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Anatomical-physiological study for *Eichornia crassipes* and evolution of activity its Alcoholic extract leaves in inhibition growth of the *E. coli*

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Abstract

The current study aims to identify the Hyancith water plant*(Eichhornia crassipes*) by increasing its biomass from 500 g at the time of sampling to 608 g on the fifth day. The water loss rate of this sample in the form of water vapor in the process of transpiration reached 2.3 liters at the highest weight of the sample The maximum temperature was 32 ° C, either anatomically by the study of the pattern of stomata, which was a parallel type and distributed on the surface of the leaf, as it was prepared in the upper epidermis 4000 stomata / cm^2 and the lower epidermis 3200 stomata / cm^2. On the other hand, the use of the plant as a bacterial antagonist by extracting its leaves with ethanol alcohol and preparation of proportions of the extract and w / v (25%, 50%, 75% and 100%), respectively, were saturated with plant extracts and placed on Petri dishes containing E. coli The inhibition zone at 75%, reaching16mm and decreased at 100% of the plant extract to become14mm.

Keywords: *Eichhornia crassipes*, *E. coli*, stomata, plant extracts.

INTRODUCTION

Eichhornia crassipes, commonly known as the water hyacinth of the Pontederiaceae family, monocotyledon plant and floating plant grasses [1].The first record invasion of the plant in the Amazon basin in Brazil in 1883 and spread the plant in many regions of the world, including Iraq, and among the factors that helped spread. The plant reproductive by vegetative flora and where one plant can form 5 plants a day. It has a production of up to 5000 seeds / plants, which can keep its vitality for 15 years. It can be transmitted with migratory birds. However, humans have effectively contributed to its flowering. The beautiful and beautiful landscape and the possibility of planting ponds and the ease of the requirements of reproduction, as well as being a floating plant with gliders, which enables it to move with water to several places [2]. The rapid spread of the plant and its coverage of vast areas of water have the effect of being classified as one of the 10 most dangerous plants in the world, resulting in environmental and economic damage. The first was the biological change of the aquatic environment from the lack of dissolved oxygen, the blocking of the sun and the heated competition for mineral nutrients such as calcium, magnesium, potassium, phosphorus and others in the environment With all aquatic organisms adversely affecting aquatic life and the food chain[3]. In terms of economics, the nature of the plant absorption of large amounts of water and lost by evaporation process of transpiration to the atmosphere with the density of the cover on the surface of the water, led to a significant reduction in water level of the rivers at a time of the world of water scarcity, As well as floods caused by heavy rains, especially in the tropics [4].The water is not only thirsty; it is also a means of processing the plant with the necessary nutrients. The absorption of water and its loss to the atmosphere in the form of water vapor leads to the accumulation of mineral elements within the cells and tissues of the plant, to take advantage of them in the physiological processes that occur in the plant to ensure its growth and vitality, all of which occurs by transpiration [5]. The process of waste of high water, which occurs in the plant, requires a device rich well, allowing the plant to lose those quantities by dispersion abroad, which in turn plays a key role in the physiological process, which is transpiration.

Despite the disadvantages of the Nile flower plant, the search for benefits has been eaten because girls contain many chemical compounds of medical and economic importance [6].

MATERIALS AND METHODS

Collection of study samples:

Water hyacinth (*Eichhornia cressipes*) samples were collected from the Rumaitha River / Al-Muthanna Governorate on 15/3/2016, and samples were taken from the plant samples weighing 500 g. With a capacity of 10 liters of water, at a rate of 3 replicates and conditions that mimic natural plant conditions. The daily follow-up of taking the weight of the sample and calculating the change in it and the percentage of water lost by the loss of water daily by weight and measuring the maximum temperatures as shown in Figure (1).

Figure 1: Showing plant specimen collection

Samples were taken from the leaves of the plant and washed well with water. The upper epidermis and the lower epidermis were removed and placed on glass slides to create samples of the temporary slides, in order to identify the patterns of stomata in the leaf and distribute them on both sides of the leaf [7]. On the other hand, samples of the leaves were washed with running water and then with distilled water and left in shade for 10 days until they were dry. They were then grinded and placed in the Reflex with 500 ml of ethanol alcohol until the extract was gelatinized, (25%, 50%, 75% & 100%) respectively [8]

Strains of *E. coli* bacteria

E.coli strains were used from the Department of Biology / Faculty of Science / University of Muthanna isolated from clinical cases and activated by planning on the MacConkey Agar medium

according to the instructions of the English company Oxiod. By dissolving 52 g of maconucleic acid in 1000 ml of distilled water and then heat the mixture until boil for 1 minute.

Antagonism test

The efficacy of the antagonism leaf extract was tested according to the method described by [9] for the Well Diffusion Method. The bacteria (1.5 x 108 mm / ml) were published in the center of Muller Hinton (Oxiod, England) in accordance with the instructions of the processed company, Of 6.5 g of Beef extract, 1.5 g of Starch and 17.5 g of Casein hydrolysate and 15 agar of whole size to 1 liter of distilled water in a volumetric flask), the middle hole with a sterile 6 mm diameters (100 µl) Serve at 37 ° C for 24 hours with control and measurement of the inhibition chambers.

