Plant Archives Vol. 20, No. 1, 2020 pp. 249-252 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

SOME RESPONSES OF *RICINUS COMMUNIS L.* TO SOIL SALINITY IN BABYLON PROVINCE, IRAQ

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Abstract

Ricinus communis L. is one of the species that grow almost anywhere in Iraq, two sites choose to differ in their soil salinity to collect plant, then to study some effects of salinity on this species. The results showed that the content of MAD don't affect by salinity, but SOD was decreased as a physiological response.

Main anatomical responses included the increased thickness of both epidermises, xylem elements and decreased phloem thickness in the stem.

Key words : *Ricinus communis* L., Soil salinity, anatomical and physiological study.

Introduction

Ricinus communis L. or Castro bean is one member of Euphorbiaceae family and its commonly known as Castro oil plant, the main features of this species are wooden small tree and it can present in a wide variation of epithets like leaf and stem colors, presence of wax covering the stem and the size of leaf lobes (Allan *et al.*, 2008; Ramanjaneyulu *et al.*, 2017). It thought that its first origin came from Ethiopia and India then distributed in 30 countries, as a cultivated plant, which is with tropical or semitropical environments (Wjecs, 2006), but it can grow usually anywhere (Omonu and Omale, 2017), but very effected by environmental conditions and its genotype (Koutroubas *et al.*, 1999) especially its oil characters and content.

In Iraq, it distributed in the middle and north parts as well as some area of western region (Hutchinson, 1959). This species has important economic value due to the uses of all its parts, thus it called a tree of gold and precious stones (Ramanjaneyulu *et al.*, 2013). All plant's parts can be used in the production of drugs. The extraction of the stem used as anticancer and antidiabetic (Dhar *et al.*, 1968), while the leaf and root extractions used as drugs to some dermal diseases, liver disorders, hypoglycemic and laxative (Nair and Chanda, 2004).

It became known that soil salinity caused adverse effects on plant in many ways like the anatomy and the physiology of species (Werker *et al.*, 1983), thus this study done to determine the changes in the leaf anatomy and the concentrations of both MDA and SOD in *R. communis* L. that induced by soil salinity.

Experimental part

The samples of *R. communis* L. were collected from Babylon province from two sites differs in their soil salinity. The plants were cultivated two years ago.

Both PH and EC determined by multimeter type HANA according to USA standard methods (USSLS, 1954).

To prepare samples of the epidermis, the fresh samples put in ethanol 70 %, then scrapped by the anatomical blade to get the upper and lower epidermis, while cross-sections prepared by hander catting (Johanson, 1940). The concentrations of MDA and SOD determined according to standard methods (Kadhim, 2017).

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Results and Discussion

The analysis of soil samples explained as showed in (Table 1). the alkalinity of both sites which is an epithet of soil in mid of Iraq. According to EC values the site 1 was slight salinity (EC= 3.1 ms), but site two non-salines according to the classification of US lab (USSLS, 1954).

Table 1: Characters of studied soils.

Site No.	Soil type	pH	EC (ms)
1	Saline	8.9	3.01
2	Non Saline	8.5	0.613

Plants used many enzymes us a physiological adaptation to avoid or tolerant salinity. The concentration of MDA and SOD are showed in Fig. (1 and 2) respectively.

Fig. 1 and 2 showed that *R. communis* used MAD to solve salinity problems, and it used a lot of SOD where salinity increased to produced substances that decreased the effect of salinity due to its ability to catch increased amount ROS (Jalali- Emam *et al.*, 2011).

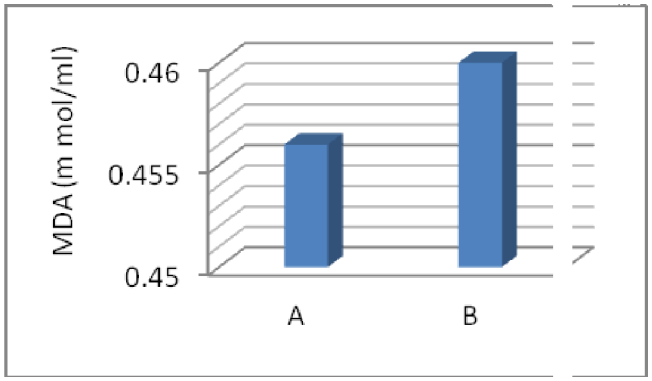


Fig. 1: Differances in MDA content, A:plant in saline soil, B:plants in non saline soil.

