How to Cite:
Hsabah, S. auda, & Falih, B. H. (2022). The effect of spraying with zolfast on the chemical qualities of three hybrids of eggplant L. Solanum melongena growing under protected cultivation. *International Journal of Health Sciences*, *6*(S7), 3339–3346. https://doi.org/10.53730/ijhs.v6nS7.12471

The effect of spraying with zolfast on the chemical qualities of three hybrids of eggplant L. Solanum melongena growing under protected cultivation

Sabaa auda Hsabah
Iraq, Dhi Qar University, Faculty of Agriculture and marshes, Department of horticulture and garden engineering
Email: sabaa.a@utq.iq

Batool Hanoon Falih
Iraq, Dhi Qar University, Faculty of Agriculture and marshes, Department of horticulture and garden engineering
Email: Batool_z@utq.iq

***Abstract*---** The study was conducted in the plastic House during the growing season 2021_2022 at the research station belonging to the Faculty of Agriculture and marshes / Dhi Qar University / mustafiya area in order to study the effect of spraying with Zolfast on the growth and yield of three hybrids of eggplants and the overlap between them under protected cultivation (plastic house), and the varieties are (black ,Barcelona and black beauty), where they were treated with five concentrations are(0, 0.5, 1, 1.5 and 2)ml L1, and sprays five times in a row and every two weeks a spray, and its effect on the chemical qualities (the percentage of chlorophyll in the leaves, the estimation of anthocyanin pigment in the fruit peels and the estimation of alkaloids in the fruits) of the eggplant plant is studied. Use the design of complete random sectors (R.C.B.D) for a one-time split factor experiment, where the items are placed in the main pieces of the Main_Plot and the concentration of zolfast is the second factor of the Sup_Plot, where it was distributed to three repeaters for each item in one warehouse, thus the number of experimental units reached 45 units . And the adoption of statistical analysis of results using the SPSS system and the L test.S.D to test the averages at the probability level of 0.05 (Al-Rawi and Khalfallah , 2000), the results showed that the chlorophyll rating in the leaves exceeds the highest value of the Barcelona variety(17.99) and surpasses the black variety with a value of (4.67) in the anthocyanin dye rating in the peel of eggplant fruits . The recipe for estimating alkaloids in fruits reached the highest value at the Barcelona variety (0.35).

International Journal of Health Sciences ISSN 2550-6978 E-ISSN 2550-696X © 2022.
Manuscript submitted: 9 April 2022, Manuscript revised: 18 June 2022, Accepted for publication: 27 July 2022

***Keywords*---**Agriculture and marshes, Zolfast on the growth, estimating alkaloids.

Introduction

Eggplant is classified (Solanum melongena L. Eggplant is one of the vegetable crops of the nightshade family ,which is one of the economically important plant families, and this family includes more than 75 genera and 2000 plant species spread throughout the world (Choudhury, 1976). It is believed that originally native to India (Vavilov, 1928), eggplant originates from ancient wild species that originated in central India and south-eastern China, from which its cultivation spread to Africa, Spain and other regions of the world (Zeven and Zhukovsky, 1975). The crop is grown for its fruits, which are eaten after cooking, used in pickles, and kept frozen or canned for export .

Fertilizing is one of the important crop service processes and one of the most important means of agricultural production in increasing qualitative and quantitative production , as it has a crucial role in regulating the feeding conditions of the plant , especially the abundance of major nutrients, including sulfur, which the plant needs in large quantities, and studies have shown that foliar spraying of fertilizers is one of the modern agricultural techniques that ensures the access of nutrients to the crop directly and quickly in the event that they cannot reach through the roots, and thus foliar feeding is one of the most efficient fertilization methods, as it processes the nutrients of the plant when there are problems in the absorption of elements from the soil (Ling and silberbush, 2002) it is worth noting that vegetable plants are uneven in the need for nutrients and this depends on the nature of growth and genetic makeup, since eggplants are soil-stressed crops for the length of its growth ,

Materials and methods of work :

The experiment was conducted during the growing season 2022_2021 at the research station belonging to the Faculty of Agriculture and marshes / Dhi Qar University / mustafafiya area to study the effect of spraying with Zolfast on the growth and yield of three hybrids of eggplants under protected cultivation (plastic house), and its effect on chemical qualities (chlorophyll ratio in leaves, anthocyanin pigment estimation in fruit peels and alkaloids estimation in fruits) is studied in one experimental unit of eggplant plant.

Estimation of the percentage of chlorophyll in the leaves :

They were measured by a SPAD device and at a rate of ten readings per experimental unit for full-grown leaves and the rate was extracted .

