Effect Soil Medium, Biohealth and Treatment Methods on Growth Vegetative and Flowering on Tecoma stans (L.) Juss Kunth and Bacterial Activity

Abdul-Kadhm N. S. Al-Shoaily * , Samira Mohammed Alsamurai & Abdul-Razzak U. Hassan
Lecturer Assist.Prof Assist.Prof

Department of Horticulture and Landscape Design, College of Agriculture, University of Basrah, Iraq *Corresponding author e-mail:abdulkathim13@yahoo.com

ABSTRACT

The experiment was carried out in the lath cloth which belongs to the Agricultural Research Station / University of Basra / Karmat Ali site and for the growing season in 2017. It was aimed to study the vegetative, floral and antibacterial of Tecoma stans according to (RCBD) in a Factorial Experiment, which indicated the correspondence between the three factors of study such as the soil media which used three media (sandy loam, loam, silty clay) and the use of Biohealth biocatalyst with three concentrations (0, 2.5, 5) g/liter^{-1} and method of addition (spraying on the leaves or by addition to the soil) experiment .The results of plants grown in loam soil showed significant increase in the height, number of branches , leaves , content of chlorophyll and the number of inflorescence (124.65 , 16.94 , 138.52 , 73.20 , 12.93) respectively . Experimental plants used in this 5 gram.liter^{-1} biohealth caused a significantly increase significantly in the all vegetative and flowering characters . The addition method of biohealth to the soil was significantly increase in all the previous characters compared with spread method . Studies antibacterial activity of three leaves methanolic extracts (A, B and C) of Tecoma plant and their concentrations (0.1 , 0.2 , 0.3)mg . ml^{-1} of each extract and their interactions showed that significant effect in inhibition zone of *Staph. aureus* bacteria compared with other bacteria studied .

Keyword :Tecoma stans, Biohealth & Soil Media .

INTRODUCTION

Tecoma stans (L.) Juss Kunth is an evergreen flowering shrub that belonging to the Bignonaceae family, located in the western India and South America (Baily, 1941). The Biohealth (biological-catalyst) contains many ingredients that aid the growth of plants because of its importance in processing plants with nutrients and improving the properties of the soil and then help create better conditions for plant growth. Al Jaber (2014) founded that spraying with biohealth led to significant increase in plant height, number of leaves, number of branches and leaf area of *Moringa oleifera* Lam. Foliar feeding is one of the successful methods in furnishing plants with nutrients, but it cannot eliminate the role of root in the absorption of nutrients from the soil solution. Qasim *et al*. (1978) disclosed that the efficiency of foliar nutrition is obtained by the usefulness of the added fertilizers compared to the ground fertilization. The environmental conditions in Iraq, in general, and Basra province in particular, may be suitable for the cultivation of such a plant where high temperatures, drought and high relative humidity are dominant. Khoury (2010) brought to light that the Tecoma plant grows well under high-temperature conditions where the temperature reaches 45 C˚ and withstands wind, salinity and drought as well. From the environmental aspects, it can be used to contribute to the development of cities by educing pollution and increasing the proportion of oxygen and air attenuation and then improving the climate due to its sustainability and tolerance of environmental and salt conditions. Tecoma plant works to sustain the supply of oxygen and moisturize the atmosphere and mitigate the glare of the sun as well as works to absorb dust and stop sand and protect soil, protect cities from strong winds and break wind's intensity of leaves for the medium of (sand + moss peat ratio by 1:

