Plant Archives Vol. 20, Supplement 1, 2020 pp. 3594-3598 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

STUDY OF THE EFFECT OF SELENIUM AND SiO_2 ADDITION ON SOME GROWTH PARAMETERS OF ROCKET (*ERUCA SATIVA* MILL.) UNDER WATER STRESS

Ahmed J. Hussain and Duraid K.A. Al-Taey
Department of Horticulture and Landscape, Agriculture Faculty, Al-Qasim Green University, Iraq

Abstract

A field experiment was carried out with the aim of knowing the effect of water stress at two levels of depletion of 50% and depletion of 70% of field capacity as a main factor and two varieties of watercress (Egyptian and Syrian) were tested as a secondary factor. Selenium fertilizer and SiO_2 were used as a secondary sub-factor to study the growth and yield characteristics, as well as assess the level of watercress tolerance. For water stress and lack of water stress experiments on watercress in central and southern Iraq, The experiment was designed within the design of the complete random block sectors (RCBD), according to the inhaler system, the inhaler Spilt-Spilt Plot. The results of the study showed that the water stress with a drain rate of 70% exceeded most of the characteristics of the vegetative and high growth. The results showed significant differences between the two types (Egyptian and Syrian) In some of the mentioned characteristics, the Egyptian cultivar achieved the highest rates in most of the characteristics of total vegetative growth, and the fertilizer combinations achieved significant differences, as the treatment exceeded selenium 20 mg. L^{-1} + SiO_2 200 mm. Kg^{-1} and achieved significant differences in most characteristics of vegetative growth, especially under water stress.

***Keywords*:** Rocket, Selenium, SiO_2, Water stress, Oxidative stress

Introduction

Eruca sativa Mill, whose name is English Rocket. Watercress belongs to the Crusader family Brassicaceae and is found in the Mediterranean countries, Egypt, Levant, Saudi Arabia, India, China and Iran. Watercress leaves are rich in calcium, iodine, iron, phosphorus, fiber and vegetable oils in addition to the presence of glycosides, alkaloids and coumarin (Al-Taey and AL-Musawi,2019) The defective sulfur materials and Thioglycoside, which is one of the most important sulfur compounds responsible for the karmic taste in the plants of this family, where this substance decomposes when the cells are torn by the action of the enzyme Isothiocyanatease, which consists of mustard oil and Thiocyanate, as the presence of these compounds gives the distinct flavor and karma taste in their plants, but Its high concentration is toxic to humans because it leads to iodine deficiency in the body and thus an enlarged thyroid gland, as it has a role in insect resistance as well (Boras *et al.*, 2011)

Iraq suffers from the scarcity of irrigation water due to the low levels of the Tigris and Euphrates rivers, which led to a crisis in the availability of watering or irrigation of agricultural fields. Watery (drought) is one of the most important non-biological environmental factors that affect plant growth in arid and semi-arid regions (AL-Taey *et al.*, 2010; AL-Taey *et al.*, 2019).

Selenium is a rare ingredient that has been used in the last two decades. Although it is not considered one of the necessary elements for plant growth, studies have shown that it has positive effects on plant growth and development, as well as plant productivity and low concentrations (Turakaniean *et al.*, 2004; Hasanuzzman *et al.*, 2010; Hasanuzzman *et al.*, 2012). This element was discovered by the Swedish scientist Joins Jacob Berzelins in 1817 AD. Volcanic activity is the main source of the element and therefore most regions of the world lack this rare element (Barker and Pilbeam, 2007; Kasar *et al.*, 2011), It has an effective role in raising the activity of enzymatic antioxidants as it is a cofactor, especially glutathione peroxidase, which transforms the hydrogen peroxide compound H_2O_2, which results from the effect of water stress into H_2O water molecules (Al-Saadi and Al-Mintafji, 2016).

Silica, also called silicon dioxide, is a white or colorless chemical compound, consisting of two of the most abundant elements in the earth and in its crust, as it consists of silicones and oxygen, and the silica ratio is 59% of the earth's crust ratio. Several studies have proven that silicon fertilizers Very effective against abiotic stresses (heat, dehydration, acidity and salinity) and biological stresses (bacteria, fungi, viruses and insects) (Laane 2018), applying silica may be an easy way to increase crop yields during drought. Moreover, since silica can improve drought tolerance by plants, its application may help reduce the need for irrigation (Ma, 2008).