Estimation of anthocyanin pigment % in fruit peel :

The anthocyanin dye in the eggplant Rind was estimated by taking 5 g of soft fruit rind and placed in 100 ml of a mixture (HCL titer 1.5 + methyl alcohol 85%) and then filtered in a standard flask and completed the volume to 500 ml with the

same mixture and read with a Spectrophotometer at a wavelength of 535 Nm as stated in Ranganna (1977) according to the following equation :

$$\text{Anthocyanins} = 100 \times \frac{\text{Dilution volume} \times \text{total volume} \times \text{device reading}}{\text{Sample size} \times \text{sample taken for reading the device is 100mg1-}} \div 98.2$$

Estimation of alkaloids|% in fruits :

I followed the method presented by the scientist (2002TreasaaGE) , to detect the presence of alkaloids in the models, where the dragendrroffs method was used, which provides for extracting the sample alcohol with succulents and taking(1 ml)of the extract and adding to it (0.5 ml) of hydraulic acid (10%) and a few drops of Dragon drops, where the appearance of the precipitate is evidence of the presence of alkaloids and the concentrations were measured along the 470 Nm).

Results and discussion :

Table (1) shows the effect of spraying with Zolfasto and the variety in estimating the content of chlorophyll leaves to the presence of significant differences of concentrations, having reached the highest concentration value ((2ml L1- (18.36) and the lowest concentration value of 0.5) ml L1 - having reached the value of (15.50) ,

The table also showed the presence of significant differences between the studied varieties, as the highest value was reached by the Barcelona variety(17.99), while the lowest value belonged to the Black Beauty variety, which reached (15.16), and the table indicated that the value of the overlap between the concentrations and the Variety had a significant effect, as the Barcelona variety gave the highest value of 19.66) in the Black Beauty has given the lowest value in the quality of estimating the Leaf content of chlorophyll of the studied plant amounted to 13.65 at a concentration of 0.

The reason for the superiority of spraying coefficients in the nutrient solution is the entry of nitrogen, which is one of the components of the nutrient solution in the synthesis of porphyrin rings that enter into the composition of the chlorophyll molecule and the element manganese, which helps to build chlorophyll through the reduction of nitrates inside the plant by acting as an enzymatic equivalent of the hydroxylamine reductase enzyme and the nitrite reductase enzyme, and thus provides the necessary amounts of the nitrogen element, the main component of the molecule chlorophyll, (Al-Sahaf, 1989) and these results agreed with (Al-Subai'i, 2021)

Table (1) the effect of spraying with Zolfastvariety in estimating the percentage of total chlorophyll % in the leaves of an eggplant plant

1- l\ml Concentration of Zolfast						species
Average of species	2	1.5	1	0.5	0	
16.83	18.13	17.62	16.80	15.95	15.66	black
17.99	19.66	18.41	17.09	16.83	17.95	barcelona
15.16	17.31	16.05	15.38	13.72	13.35	Black beauty
	18.36	17.36	16.42	15.50	15.65	Average of zolfast
Inteference		of Zolfast		Of species		L.S.D. % 0.05
0.45		0.37		0.21		

Estimation of anthocyanin pigment in the rind of fruits mg 100 G1-soft weight:

Table (2) the effect of spraying with Zolfasto and the variety in estimating the anthocyanin pigment in the peel of fruits mg 100 g 1 - soft weight indicates the presence of significant differences in concentrations, as the highest concentration value reached 2 ml L 1 - 4.24 G 1 - and the lowest concentration value of 0.5 ml L 1 - as the value reached 3.58 G 1 - the table also showed the presence of significant differences between the studied varieties, as the highest value 4.67 G1 - while the lowest value of the Black Beauty variety is 3.32 G1 -, and the table indicated that the value of the overlap between the concentrations and the Variety has a moral effect, as the black variety gave the highest value of 4.19 G1 - in the estimation of the anthocyanin pigment in the peel of fruits, mg 100 G1 - soft weight of the studied plant at concentration 2, while the Black Beauty variety anthocyanins in the peel of fruits mg 100 G1 - soft weight of the studied plant amounted to 2.07 G1 - atconcentration 0.

An increase in the concentration of chlorophyll pigment in the leaves helps to concentrate it in the fruits (Salloum, 2012), in addition to the presence of chlorophyll pigment with delphinidine dye contributes to an increase in the concentration of anthocyanin pigment and the coloring of the fruit peel in black, and this is consistent with what was indicated (El-Sayed, 2009). These results were agreed with (al-Maliki ,2012) and (Al-Subaie, 2021).