1), while the medium of moss peat was significantly higher as to the height of seedlings, dry weight of leaves and vegetative branches and the root total and the amount of chlorophyll compared with other media of plant of *Albizia lebbek* Benth L. . Al-Samaraii (2012) she found increasing significantly in vegetative and chlorophyll in loam soil copard with sandy soil on *Lawsonia inermis* L. var. Al-Azzawi (2013) obtained a significant increase in leaf area, length of vegetative branches, dry weight ratio of root and vegetative total, and chlorophyll ratio when using growth medium with sandy loam mixture compared with medium loam texture of orange seedlings *Citrns sinensis*. Since biohealth's biocatalyst contains 75% humic acid, the latter has significant roles in improving plant growth and development. In a study conducted by Zinel and Hussein (2017) on the effect of humic acid spraying at 2 $mg.L^{-1}$ on *Citrus aurantium* L. it led to a significantly increase in all studied attributes (length, stem diameter, number of leaves, lateral branches, leaf area, leaf content of chlorophyll and percentage of nitrogen in leaves) compared to a factorial experiment. Al-Musawi and Qais (2017) explained that the treatment of *Citrus aurantium* with humic acid at a concentration of 400 $mg.L^{-1}$ caused a significant increase in the attributes of vegetative growth (plant height, stem diameter, number of leaves, leaf area, dry material of the total vegetative) compared to the factorial comparison, while don't there were significant differences between the concentration of 400 mg. L^{-1} and concentration of 200 mg L^{-1} in the stem diameter and leaf area. Akkam *et al*. (2017) concluded that the use of humic acid on *Prunus Americana* L. seedlings sprayed at a concentration of 4 $mg.L^{-1}$ and ground fertilization at a concentration of 6 mgL^{-1} had a significant impact in improving the vegetative attributes studied and the content of the leaves of chlorophyll and the percentage of major elements N.P.K. compared to the factorial comparison. Saadudin *et al*. (2005) made clear that foliar fertilization is a complement to ground fertilization and not a substitute for it. Foliar nutrition generally increases the metabolic process of plant leaves and thus increase the amount of processed materials in the leaves leading to increase the dry weight of the plant.

MATERIAL AND METHODS.

Location of Experiment and Implementation

The experiment was carried out in the lath cloth (which belongs to the Agricultural Research Station/ University of Basra / Karmat Ali site, on of a one- year ago and of similar growth rate of 38-40 cm, and one main branch with a rate of 4.5-5 mm diameter left, and on 10/11/2017 turned to pots of 30 cm diameter and depth of 40 cm and a capacity of 12.5 kg pre-sterilized formalin at a concentration of 4% after filling in the center of its own soil and previously sterilized also formalin at a concentration of 4% pursuant to a method adopted by (Said and Ad-Doori, 1982). The study included 18 factorial treatments, which are possible interventions between the three factors of the experiment, namely:

1. Growth Medium

The experiment involves three growth media as follows:

A. Sandy soil loam (agricultural thari) + peatmoss ratio of 3: 1

B. medium of soil loam (0.5 agricultural thari soil + 0.5 slit clay soils)+peatmoss ratio of 3:1

C. the slit clay soils + peatmoss ratio of 3: 1.

Peatmoss is stable for all growth media produced by the German company KLASMANN.

Table (1) shows some physical and chemical properties of sandy loam soils (thari) , Table 2 shows some of the physical and chemical properties of the used peatmoss, Table (3) shows the physical and chemical properties of the medium of slit clay soils. and soil was under an analysis carried out at the Central Laboratory of the College of Agriculture / University of Basra

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Table 1: Some of the physical and chemical properties of thari used in agricultural media.

Attributes of a growth medium	Value (reading)
Acidity pH	7.45
EC	2.9
Organic matter %	2.64
Total Nitrogen (g. kg^{-1})	0.53
Total phosphorus (g. kg^{-1})	0.56
Total potassium (g. kg^{-1})	0.66
Soil separators	
Clay %	10.6
Silt %	7.4
Sand %	82
Texture	Sandy loam

Table 2: Physical and chemical properties of peatmoss used in line with package instructions

Attributes of a growth medium	Value (reading)
Acidity	5.5-6.5
EC	0.5
N-P-K	14-10-18
Organic matter %	%0.85

Produced by Klasmann Deilmann

Table 3: Some of the physical and chemical properties of soil silty clay used in agricultural media.

Attributes of a growth medium	Value (reading)
Acidity	7.60
EC	4.96
Organic matter %	3.5
Total Nitrogen (g. kg^{-1})	0.78
Total phosphorus (g. kg^{-1})	0.23
Total potassium (g. kg^{-1})	0.42
Soil separators	
Clay %	42.0
Silt %	47.7
Sand %	10.30
Texture	Silt clay

2. Biohealth biocatalyst produced by Humin Tech Gmbh, German, applied in three concentrations as follows:

A. 0 gram . $liter^{-1}$ (non-factorial)
B. 2.5 grams.$liter^{-1}$
C. 5 grams.$liter^{-1}$

Adding a Biohealth catalyst includes:

1. Sprayed on the leaves

Plants were treated with these solutions and for each concentration of the biohealth catalyst sprayed on the leaves using a 2.5 liter sprader to the degree of full wetness with full coverage of soil media to ensure that the solution does not get spoiled.

2. Added to the soil

Plants were treated with these aqueous solutions related to each concentration of the biohealth catalyst in addition to the soil (the used medium).

A factorial spraying or addition repeated for three times during the growing season starting from 01/12/2017 at a rate of one month between sprays.