Materials and Methods

Implemented a field experiment for planting watercress girls *Eruca sativa* Mill for the agricultural season 2018-2019 in the fields of the University of AL-Qasim Green, Agriculture faculty, Department of Horticulture and Landscape on 10/15/2018, the soil was prepared for agriculture where a mixture of soil made of Soil, sand, and organic matter, at an average rate of 60% soil, 30% sand, and 10% organic matter, where organic fertilizers were used from corn kernels and then were placed in anvils with dimensions 55 * 25 * 20 cm During the preparation of the soil for planting, Sio_2 was placed in the soil and the added amount was 100 mg. Kg^{-1} and 200 mg. Kg^{-1} The seed ratio was calculated based on the area of one hectare and was 0.16 g. $Anvil^{-1}$ The seeds were mixed with a quantity of sand and cultivated In the anvil by prose method, a quantity of 10 kg of prepared soil was placed for each anvil, two cultivars of watercress were cultivated, namely the Egyptian variety and the Syrian variety in the anvils, Then the service operations were performed from irrigation, thinning and hoeing when needed, and after 20 days of planting the plant was exposed to water stress, the experiment was carried out as a three-factor experiment within the split-split plot design with 24 treatments repeated three times, the main factor plot includes two types Of stress, they are 50% drain and 70% field capacity drain. The second factor, Sub Plot, included testing two varieties of watercress The Egyptian cultivar and the Syrian cultivar, while the third factor included Sub Plot Sub (without addition, adding selenium fertilizer 20 mg. Liters^{-1}, adding SiO_2 to the soil 100 mm. Kg^{-1}, adding SiO_2 to the soil 200 mm. Kg^{-1}, and selenium 20 mg. L^{-1} + $SiO_2$100 mm.$^{-1}$ kg and selenium 20 mg. L^{-1} + $SiO_2$200 mm.$^{-1}$ kg. 50% is 10.7 kg and its weight in depletion is 70% is 10.2 kg, and the averages for all traits were compared according to the least significant difference test (LSD) and the probability level 0.05 (narrator and behind God, 2000) within 3 sectors where J each sector on 24 and experimental argument where he became the number of units 72 experimental units experimental 72 = 2 * 2 * 6 * 3.

The symbols were defined according to what is listed below:

The local (Egyptian) variety is to be symbolized (A1)

Water stress will be symbolized by C1 and C2

A- Selenium fertilizer: 20 mg is being used. L-1 sodium selenite and symbolized by T2.

B-SiO_2: 100mm is used. Kg^{-1} is denoted by T3.

C- SiO_2: 200mm is used. Kg^{-1} is denoted by T4.

D- Interference between combinations: Selenium 20 mg. L^{-1} + $SiO_2$100 mm. Kg^{-1} and denoted by T5.

C- Interference between combinations: Selenium 20 mg. L^{-1} + SiO_2 200 mm. Kg^{-1} and denoted by T6.

Comparative treatment: denoted by T1.

Laboratory analyzes of the soil were carried out in the laboratories of the Agricultural Directorate of the Holy City of Karbala by taking ten random samples from the soil of Al-Nasadin and they were published in the open air for a week, then they were ground and sifted with a sieve with 2 mm holes and then mixed well and a sample was taken from them for the purpose of analysis.

Table 1 : Shows the chemical and physical properties of the soil of the experiment field:

Value	Unit	Traits
1.77	ds.m^{-1}	Ec
7.55	—	pH
0.71	%	O.M
24	Mg. Kg^{-1}	N
2.55		P
125.66		K
7.9		S
350	G.kg^{-1} soil	Sand
218		Silt
450		Clay
Loan	—	Tissue class

Results and Discussion

Height of plant (cm)

From Table (2), we note that the Egyptian cultivar A1 was significantly superior (70.39 cm), while the Syrian cultivar A2 scored (70.33 cm). The water stress rate of depletion of 70% C2 achieved the highest rate of plant height by (71.34 cm) while it was (69.37 cm) when it depleted 50% C1. The combinations recorded significant differences, as the highest selenium level was 20 mg. L^{-1} + SiO_2 200 mm. Kg^{-1} with (77.32 cm) was the lowest rate when comparing with (61.11 cm).