Table (2) effect of spraying with Zolfastvariety in the estimation of anthocyanin pigment in the

rind of fruits (mg 100 G1 - soft weight) of an eggplant plant .

1- l\ml Concentration of Zolfast						species
Average of species	2	1.5	1	0.5	0	
4.67	4.19	3.93	3.73	3.29	8.24	black
3.92	4.46	4.29	4.11	4.01	2.72	barcelona
3.32	4.08	3.74	3.29	3.43	2.07	Black beauty
	4.24	3.99	3.71	3.58	4.34	Average of zolfast
Inteference		of Zolfast		Of species		L.S.D.$_{0.05}$
3.75		2.14		1.59		

Estimation of alkaloids in fruits mg 100 G1-soft weight:

Table (3) shows the effect of spraying with Zolfasto and the variety in the estimation of alkaloids in fruits mg 100 g 1-soft weight of an eggplant plant to the presence of significant differences in concentrations, as the highest value of the concentration reached 2 ml L1 - 0.47 G1 - and the lowest value of the concentration of 0 ML L1 - as the value reached 0.14 G1 -, the table also showed the presence of significant differences between the studied varieties, as the highest value Barcelona 0.35 G1 - while the lowest value of the Black Beauty variety is 0.24 G1 -, and the table indicated that the value of the overlap between the concentrations and the Variety has a moral effect, as the Barcelona variety gave the highest value of 0.57 in the estimation of alkaloids in fruits, mg 100 G1 - soft weight of the studied plant at concentration 2, while the Black Beauty variety gave the lowest value in the quality of alkaloids in fruits, mg 100 G1 - soft weight of the studied plant at concentration 2, while the Black Beauty variety gave the lowest value in the quality of alkaloids in fruits mg 100 G1-soft weight of the studied plant amounted to 0.12 atconcentration 0.

Studies have indicated that the percentage of accumulation of compounds depends on the genetic characteristics of the cultivated variety, and the reason for the disparity between varieties in their content of alkaloids is due to the difference

of their wild parents, from which they obtained some of their breeding qualities (Hassan, 1999).

Fertilization also has a clear moral effect on the accumulation of alkaloids, especially at the upper levels of nitrogen fertilization, as in the full mineral treatment, and the reason for this is that total alkaloids are one of the organic secondary metabolic components within the plant, and nitrogen is the main element in their construction and accumulation, (Abu Zeid, 2005),

Nitrogen also improves vegetative growth when it gets represented to organic nitrogen compounds in chloroplasts, which are the center of carbohydrate synthesis in the plant.

Potassium also has the effect of activating the enzyme Nitrate Reductase, which leads to the reduction of nitrates in leaves and their conversion to ammonia, which in turn binds to ketonic acid to form protein amino acids, which form proteins (Al-Fadli, 2006),

Table No. 3 effect of spraying with Zolfastvariety on the estimation of alkaloids in fruits (mg 100 G1 - soft weight) of an eggplant plant .

1- l\ml Concentration of Zolfast						species
Average of species	2	1.5	1	0.5	0	
0.29	0.46	0.39	0.28	0.21	0.13	black
0.35	0.57	0.46	0.33	0.24	0.18	barcelona
0.24	0.38	0.30	0.22	0.18	0.12	Black beauty
	0.47	0.38	0.28	0.21	0.14	Average of zolfast
Inteference		of Zolfast		Of species		L.S.D.$_{0.05}$
0.04		0.05		0.08		

References

- Abu Zaid, Nasr Al-Shahat. 2005. Physiology and chemistry of alkaloids, pharmaceutical and Pharmaceutical Research Division, National Research Center, scientific books publishing and distribution house, Cairo, Egypt.
- Abu Dahi, Youssef Mohammed and Moayed Ahmed Younis .1988. Plant nutrition guide. Ministry of higher education and scientific research . University of Baghdad . Iraq .
- Tahafi, Sami Ali Abdul Majeed, Iman Lazim and Yahya Hadi Nasser .2004 . The effect of the number of sprinkles with different levels of zinc on the yield of eggplants grown under greenhouse conditions . Technical magazine . 17 (3) : . Pp. 169-158 Iraq.