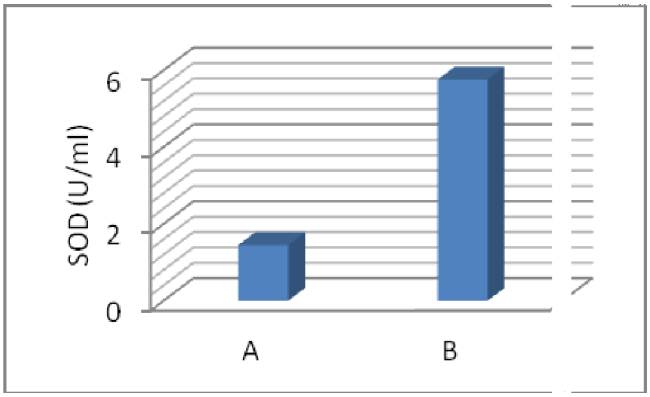
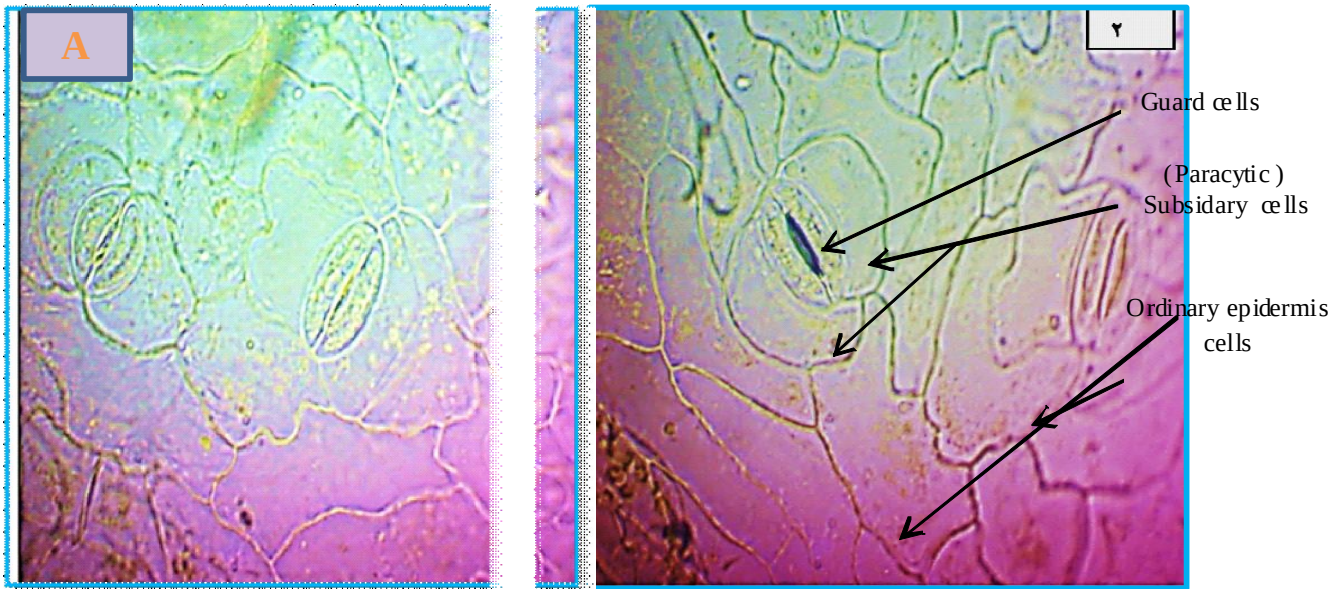


Fig. 2: Differances in SOD contents, A: plant in saline soil, B:plants in non salime soil.

R. communis L. is one of the species that grow almost anywhere, and its ability to be good adapted to adverse environmental conditions (Gonzalez-Chavez *et al.*, 2014), and salinity is one of these adverse conditions, that saline soils are about 40-50 % of the terrestrial surface of the earth . So its main effect is one cultivated surface worldwide (Rengasamy, 2006)

The anatomical results of lower epidermis and stem as showed in plates (1 and 2) explained that epidermis is glabrous and stomata are the paracytic pattern as it described in many other studies (e.g. AL-Hadeethi *et al.*, 2016). Salinity didn't affect on density of stomata, but caused slight decrease in guard cells size which may due to low soil salinity, because usually increased salinity lead to change size of epidermal cells (Hameed *et al.*, 2012) or increased density of stomata, cell size and vacuolar volume (Flowers and Colmer., 2008).