The triple interference achieved significant differences, as the highest rate when treating A2C2T6 was (78.54 cm) while the lowest rate when treating the A1C1T1 interference was (54.95 cm).

Total number of Leaves (Leaf. Plant^{-1})

From Table (2), we notice that there are no significant differences in the number of leaves between the Egyptian variety A1 and the Syrian variety A2. The water stress attained a percentage of depletion of 05% C1, with the highest number of leaves at (18.654/plants), while it was (18.238/plants) when depletion of 70% C2. The combinations recorded significant differences, as the highest selenium level was 20 mg. L^{-1} + SiO_2 200 mm. Kg^{-1} with (21.573 / plants) and it was the lowest rate when treating the comparison with (15.243 / plants).

And the triple interference achieved significant differences, as the highest rate when treating A2C1T6 was (22.391/ plants), while the lowest rate when treating A2C1T1 interference was (14.647 / plants).

Wet weight for the first moment (g.)

From Table (2), we note that the Egyptian cultivar A1 significantly (89.48 g), while the Syrian cultivar A2 (63.06 g). The water stress rate of depletion of 50% C1 achieved the highest rate of wet weight percentage for the first moment at (80.03 g), while it was (72.48 g) when depletion of 70% C2. The combinations recorded significant differences, with the highest Sio_2 rate being 200 mm. Kg^{-1} with (79.75 g), but did not differ significantly from treatments of selenium 20 mg. L^{-1} and SiO_2 100 mm. Kg^{-1} and selenium 20 mg. L^{-1} + SiO_2 100 mm. Kg^{-1} and selenium 20 mg. L^{-1} + SiO_2 200 mm. Kg^{-1} with (75.33), (77.17), (75.96) and (78.38), respectively, and the lowest rate was when the comparison treatment was (70.93 g).

The triple interference achieved significant differences, as it was the highest rate at the A1C1T3 treatment and reached (114.17 g), while the lowest rate when treating the A2C2T3 interference was (40.21 g).

Of dry matter for the first moment (%)

From Table (2), we note that the Syrian cultivar A2 significantly outperformed (15.07%), while the Egyptian cultivar A2 scored (13.47%). No significant difference was achieved between water stress by 50% C1 depletion and water stress by 70% C2 depletion of field capacity. The combinations recorded significant differences, with the highest Sio_2 rate being 200 mm.$^{-1}$ kg (15.45%) was the lowest when treating selenium 20 mg. L^{-1} + SiO_2 200 mm. Kg^{-1} with (13.89%).

And the triple interference achieved significant differences, as the highest rate when treatment A2C2T4 was (17.85%), which did not differ significantly from transactions A2C2T2 with (17.78%) and A2C2T1 with (17.12%), while the lowest rate when treating the A1C1T1 interference was (12.18%).

The leaf content of chlorophyll

From Table (2), we note that the Egyptian cultivar A1 was significantly superior to (62.92 Spad Unit), while the Syrian cultivar A2 (49.21 Spad Unit) scored. The water stress attainment rate of 70% C2 attained the highest rate of total chlorophyll in leaves at (57.38 Spad Unit) while (54.64 Spad Unit) was when depletion of 50% C1. The combinations recorded significant differences, with the highest SiO_2 rate being 200 mm. Kg^{-1} with (60.01 Spad Unit) and it was the lowest rate when compared to (51.66 Spad Unit).

The triple interference achieved significant differences, as it was the highest rate at treatment A1C2T4 and reached (75.53 Spad Unit) while the lowest rate when treating A2C1T1 interference was (42.63 Spad Unit).

Leaves area in cm^2

From Table (2), we note that the Egyptian cultivar A1 showed significantly superiority by (273.19 cm^2), while the Syrian cultivar A2 (244.97 cm^2) scored. The water stress attained a 50% depletion of C1, the highest rate of Leave area was (264.12 cm^2) while it was (254.03 cm^2) when depletion of 70% C2. The combinations recorded significant differences as the highest Sio_2 rate was 200 mm. Kg^{-1} with (281.71 cm^2), and it was the lowest rate when treating the comparison with (235.01 cm^2).

The triple interference achieved significant differences, as the highest rate when treating A1C2T4 was (321.81 cm^2), while the lowest rate when treating the A1C1T1 interference was (204.01 cm^2).