Experimental measurements

All measurements of the studied attributes were taken on all plants of the experiment, which included the following indicators:

Vegetative Growth Indicators:

1- Plant height (cm)

2- Number of secondary branches (secondary branch. Plant $^{-1}$)

3 - Total number of leaves (leaf - plant $^{-1}$)

Percentage of dry matter of the shoot system (%)

Dry matter percentage was calculated according to the following equation: -

$$Percentage\ of\ dry\ matter\ for\ the\ shoot\ system\ \% = (\ Dry\ weight\ of\ shoot\ system\ ) /(\ Fresh\ weight\ of\ shoot\ system\ ) \times 100$$

Chemical Properties of Leaves :

1. Leaf Content of Total Chlorophyll (mg. 100 g $^{-1}$ fresh weight)

The total amount of pigment chlorophyll mg / 100 g soft paper tissue was calculated in line with Goodwin's study (1976) and by applying the equation:

Total chlorophyll = 20.2 × D (645) + 8.02 × D (663) (V / W × 1000)

Floral Measurements

1. Number of inflorescences (inflorescence. $plant^{-1}$)

Design of the Experiment and Statistical Analysis

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Randomized Complete Blocks Design (RCBD) was carried out by the Factorial Experiment, which consisted of 18 factorials, which is the correspondence between the three factors of study; the growth media. Three growth media (sand loam , loam, silte clay) and Biohealth biocatalyst were used in three concentrations (0, 2.5, 5) g. L^{-1} and an addition method (spraying on leaves or adding to soil) at triplicates for each factorial experiment. The number of experimental units is 54 experimental units with 4 views per factorial experimental. Now, the number of experimental plants is 216 plants.Statical analysis done by GenStat.2013 program was used to compare the averages according to the test of the least significant difference at a probability level of 0.05 AL-Rawi & Khalafullah, 1980).

Lab. Experiment

Inhibitory Efficiency of some Pathogenic Bacteria

Collect and Prepare Samples

The *Tecoma stans* leaves were collected and cleaned and washed with distilled water and then left to dry under room temperature .Methanol was used to obtion methanol extract according to Nwosu and Okafor (1995) a weight of 75 grams of Tecoma leaves was grinded and placed in an electric mixer type Panasonic, each placed separately of treatments (A , B , C) and added 400 ml of 96% methanol alcohol and operated for 15 minutes and then the mixture was stirred in a magnetic hotplate stirrer for 24 hours at 45-50 C˚ Intermittently and after that putting the solution in a 3000 rpm centrifuge for 30 minutes, where the sediment is neglect and the filtate is taken, the operation is repeated three times to rid of the sediment, it is filtered by using filtering paper (Whatman No.1) and the filtrate is dried by means of water bath at temperature of 60 C˚ . The abstracts are collected in sterile bottles and kept in a fridge till the time of using.

Antibacterial Activity:

Nominating the Examination Factor

Three factors of treatment are chosen and numbered as follows.

-Extract (A)from the plant grown in medium of the sandy loam soil untreated with biohealth.

- Extract (B) from the plant grown in medium of the loam soil and treated with biohealth at concentration 5 g . liter -¹ in addition meyhod to the soil.

- Extract (C) from the plant grown in medium of the silty clay soil and treated with Biohealth at concentration 5g . liter¹ in addition method to the soil.

Bacterial isolates

Two kinds of bacterial isolates are chosen , gained from the Microbiology Laboratory / Al Sadr Teaching Hospital/ Basra; one of them is negative to (Gr-ve) *:**Escherichia coli, Pseudomonas aeruginosa, Klebsiella pheumoniae*** and the other is positive to (Gr+ve) ***Staphylococcus aureus.***

Antibacterial Activity :

The Agar-well diffusion method is used as in the approach of (Perez, *et al*:1990), where 20 ml of Muller Hinton Agar is poured into each 9 cm plate and then the medium is provided with 10 micro-liter of bacterial inoculum containing 1x106 cell/ml on each plate by using a cotton swab, then the plates are left for (10-30) minutes till they get dry . Then 3 holes were made in each plate by using the 6 mm cork borer for each hole , then the holes were filled with 50 micro-liter of the abstract at concentration of (100, 200, 300) micro-gram/ ml to all abstracts at triplicate plates were 24 hours at 37 C˚. The results were incubated recorded by measuring the inhibition diameter in millimeters by using a ruler. The results are analyzed as in the model of global experiments by means of triplicate and a test of Least Significant Differences (L.S.D) at a possibility rate of 0.05 to indicate the significance of the results (Al-Rawi & Khalafallah,2000)