- Eltahafi, Sami Ali Abdel Majid .2005 . The effect of adding nitrogen and spraying with boron on the growth and yield of eggplant Solanum melongena L. Cultivated under greenhouse conditions, Iraqi Journal of Agricultural Sciences . 36 (5) : .50 – 43
- Narrator, khashaa Mahmoud and Abdul Aziz Mohammed khalafullah .2000. Design and analysis of agricultural experiments, Ministry of higher education and scientific research . University of Mosul . Iraq .
- * Al-Rabi'i Musamam Abd AMI, Mohammed Amin, Sami Karim waldulaimi, Haider Aris Abd al-Raouf (2012). The effect of magnetically treated irrigation water and spraying with salicylic acid on the vegetative and ornamental growth qualities of the ester plant (.Callistephus chinensis L) . Al-Kufa magazine for the general agricultural. (220–210)1(4)
- Sir, Mr. Fathi .2009. The technology of production of greens of warm seasons in desert lands. The Egyptian library . Egypt.555 P.
- Al-Subaie, Omar Amer Ibrahim .2021. The effect of magnetization of well water, treatment with silicon and sulfur on the growth and yield of cauliflower .Brassica oleracea var. botrytis L under conditions of saline stress . Master thesis-quantity of Agriculture - University of Basra / Iraq .
- Al-Sahaf, Fadel Hussein and Iman Faisal Al-Shukri .1998 . The effect of spraying with a growth regulator (fluoraton) and a nutrient solution (Two Rivers) in the yield of eggplant Solanum melongena L. Under the conditions of heated greenhouses, Iraqi Journal of Agricultural Sciences . 29 (2) :181-189.
- Al-Malki, Haider Majid Yadi (2012) the effect of spraying with the biostimulants terasorb and kimbak and the number of sprays on the growth and yield of eggplant plants growing in plastic houses. Master thesis-quantity of Agriculture - University of Basra / Iraq .
- Al-Fadhli, Jawad Taha Mahmoud. 2006. The effect of adding NPK to the soil and spraying on the growth, yield and components of potatoes. Master's thesis, Faculty of Agriculture, University of Baghdad.
- Wanted, Adnan Nasser, Izzedine Sultan and Kareem Saleh Abdul .1989 . Vegetable production (part I), revised second edition. House of books for printing and publishing . University of Mosul . Iraq .
- Boras, mitadi, Bassam Abu Turabi and Ibrahim Albasit .2011 . The production of vegetable crops is the theoretical part. Publications of Damascus University-Faculty of Agriculture. 466 P.
- Hassan, Mohammed Karim .2010 . The effect of foliar nutrient spraying and the cultivation method on some natural and chemical qualities of eggplants of the variety (Barcelona) grown in greenhouses, Journal of Muthanna University . 6 (12): 87-112. Iraq.
- Rady, Nasser Jubeir .2010 . The influence of seed generation and the type of compost solution type on the growth and yield of hybrid eggplant (Barcelona). Master's thesis - Technical College / almusaib-Technical Education Authority . Iraq.
- Salloum, Yasmin Fadel .2012 . The influence of organic matter on the growth, yield and quality of eggplant fruits(Solanum melongena L.). Master's thesis . Department of horticulture and garden engineering . Faculty of Agriculture . University of Baghdad.
- Yusuf, Zainab Rahman Jassim (2011) . The effect of the variety and the spraying of the nutrient solution (KING LIFE). In the growth and yield of the

eggplant plant . Master's thesis . Faculty of Agriculture .University of Basra . Iraq .

- Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). Health and treatment of diabetes mellitus. International Journal of Health Sciences, 5(1), i-v. https://doi.org/10.53730/ijhs.v5n1.2864
- Choudhary, B.,.1976.Vegetables 4th editionNational Book Trust, New Delhi pp.50-58.
- Dauny, M. C. ; R. N. Iester ; J. W. Hernart and C. Durant .2000 . Egg plant: Present and Future. Capsicum and Egg plant . New letter . 19:11-18 ,New York.
- Ling, F. and M. Silberbush .2002 . Response of maize to foliar v s. soil application of nitrogen , phosphorus and potassium fertilizer. J. Plant Nut. 25:2333-2342.
- Vavilov, M. I., .1928 . Geographical centers of our cultivated plants Proc. 5th edition International Congress of Genetics,New York , pp. 342-690 .
- Patel, P.C. ; Patel M.S. and Kalyana N.K. (1997) . Effect of folair spray of iron and sulfur on fruit yield of chlorotic acid lime . J. Indian Soc. Soil Sci. 45 (3) : 529 – 533 .
- Ranganna ,S. 1977. Manual of Analysis of Fruit and Vegetable Product. TATA MC Graw Hill pub. Co. ltd. Newdelhi . p:634.
- Zeven, A. C. and P. M. Zhukovsky . 1975 . Dictionary of Cultivated Plants and their Centres of Diversity, Wageningen, Netherlands, p.219 .