In the triple overlap between the factors studied from Table 3, a significant superiority of the A2C2T6 coefficients in the characteristic of plant height by (78.54 cm), treatment A2C1T6 in the adjective number of leaves by (22.39 leaves. $Plant^{-1}$) and treatment A1C1T3 in the wet weight of the first batch of (114.17 tons) were observed. Ha^{-1}) and treatment A2C2T2 in the percentage of dry matter for the first pest at (17.78%) and treatment A1C2T4 in both the leaf content of chlorophyll with (75.53) and the leafy area at (312.81 cm^2) while the treatment gave the A1C1T1 factors the lowest rate of plant height with (54.95 cm) the recipe for the percentage of dry matter for the first batch is (12.18) and the prescription for the leafy area is (204.01). It was hoped A2C1T1 lower rate for the number of leaves recipes b (14.64) recipe total chlorophyll b (42.63) and achieved treatment A2C2T3 the lowest rate for the recipe wet weight of the first B share (40.21).

Table 2 : Shows the effect of cultivars, water stress, and interference on vegetative and specific characteristics

Treatments	Plant height	Total number of papers	Wet weight for the first moment	The percentage of dry matter for the first moment	Total chlorophyll	Leaves area
A1	70.39	18.32	89.48	13.47	62.92	273.19
A2	70.33	18.56	63.06	15.07	49.21	244.97
LSD (0.05)	0.03	N.S	10.22	1.36	2.19	0.99
C1	69.37	18.65	80.03	13.52	54.64	264.12
C2	71.34	18.23	72.48	15.02	57.38	254.03
LSD (0.05)	0.02	0.26	6.71	N.S	1.41	0.59
T1	61.11	15.24	70.93	13.96	51.66	235.01
T2	65.47	17.07	75.33	14.08	52.71	258.25
T3	66.11	17.85	77.17	14.16	57.61	271.88
T4	75.12	18.22	79.75	15.45	60.01	281.71
T5	77.05	20.67	75.96	14.09	58.41	257.03
T6	77.32	21.57	78.38	13.89	55.67	250.61
LSD (0.05)	0.02	0.34	4.87	0.65	2.44	0.72

Through the results, it is noticed that the Egyptian variety is significantly superior to the characteristics of vegetative growth (leaf content of chlorophyll, foliar area, plant height and wet weight for the first variety on the Syrian variety according to the conditions of the experiment and also notes the superiority of the Syrian variety in the characteristics of (percentage of dry matter for the first seed. As for (the number of leaves/plant), the two cultivars did not differ morally, and the reason for this may be due to the difference of the varieties in their genotype and genetic expression and their ability to withstand environmental conditions, especially conditions dehydration, since each variety has a different response when exposed to water stress, it is noted that water stress led to an increase in the leaf content of total chlorophyll and also increased the height of the plant, while the effect of water stress on the area of leaves and the number of leaves in the plant where it was the highest possible when water stress The least, and the reason for this may be due to the reduction of the water content of plant cells by reducing the water potential in the soil solution to the extent that simulates the thirst of plants when the soil dries up, as the elongation of cells does not occur until after the pressure from inside to outside the cell, which is known as inflationary pressure, and that the lack of this pressure due to lack of water led to slowed cell elongation, division and size reduction, which negatively affected some vegetative traits, including the number of leaves and the leafy area (Hamzawy, 2016; Burhan and AL-Taey, 2018). Also, cells subjected to high water stress need to spend a lot of energy to resist water stress and this drainage energy creates an imbalance in the water balance inside the cells, which negatively affects all structural processes within plant tissues that are closely related to the melting of nutrients and their availability in the soil solution (Al-Taey and Saadoon, 2014; Zhai *et al.,* 2016). This reflected negatively on the soft weight of the plant for the first moment.

Table 3 : Shows the effect of cultivars, water stress, and interference on vegetative and specific characteristics.