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Results & Discussions

Indicators of the vegetative growth

The results of present study represented in tables (4,5,6,,7) showed that the plants grown in the medium of the loam soil recorded a significant increase in height, number of branches,leaves and the chlorophyll contained in the leaves in

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compared to the plants grown in the silty clay soil or the sandy loam. The reason may due to the existence of a proportion of the 50% of thari soil in the loam soil medium added to the medium ,which in turn improves the soil structure, or the reason for the significant increase may be attributed to qualities in the middle of the loam soil which contains an appropriate amount of clay to stor water and nutrients necessary for plant growth (AL-Naimi,2010). the results coincide with the results given by (Al-Azawi,2013) ,originally made on orange trees. As for the biohealth , the plants overweighed morally superior in their height, number of branches and leaves and the chlorophyll at treating it with the biohealth at a concentration of 5g.liter-1 compared to the plants treated with the biohealth at a concentration of 2.5 g.liter-1 and the untreated plants. The treated plants at concentration of 2.5 g. liter-1 outweighed on untreated plants morally in all other characters. The reason may be attributed to the biohealth containing humic acid and microbiology and extract of marine algae that work at improving the plants growth, where the humic acid does plays an active role in the growth of the plant and the preparation of the food ingredients and the humic acid increases the permeability of the cell membrane , the process of water and food ingredients absorption become more effective in the plants; this helps the movement of minerals and their transmission in the plant. The activation of plants enzymes is one of the important characteristics done by the humic acid (Al-Mousali, 2018). These results have coincided with the results reached by Al-Jabir (2014) on Moringa plant. As for the method of using the biohealth it morally influenced these properties, where plants with biohealth added to their soil, overweighed on the plants sprayed with biohealth. The reason may be attributed to the addition of Biohealth to the soil is to raise its physical, chemical and biological properties as it biohealth it works as a reservoir for several important feeding ingredients needed by the plant in addition to its regulatory role for soil minutes, eventually it has a positive effect in improving the soil properties and the provision of the food ingredients necessary for the growth and development of the plant (Eman et al, 2008). The interaction between soil medium and biohealth had significant effect in vegetative characters , the plants had grown in loam soil aad treated by biohealth at 5 $gm.L^{-1}$ concentration were superior in height , number of branches , leaves, and chlorophyll comparing with the plant which had grown in sandy loam which untreated plants with biohealth (tables 4,5,6, and 7). The interaction between loam soil and the method of treating by addition biohealth to soil had significant effect in all vegetative characters studied comparing with plant that grown in sandy loam untreated in biohealth. The interaction between biohealth concentration at 5 $gm.L^{-1}$ and method of treating by addition to the soil had significant effect in all vegetative characters compared to untreated plants . The interaction between loam soil , biohealth at 5 $gm.L^{-1}$ concentration and the addition method of biohealth to soil was superior significantly in all vegetative characters studied the plants grown in sandy loam soil and untreated in biohealth.

Indications of Inflorescence Growth

Table (8) one showed that the plants grown in the medium of the loam soil out weigh morally the others in the number of inflorescences, which reached (12,93) inflorescences /plant in comparison with the plants grown in a medium of silty clay soil or sandy loam soil which reached (11.76 , 10.81) inflorescences/ plant respectively, at the same time the plants grown in a silty clay soil overweighed morally on the plants grown in sandy loam soil. The moral increase in the inflorescences and the diameter of the plants grown in loam soil may be explained as a result of the role of the loam medium in the increase in vegetative growth , part of which is the number of leaves ,table (5), which leads to the absorption of greater amount of water and food ingredients, which lead to the increase in the chlorophyll in the leaves , consequently an increase in the secondary metabolism being made and its transmission to the inflorescences , which in turn leads to increase in the number

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inflorescences and their diameter in the plant. The plant treated with biohealth at concentration 5 gm.L^{-1} superior singificant in the number of inflorescences comparing with the plants treated with biohealth at concentration 2.5 gm.L^{-1} and untreated plants . The reason may lead to increase in the vegetative characters studies that results cause increasing the number of inflorescences table (8). As for the addition method of biohealth to soil was superior in the plant florescences comparing with the plant treated by spraying method on the leaves. The interaction between loam soil and biohealth at 5 gm.L^{-1} concentration had significant superior in the number of inflorescences of plant comparing with plants grown in sandy loam soil and untreated. The interaction between loam soil and the addition method of biohealth to soil had significant effect on the number of inflorescences and it's diameters of plants comparing with plants grown in sandy loam and untreated by addition or sparyed. The interaction between biohealth concentration at 5 gm.L^{-1} and the addition method had significant superior in the numbers of plant inflorescences and it's d comparing with plants had treated at 2.5 gm.L^{-1} concentration biohealth by addition method or spraying on the leaves and plants untreated .The interaction between loam soil , biohealth at 5 gm.L^{-1} concentration and the addition method to soil had significant superior in the number of plants inflorescences comparing with plants grown in sandy loam soil and untreated with biohealth.