Salinity induced many changes in the stem layers of *R. communis* L., main these changes included the



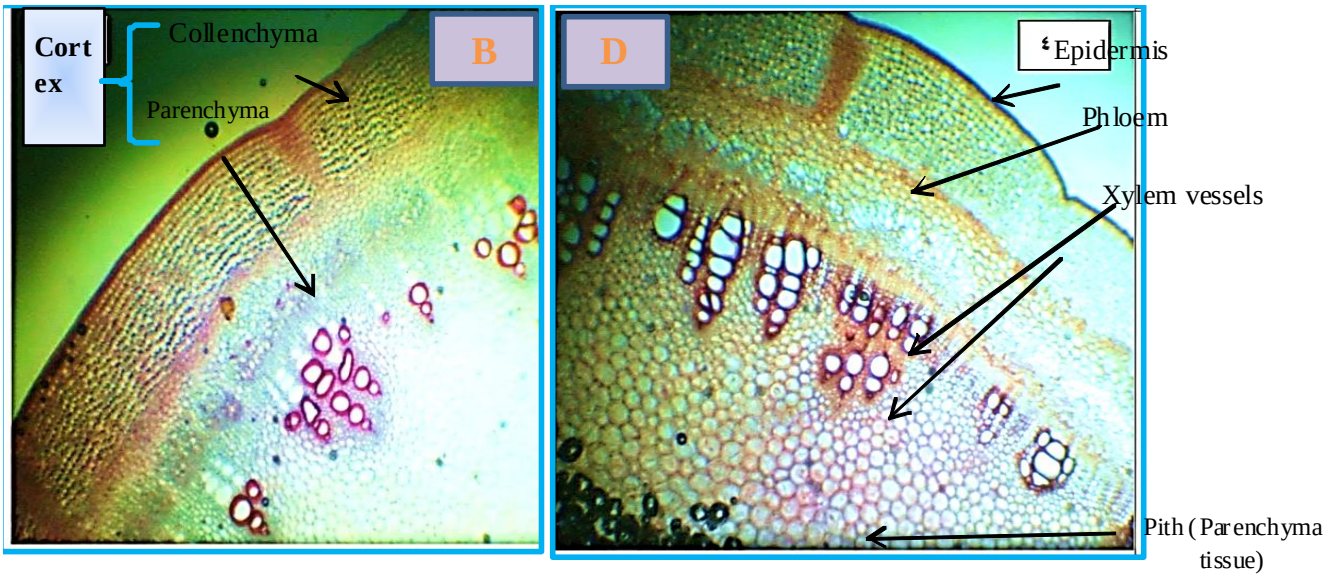
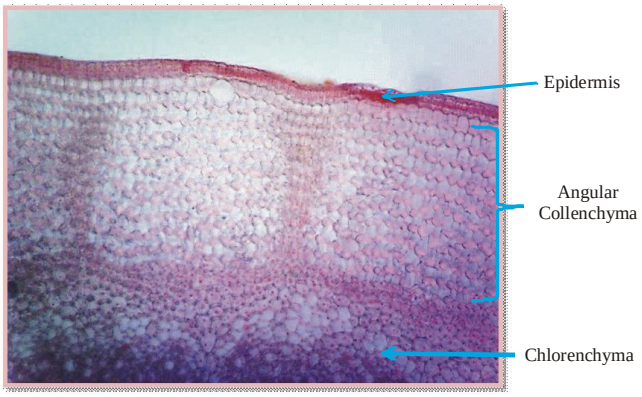
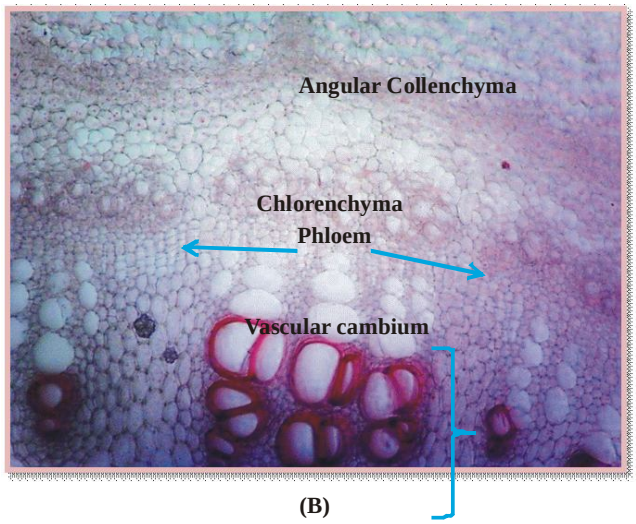


Plate 1: The Variations in the characteristics of the lower leaf epidermis , and cross sections of stem *of Ricinus communis*. A,B (Non saline soil) – C,D (saline soil).



(A)



(B)

Plate 2: A + B : illustrate the arrangement the tissues in a cross section of the *Ricinus communis* L. stem under Light Microscope 10X .

increased thickness of both epidermis cells and the xylem elements and decrease the thickness of both phloem layer and the number of xylem elements.

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