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Impact of Growing Beans (Vicia Faba) In Saline Soil on Aldosterone, Angiotensin-1 Hormones, Urea and Creatinine in Local Rabbits Males (Oryctolagus Coniculus)

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***Abstract*---**Planting *Vicia faba* in saline soil could be lethal because of high salt concentration and osmotic pressure. We use two conditions one is normal soil, and the other is saline soil to be compared. The first time the bean didn't grow the second experiments it grows in weak shape and different properties from the normal. The growing plants (bean) in the saline soil were taken and mixed with the rabbit food to find the impact of salty bean on hormones and other parameters. The soil and plant results are differed from control which saline soil affect the properties and plant growth. Electrical conductivity increases, CHO (organic matter in soil) decreased in soil, Humidity% in salinity soil increased, pH increases. All these results of soil decreasing length, chlorophyll concentration, organic materials, and many studied parameters in plant. The rabbits' feeds with saline bean have different parameters from the normal.

***Keywords*---**aldosterone, angiotensin-i, creatinine, hypertensions, saline soil, urea, vicia faba.

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Introduction

Faba bean is plant that can grow on cold season. In the Pre-historic time, Legume crop originated in the middle of Asia and Middle East. Traditionally, Legumes as main source of protein was used for both human and animals [Multari et al., 2015]. With optimum growing conditions, seeds germination takes 10-14 days. The strong stem of Faba bean and upright growing; the plant grows one node per week and can grow up to 130 cm in tall. The first flower starts to show up at the stage near by 9 or 10 nodes (30 cm tall). The flowers produce pods with 3-6 seeds. The good management such (soil fertility, irrigation, planting time), it can reduce aborted flowers to improve the yield production [Etemadi et al., 2018]. As important food, Legumes with high nutritional value and low coast production with ease preservation. It belongs to the family Leguminosae which can grow at low temperature in winter. Legumes considered to be good source of protein, fibers which used for diet, low fat levels with high amount of carbohydrate.

Also, Legumes cheap source of protein in most high population countries [Wrigley et al., 2015]. Cereal protein and Legumes can be complimentary to each other. Legumes contain amino acids conjugated with Sulphur such as (Cysteine, Trypsin and Methionine) but are rich in lysine content, whereas cereals composition is vice versa [Ali et al., 2014; Mariush and AL-Mharib (2020)]. The protein quality in food can be determined as Biological Value (BV), which is the measure of absorbed total protein by organism's body [Goll et al., 2014]. The crop production future faces challenges, in conjunction with increasing of population. With different affected factors such climate change, extreme weather conditions the food production become more difficult. During floral development, Bean (Vicia faba) may responses to heat stress. Its valuable to drive towards and increased food production. Beans yield production a good source of N as mineral and protein valuable source, exposure to high temperature may result in yield mass, seeds and pot sets [Jata et al., 2015; Bishop et al., 2016]. The Central Asian region such India is the center of the original evolution of the bean. Plant description: A round plant up to 80 cm high, the leg has a square-like angle and rib, the flowers are white, black, and the fruit is a horn with several seeds in it [Mohammed, 2016].

Food information per 100 g of bean

Calories 341, fat 1.53, total carbohydrate 58.29, fiber 25, sugar 5.70, proteins 26.12, containing sodium salts mg 25 and potassium salts mg 332, calcium mg 37, iron mg 106, magnesium mg 333. Beans are rich in mineral salts such as iron and phosphorus, and are beneficial to the heart in terms of increasing the level of good blood cholesterol, reducing the blood pressure of menopausal women, maintaining the blood sugar level, and making bean husks a cure for constipation. [Etemadi et al., 2019]

Salinity soil

Managing soil and water very important to crop production. Impacted soil is major factor of limited agricultural production. Increased grain yield of plants is required to fulfil the increasing food demand for increasing population around the

world. Desertification, is another problem faces the crop production. Salt in soil made a stress to suppress the plant growth [Ratnakumar et al., 2016]. The plant performance under salinity stress needs to be enhanced direct way or indirect using eco-friendly methods or new improved biotechnology. The salinity soil problem is a scourge for world production of plants. The growing crops suffering from high osmotic stress even toxicities and disorders in nutritional elements, and weak physical properties leading to reduced crop productivity [Wang et al., 2017]. Under irrigation, salinity soil is a growing problem for crops productivity in the dry hot areas. In these regions, soil frequents saline with low potential. Therefore, most crops grow under irrigation were salt occur as ions which released from weathering minerals, or may come from fertilizer. Sometimes, ions might migrate from shallow groundwater upward to soil. All soil types contain some water percentage and salts are water-soluble. Thus, plants can absorb the nutrients in water-soluble form, but excessive salt accumulation strongly affect the plant growth [Seleiman and Kheir, 2018].