Treatments	Plant height	Total number of papers	Wet weight for the first moment	The percentage of dry matter for the first moment	Total chlorophyll	Paper space
A1C1T1	54.95	15.95	80.31	12.18	60.41	204.01
A1C1T2	66.04	16.84	83.43	12.34	50.33	239.33
A1C1T3	66.14	17.24	114.17	13.21	67.03	278.37
A1C1T4	72.45	16.45	93.47	14.98	58.71	292.21
A1C1T5	75.25	20.64	89.51	13.02	68.57	291.13
A1C1T6	76.66	21.27	83.35	14.08	57.63	310.53
A1C2T1	64.74	14.85	72.51	13.51	57.97	251.83
A1C2T2	68.64	15.85	84.53	12.95	60.13	277.13
A1C2T3	67.05	17.95	93.51	14.45	66.57	288.43
A1C2T4	77.84	17.76	101.53	13.64	75.53	312.81
A1C2T5	78.05	20.84	91.47	13.12	69.57	272.31
A1C2T6	76.83	21.27	85.55	14.19	61.41	251.17
A2C1T1	62.65	14.64	75.43	13.03	42.63	277.61
A2C1T2	63.24	17.85	85.83	13.24	49.53	261.77
A2C1T3	62.64	19.05	60.81	13.45	45.77	278.17
A2C1T4	77.75	18.05	63.81	15.31	55.81	275.77
A2C1T5	77.45	20.45	60.67	14.91	47.63	230.11
A2C1T6	77.24	22.39	69.55	12.54	51.61	230.53
A2C2T1	62.05	15.64	55.47	17.12	45.63	206.57
A2C2T2	63.95	17.75	47.53	17.78	50.81	254.77
A2C2T3	68.55	17.15	40.21	15.55	**51.07**	242.57
A2C2T4	72.44	17.65	60.21	17.85	49.97	237.03
A2C2T5	77.44	20.75	62.19	15.35	47.87	234.61
A2C2T6	78.54	21.36	75.06	14.73	52.06	210.17
LSD(0.05)	**0.05**	**0.71**	**11.38**	**1.08**	**4.66**	**1.46**

As for overlap treatments , notice the superiority of the treatment Sio2 200 mm. Kg^{-1} in both the percentage of chlorophyll in the leaves and the leafy area and the percentage of dry matter for the first insect, the number of leaves and the height of the plant exceeded the treatment of selenium 20 mg. L^{-1} + Sio_2 200 mm. Kg^{-1} and this is consistent with the results obtained (Sokoto and Muhammad, 2014) as the plants are planted with SiO_2 maintains a greater increase in the leaf content of chlorophyll compared to crops grown without the use of SiO_2 under conditions of moisture stress so the positive effect of SiO_2 on photosynthesis may be due to a decrease in the absorption of cadmium and zinc, which leads to an increase in the leaf content of chlorophyll and in PSII activity by reducing damage to the photovoltaic mechanism (Hattori *et al.* 2005). The reason for the increase in the number of leaves and the leafy area may be that the addition of SiO_2 to the soil works directly to increase the structural characteristics of plants that increase the structural hardness of the tissues and as a result SiO_2 works to increase the number of leaves and increase the leaf area and thus increase the effectiveness of photosynthesis and increase plant growth as well as increase productivity (Epstein 1999) (Hattori *et al.,* 2005). An increase in chlorophyll in the leaves in the Egyptian variety may be the result of spraying with selenium, and this can be explained by the increase in potassium concentration in the leaves and its inhibitory effect on the production of lion ascetic and increasing gibberellins production. Its efficacy and worked to scavenge the roots of the toxic oxidizing hydrogen peroxide of the plastids membranes and convert them into water molecules and then reduce concentration and toxicity, as it is believed that selenium is a non-enzymatic antioxidant due to its ability to inhibit the magnetic momentum of free radicals (Elizabethn *et al.*, 2010) This is in agreement with the results obtained (Nancy and Arulseliv, 2014) on tomato plants.

References

Al-Saadi, A.J.H. and Al-Mintafji, H.N.H. (2016). The relationship between water stress, selenium and parasinolide in some indicators of vegetative growth and the content of elements in the coriander plant. *Coriandrum sativum* L. Ibn al-Haytham Journal of Pure and Applied Sciences, 29(3) : 376-386.

Al-Taey D.K.A.; Al-Janabi, A.H. and Rachid, A.M. (2019). Role of Additive in Mitigation of the Negative Effects of Saline Water on Cabbage (*Brassica oleracea* var. Capitata L. Plant Archives, 19(1): 78-85.

Al-Taey, D.K.A. and Al-Musawi, Z.J.M. (2019). Effect of Nano-fertilizers, salicylic acid, and organic matter in growth and yield of rocket (*Eruca sativa* Mill.) under Salt stress. International Journal of Botany Studies, 4(3):77-81.