Results And Discussion

1. Physiological study in the plant (Transpiration)

The results in the table 1 showed that the sample of the *Eichornia cressipes* plant with a weight of 500 g increased its mass to reach its highest weight on the fifth day of agriculture to 608 g, ie, a daily increase of 21.6 g. If for one month 30 x 21.6 = 648 With original weight 500 + 648 = 1148 × 5 = 5740 g This mass has a large capacity to cover a wide water area. Consistent with the study [10]. While the amount of water lost in the highest weight of the mass of 2.3 liters of water per day, the rate of lost by the plant at the full mass of 5740 g estimated at 9.44 liters per day, knowing that the temperature is 32 degrees Celsius, how the loss of water from the mass in Summer, especially when temperatures reach 50 °C in the shade, so water loss is expected to double.

Table 1: shows the average weight of the plant sample and its loss of water in liters for five consecutive days.

Days	weight	Maximum temperature range℃	Water loss rate (L)
1th	500	30	1.7
2th	527	29	1.8
3th	552	28	2
4th	579	30	2.1
5th	608	32	2.3

3.1 Anatomical study in the plant (Stomata)

The anatomical models in Figs. 2 and 3 of the upper and lower leaves of the leaf showed that the parallel type, the two auxiliary cells were parallel to the longitudinal axis of the hole. Size of guard cells 4 × 7 µm.

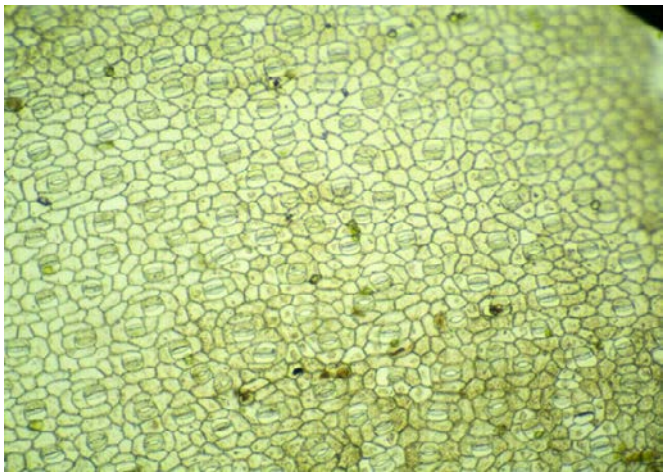

Figure 2: spread of stomata on surface of the leaf by use power of magnification 10X .

The average size of the pore 4 × 4 µm, the number of stomata on the surface of the leaf 4000 stomata / cm^2 in the upper epidermis and 3200 stomata / cm^2 of the bottom, indicating the plant enjoys a high efficiency device compatible with the loss of water to the atmosphere in the form of water vapor process transpiration [7].

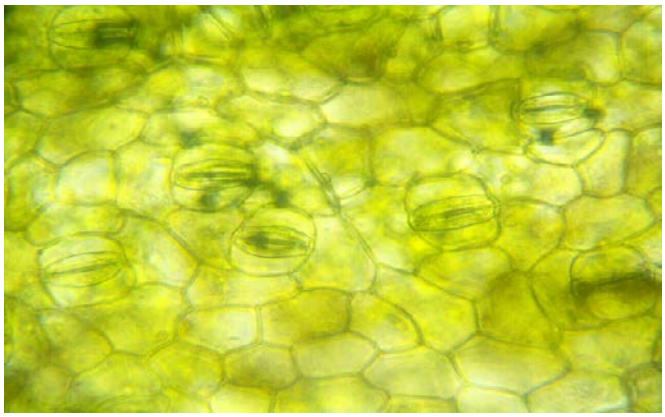

Figure 3: spread of stomata on surface of the leaf when the power of magnification 40X .

3.2 Study of extract leaves against *E.coli* bacteria.

The results in table (2) showed that the area of diameter inhibition of the growth of *E.coli* bacteria, increased by increasing the concentration of the plant extract to the maximum extent of inhibition at 75%, as 16 mml but decreased the area of killing bacteria when increasing the concentration to 100% to be 14mml. The results of the study were consistent with other studies in the use of Hyancith water extract not only as antibacterial agents, but also against tumors or as antioxidants because they contain many of them. High-life plant compounds[11].

The extracts of the Hyancith water plant have been used for the production of many plant compounds with pharmaceutical effects including alkaloids, amino acids, carbohydrates, flavonoids, clicosides, phenols, saponines, steroids, tannins, terpenes and many others [12].

Table 2: shows the percentages of the ethanol extract of *Eichhornia cressipes* in inhibiting zone of *E.coli* .

w/v concentration of extraction %	Diameter of inhibition zone. mm
25	12
50	12
75	16
100	14

The plant extract showed its inhibitory activity in the growth of various types of bacteria, especially the alcoholic extracts of its leaves, such as Staphylococcus albus and Antifungal [13]. In another study, plant extracts were used as an anti-bacterial, as well as anti-tumor and anti-viral Bioconcentration as antioxidants [14].

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