which is reflected in an increase vegetative growth characteristics represented by plant height, stem diameter and plant dry matter. Also, when spraying with magnesium, this element necessary for the activity of the main enzymes leads to the stabilization of the carbon dioxide molecule (CO<sub>2</sub>) in the Calvin cycle in the dark reactions in the photosynthesis process, Thus it stimulates and increases this process and increases the production of nutrients manufactured to build vegetative growth of the plant, as well as its role in the manufacture of chlorophyll molecule and the synthesis of ribosomes to manufacture proteins and activate enzymes, thus reflect on increased vegetative growth (Al-Sahhaf, 1989a). The significant increase in chemical qualities as a result of the use of humic and magnesium may be due to the fact that humic acid increases the content of Indole Acetic Acid (IAA), which has an important role in growth, which is reflected positively to increase of phenols and chlorophyll pigment (El-Bassiouny *et al.*, 2014). Also, the element magnesium enters into the composition of the chlorophyll molecule and constitutes 2.7 % of the molecular weight of the chlorophyll molecule and occupies the center in this molecule and the magnesium atom is fixed in this molecule, so its spraying will lead to an increase in the manufacture of chlorophyll a, which is the main pigment in the photosynthesis process, as well as carotene, which is the protector of Photosynthesis pigments from photooxidation (Al-Sahhaf, 1989b).

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