Experimenting the Inhibitory Activity of the Growth of Some Human Pathogenic Bacteria

Table (9) and picture No. (1) explain that the type of bacteria and methanolic extracts of leaves of Tecoma plant, its concentrations and interactions had a significant effect in inhibiting the growth diameter of the tested bacteria. The ***Staph. aureus*** bacteria are, most, affected compared with species the other types of bacteria, where it reaches the highest level of inhibition (17.25) mm in comparison with ***E. coil*** bacteria, which produces the lowest rate of inhibition (11.63) , where no significant differences appear between ***Pseudo. aergnosa*** and ***Klebsiella pneumonia*** . This may be attributed to the bacterial sensitivity of the Gram bacteria to plant extracts .From the same table, it seems that the extract (**B)** has great effect on the inhibition diameter, where it shows records 14.50 mm compared to extract (A) which records the lowest level of inhibition (12.56) mm whereas no significant differences between the two extracts (B,C) appear. The reason may lead to the increase in average of inhibition diameter as a result of treatment with plant extract treated with biohealth, which gave an increase in the production of secondary metabolic compounds as well as for the quality of loam and silty clay rich in elements and its retention of compounds and additives compared to sandy loam soil texture rapid loss of compounds and elements by irrigation. From the same table , one can notice a moral difference among the concentrations used where concentration 0.2 mg/ ml recorded the highest value ever to level inhibition (15.22) mm surpassing in value on the two concentrations (0.1 and 0.3) mg. ml -1 whereas concentration (0.1) mg. ml-1 has given the minimum value of the average inhibition diameter (11.64)mm . The reason may be due to the fact that the concentration (0.2)mg ml-1 is the best concentration where the abstract dissolves, Consequently, it spreads faster in the food medium, and then it gave the biggest inhibition diameter. As for the bilateral interference among the bacterial types and extracts there is moral difference among the average transactions. If bacteria ***Staph. aureus,*** treated with abstract (B) gives the highest value to average inhibition diameter which amounted to (18.33) mm compared to the lowest value recorded to bacteria ***E. coli*** treated with extract (A) amounted to (9,89) mm to average inhibition diameter. As the results of interference among bacteria types and concentrations have shown the highest inhibition value given by ***staph. aureus*** at concentration of (0.2)mg ml -1 reach (21.67) mm inhibition diameter compared to the least average inhibition diameter recorded at

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treatment with ***E.coli*** at concentration (0.1) mg. ml. As the result of interference among tracts and concentrations have shown the highest inhibition value gave by extract(B)at concentration 0.2mg.ml-1 reach 16.67 mm inhibition diameter compared with lowest value recorded in extract(A)at concentration 0.1mg.ml-1 . As for the triple interference among the various types of bacteria , the extracts and the concentrations applied, the transactions show moral differences among them in the average diameter of bacterial inhibition, ***Staph. aureus*** treated with extract (B) concentration of (0.2) mg ml-1 gave the highest average to inhibition diameter (23.67) mm to overweigh all types transactions ,whereas **E. coli** bacteria has given the lowest value of average diameter of inhibition (8.67)mm. The reason of increase in inhibition may be attributed to the existence of phenolic substances and tannins in the mathanolic extract in Tecoma plant ,which leads to affecting the growth of bacteria and the increase in inhibition diameter(Named and Minal 2014), or attributed to the inhibitory effect of methanolic extracts of leaves of Tecoma plant because they contain many secondary metabolites such as tannins, soaps, flavonoids, anthroquanins, alkalis and glycosides, which are considered principles of plant efficacy . this coincides with (Enthikumar *et al*., 2010).

Table 4. Effect of Soil Medium and Biohealth, and the Method of its Addition and interference in the Height of Tecoma plant (cm).