AL-Taey, D.K.A. and Saadoon, A.H. (2014). Effect of treatment of Salicylic acid and water Salinity on the Growth and Nitrate Accumulation with nitrate reductase activity in the Leaves of Spinach, *Spenacia oleracea* L. Journal of Babylon University, Pure and Applied Sciences, 3(22): 1188-1203.

Al-Taey, D.K.A.; Al-Azawi, S.S.M. and Husien, M.H. (2010). Effect of Spraying Acetyl Salicylic Acid on the Plant Tolerance for Salt Stress & Survival Percentage after Transplanting of Orange (*Citrus sinensis*). Babylon Journal University -Pure and Applied science, 18(4): 1513-1520

Barker, A.V. and Pilean, D.J. (2007). Handbook of plant Nutrient CRC Press. Boca Ratan, F1.

Bouras, Metadi Bouras, Bassam Abu Turabi and Ibrahim Al-Basit. 2011. Vegetable crops production. The theoretical part. Damascus university. Directorate of Books and Publications. 82-83.

Burhan, A.K. and AL-Taey, D.K.A. (2018). Effect of Potassium humate, humic acid, and compost of rice wastes in the growth and yield of two cultivars of Dill under salt stress conditions. Advances In Natural And Applied Sciences. 12(11): 1-6.

Elizabethn, A.H.; Pilon-Smits and Colin, F.Q. (2010). Selenium Metabolism in plants: R. Hell and R.-R. Mendel (eds.), Cell Biology of Metals and Nutrients. Springer-Verlag Berlin Heidelberg.

Epstein, E. (1999). Ann. Rev. Plant Physiol. Plant Mol. Biol., 50: 641.

Hasanuzzman, M.; Hossain, M.A. and Fujita, M. (2010). Selenium in Higher Plants : Physiological Role, Antioxidant Matabolism and Abiotic Stress Tolerance. J. Plant Sci., 5: 354-375.

Hasanuzzman, M.; Hossain, M.A. and Fujita, M. (2012). Exogenous Selenium Pretreatment Protects Raps seed seedling from Cadmium-Induced Oxidative Stress by Up Regulating the Antioxidant defense Systems. Bio, Trace Elem Res. 10: 2011-1021.

Hattori, T.; Inanaga, S.; Araki, H.; An, P.; Morita, S.; Luxova, M. and Lux, A. (2005). Application of silicon enhanced drought tolerance in *Sorghum bicolor*. Physiologia Plantarum, 123: 459–466.

Hattori, T.; Inanaga, S.; Araki, H.; An, P.; Morita, S.; Luxová, M. and Lux, A. (2005). Physiol Plant 123: 459.

Hirich, A.; Rami, A.; Laajaj, K.; Choukr-Allah, R.; Jacobsen, S.E.; ELYoussfi, L. and Omari, H. (2012). Sweet corn water productivity under several deficit irrigation regimes applied during vegetative growth stage using water irrigation source .World Academy of Science, Engineering and Technology 61.

Kasar, K.A.; Ibraheam, Z.I. and Abbood, R.S. (2011). Relation of antioxidant vitamins (A, E, C) with insulin level and Selenium in Diabetic patients type 2. J. Kerbala Univ., 9(4): 1-6.

Laane, H.M. (2018). The Effects of Foliar Sprays with Different Silicon Compounds. Plants, 7(45): 2-22.

Ma, J.F. and Yamaji, N. (2008). Silicon uptake and accumulation in higher plants. Trends. In plant science, 11(8): 392-397.

Nancy, D. and Arulseliv, P.I. (2014). Effect of selenium fortification on biochemical activities of tomato (*Solanum lycoprsicum*) plant. Indo Am. J. Pharm. Res., 4(10): 2231-6876.

Sokoto, M.B. and Muhammad, A. (2014). Response of Rice Varieties to Water Stress in Sokoto, Sudan Savannah, Nigeria. Department of Crop Science, Faculty of Agriculture, Usmanu Danfodiyo University, Sokoto, Nigeria.

Turakaniean, M.; Hartikainen, H. and Seppanen, M.M. (2004). Effect of Selenium Treatment on Potato (*Solanum tuberosum* L.) Growth and Concentration of Soluble Sugars Starch. J. Agric Food Chem, 52: 5387-5382.