Impact of salinity on plants

Crops have various responses to salt stress. Salinity decreases the production, soil physicochemical properties and even area ecological balance. The obviously effect showed in morphology, physiology, and biochemical interactions like water uptake, nutrient uptake, growth of plant, and seed germination. Salinity soil could affect all plant phases starting from germination until the production phase. The effect is toxicity of ions, osmotic stress, nutrients deficiency, and weak water uptake [Guangming et al., 2017].

1-2 rabit and hormones

Angiotensin-I, Aldosterone, is an organization that controls the regulation of blood pressure. Angiotensin stimulates the secretion of aldosterone excreted from the cortex of the adrenal cortex and the latter shrinks blood vessels that raise blood pressure and absorb salts, that is, an increase in the level of water in the blood and a decrease in the level of salts, including sodium, to absorb salts into the blood vessels to increase blood pressure, and also to reduce blood vessels, particularly the ascending artery [Su et al., 2021]. Aldosterone causes sodium reabsorption in kidney plants, which is accompanied by fluid reversion to the body through the kidney, which increases the volume of fluids, and in this way the earth stability of the kidney will continue (Atlas, 2007).

Aim of the study

The study aimed to evaluate the soil physical-chemical properties and the effect on the plant growth. Then, find the effect of yield on some parameters in local rabbits.

Materials and Method

First stage

Planting Vicia faba in saline soil until flowering and have horns of beans, the field experiment was made two time because the first time there was no growth, then find out the differences between other beans growing in different normal soil. We ban four mid-size flowerpot and then write numbers on them from 1 to 4. Flower no.1 were the control, it has normal soil. The second one's 100 g salt, the third one's 150 g salt, the fourth one's 200 g salt, we mix the salt with the soil well, and planting the seeds of Vicia faba. The experiment was conducted on 2021/1/22, when the beans were grown in flowerpot at home. The rest of did not grow because of the impact of saline soil on the growth of this bean plant for the first step. The second step on 2021/4/21 another experiment was conducted with the placement of new soil with lower percentage of salt in the three flowerpots where the bean plant finally appears, irrigate and observing them daily. At last, feeding the beans growing in saline soil to find its impact on the rabbit's males. In this study, 20 adult white laboratory rabbits, Albino rabbit, aged 7-9 months and weights (1250-1500 g), were used.

Food and water were given continuously and in sufficient quantities for the duration of the experiment. Consideration was given to the equal weights of each group as far as possible before the start of the research. Abeer saw blood samples obtained from the heart and size (10ml) mediated by a medical investigator where blood samples were placed in the test tubes and separated into the centrifuge quickly. (3500 rpm 15 minutes for serum blood (Block Serum) where new plastic test tubes were placed and aldosterone, Angiotensin II, Urea, Creatinine chemical tests were performed. The concentration of urea in the blood serum was estimated using the analysis kit of the French company Biomerieux, a color method, and the concentration of Createnin in the blood serum was estimated using the French company BIOLABO analysis kit. For Aldosterone and Angiotensin-1, it was measured using an immunological method known as Enzyme-linked Immuno Sorbent Assay (ELISA) using the BioTISA type.Statistically analyzed data by finding correlation and contrast analysis test (ANOVA T test, comparison of computational averages of transactions using Duncun Multiple Range test with moral level 0.01) > (P using Minitab Duncun)

Experiment design

- First Group G1 (Control Group).
  This group was given drinking water (distilled water) and food per day, with seeds of beans grown in normal soil at a concentration (1 g/kg) of body weight by mouth per day and for 14 days.
- Second Group G2
  I gave this group drinking water (drip water) and food on a daily basis, which would feed beans grown in saline soil at a concentration (1 g/kg albedo) of body weight by mouth every day and for 14 days.

Results

Table 1
Chemical results of soil

No	So_4^{2-} ppm	HCo_3^- ppm	EC ds\m	CHO %	Hum %	PH
Control	9.4	8.6	3.6	39	37	7
Salty Soil	11.5	13.4	6	36	42	7.8

Table 2
Chemical results of plants

	Leaves Dry Weight g	Plant Length cm	CHO %	Chlorophyll	N %	P %	K %
Control	1.8	1.5	4.0	3.6	6.3	8.1	5.8
Saline Soil	1.1	0.8	3.4	2.0	5.7	10.3	6.5

Table 3
Rabbits Aldosterone, Angiotensin-I, Urea and creatinine

Group	Urea mg/dl	Creatinine mg/dl	Aldosterone Pg/ml	Angiotensin-I Pg/ml
G1	26.234 ± 3.155^b	0.522 ± 0.235^b	$\pm14.11^b$ 200.47	$\pm6.22^b$ 40.12
G2	62.500 ± 9.355^a	1.760 ± 0.1713^a	$.22\pm11.5^a$ 270	$\pm8.34^a$ 59.65

Values represent the rate of the standard deviation. The number of animals is 10 per group. Vertically different small letters indicating moral differences ($0.05 \geq P$).

Discussion

Soil chemical results shows in table 1 above

The Salts often originated from crust and weathering in which rocks are dissolved with time and carried by water. These slow chemical interactions led to accumulate salts in surface soil and underground water. The salts also can be added because of fertilizers or organic amendments added to the soil. So42- and HCo3- Increases as main salts in soil with different shapes results from interactions between elements. Combination of salts may be found in soil water such (Sodium, Calcium, Potassium, Magnesium, Phosphor, and many other). The major source is usually the irrigation water which lead to salt accumulate over time in dry and semi dry lands because of low rainfall which the main factor that dissolve and leach salt and the final results is the salt accumulate in soil to become saline soil [Liu et al., 2017]

Electrical conductivity increases as irrigation water enters clay particles spaces, results the dispersion and swelling of clay particles which lead to gathering particles together and increases ions availability in soil. The relationship between salinity and irrigation sodicity are the effect of infiltration rates of soil and hydraulic conductivity [Mohammed, 2016]. The CHO (organic matter in soil) decreased in soil because of anaerobic microorganisms' activity in soil which can prevent plant growth and decrease rates of organic matter decomposition in soil, which cause infertile soil [Conant et al., 2011]. The explanation of increasing Humidity% in salinity soil cold be that the plant uptake of water from soil and left some. The remain water become bounded to soil particles and held tighter and more difficult to be taken by root. By time, the plant uses the water in processes and metabolism and even transpiration or evaporation to atmosphere. The soil water increases because of high salts concentration in the remaining soil water [Seleiman and Kheir, 2018]. PH increases by number which mean more alkali soil can caused by soil dispersion which reduces the entering water and hydraulic conductivity of soil. This led to loss soil structure and low number of soils macropores. Thus, the available sodium ions induced soil and prevent plant growth by decrease rates of organic matter decomposition and finally the soil become alkali soil [Shrivastava and Kumar, 2014].

Plant results as shown in table 2 above

Salinity effect photosynthesis throughout leaf reduction with chlorophyll low content as shown in table 2. The saline soil effect on plant growth through osmotic stress and imbalance of available nutrition, so that the leaves become smaller lead to chlorophyll decreased and minimal in the dry weight [Igboama and Ugwu, 2016]. The plant length also affected because of lower plant growth, Also, the organic matter decreased in the plants growing on the saline soil, this happened because of low plant grow rates which reflect on organic matter production [Miransari and Smith, 2019]. Salinity soil reduces P-3 plant uptake, that's happened because phosphorus precipitate with calcium ions. With the same effect, the elements nitrogen and potassium will be less in the plant grown in saline soil. The decrease in big nutrients N, p, K may occur due to the effect of osmotic pressure results from high concentration of elements in soil [Hashemi et al., 2018].

Results of rabbits showing in table 3 above

There is a moral rise at a moral level. (P ° 0.05) For the concentration level of urea, Creatinine and Aldosterone and Angiotensin-I hormones in rabbits' blood serum given to their standard pollination. The beans grown with saline soil, G2, according to the values mentioned in table 1(62.500 ° 9.355, 1.760 ° 0.1713, .22 ° 11.5 ° 270,8 ° 59.65), compared to the control group given to its standard alloy, the beans grown with normal soil G1 and the values stated respectively, 26.234 3.155), 0.522 0.235, 14.11 200.47, 6.22, 40.12. Feeding the study animals on the seeds of the beans grown in saline soil in the G2 group led to a rise in the hormone angiotensin 1 and aldosterone due to the fact that they contain oxalate, which affected kidney function, raising the blood pressure of the study animals. The increase in hormone effectiveness (ALD) due to the effect of this substance on

the adrenal gland, which led to disorders in its hormone secretion and thus increased the withdrawal of Na and water [Mulay et al., 2016].

The increase in aldosterone excretion has led to an increase in sodium and water reuptake, an increase in potassium and magnesium deficiency of renal anabytes and, consequently, an increase in arterial blood pressure to its highest levels in animals suffering from aldosterone deficiency. Angiotensin also catalyzed aldosterone secretion that promoted sodium retention in distal nephron in the kidney, causing fluid retention and thus hypertension [Kesireddy, 2019]. Treatment with salted beans with a high oxalate content has also led to the destruction of the Juxtaglomerular Appratus next door, leading to a malfunction of the Renin-Angictensin system regulating the release of ALD from the adrenal cortex [Loboda et al., 2016]. Increased ions in the body, including calcium, deposited in the form of calcium oxalate cause damage and damage to the tissue of the kidney, especially capillaries and renal plants. This, in turn, affects the functioning of the kidney, particularly the process of ion excretion and reuptake, especially sodium, which is essential for the regulation of blood pressure, so that the level of urea and creatinine in the blood serum has risen [Gerich, 2010].

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