Effect Growth medium	Effect Biohealth gm.liter^{-1}	Effect Treatment method		overlap of growth medium Biohealth	Effect growth medium	Effect Biohealth	Effect treatment method	
		spray	Add				spray	Add
Loamy sand	0	90.39	86.78	88.58	106.80	96.26	110.41	120.88
	2.5	103.11	109.50	106.31				
	5	116.33	134.67	125.50				
loam	0	102.50	107.83	105.17	124.65	118.87		
	2.5	122.33	137.28	129.81				
	5	132.17	145.78	138.97				
Silty clay	0	92.61	97.44	95.03	115.49	131.80		
	2.5	113.83	127.17	120.50				
	5	120.39	141.50	130.94				
R. L.S.D. 0.05		5.627		3.979	2.297	2.297	1.876	

growth medium overlap × treatment method				Biohealth overlap × treatment method		
Treatment method	Loamy sand	Loam	Silty clay	0	2.5	5
spray	103.28	119.00	108.94	95.17	113.09	122.96
add	110.31	130.30	122.04	97.35	124.65	140.66
R. L.S.D. 0.05	3.249			3.249		

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Table 5. Effect of soil medium and the Biohealth, the method of its addition and interference in the number of sub-branches of Tecoma (branch. Plant^{-1}).

Effect Growth medium	Effect Biohealth gm.liter^{-1}	Effect Treatment method		overlap of growth medium Biohealth	Effect growth medium	Effect Biohealth	Effect treatment method	
		spray	Add				spray	add
Loamy sand	0	11.33	9.67	10.50	14.81	12.08	14.94	16.91
	2.5	15.50	17.94	16.72				
	5	16.00	18.44	17.22				
loam	0	12.78	14.83	13.80	16.94	17.51		
	2.5	17.00	19.50	18.25				
	5	17.39	20.88	18.78				
Silty clay	0	10.78	13.11	11.94	16.02	18.18		
	2.5	16.28	18.83	17.55				
	5	17.44	19.67	18.55				
R. L.S.D. 0.05		1.349		0.954	0.551	0.551	0.451	

growth medium overlap × treatment method				Biohealth overlap × treatment method		
Treatment method	Loamy sand	Loam	Silty clay	0	2.5	5
spray	14.28	15.72	14.83	11.63	16.26	16.94
add	15.35	18.17	17.20	12.54	18.76	19.43
R. L.S.D. 0.05	0.779			0.779		

Table 6. Effect of soil medium and the Biohealth, the method of its addition and interference in the number of total leaves in Tecoma (leaf. Plant^{-1}).

Effect Growth medium	Effect Biohealth gm.liter^{-1}	Effect Treatment method		overlap of growth medium Biohealth	Effect growth medium	Effect Biohealth	Effect treatment method	
		spray	Add				spray	add
Loamy sand	0	93.50	87.67	90.58	121.55	101.05	126.18	132.64
	2.5	122.83	130.39	126.61				
	5	134.28	151.61	147.44				
loam	0	109.44	116.00	112.72	138.52	134.29		
	2.5	138.67	149.50	144.08				
	5	157.33	160.17	158.75				
Silty clay	0	97.50	102.17	99.83	128.17	152.90		
	2.5	125.39	138.94	132.16				
	5	147.67	157.33	152.50				
R. L.S.D. 0.05		6.186		4.374	2.525	2.525	2.062	

growth medium overlap × treatment method				Biohealth overlap × treatment method		
Treatment method	Loamy sand	Loam	Silty clay	0	2.5	5
spray	119.87	135.15	123.52	100.15	128.96	149.43
add	123.22	141.89	132.81	101.94	139.61	156.37
R. L.S.D. 0.05	3.571			3.571		

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Table 7. Effect of soil medium and the Biohealth, the method of addition and interference in leaf contents chlorophyll mm.mg^{-1}.

Effect Growth medium	Effect Biohealth gm.liter^{-1}	Effect Treatment method		overlap of growth medium Biohealth	Effect growth medium	Effect Biohealth	Effect treatment method	
		spray	Add				spray	add
Loamy sand	0	62.51	59.92	61.22	68.05	64.01	68.65	71.92
	2.5	65.09	70.81	67.95				
	5	73.76	76.20	74.98				
loam	0	65.10	67.44	66.27	73.20	72.07		
	2.5	73.39	78.40	75.89				
	5	75.79	79.11	77.45				
Silty clay	0	63.43	65.65	64.54	69.16	74.78		
	2.5	69.34	75.41	72.37				
	5	69.47	74.38	71.93				
R. L.S.D. 0.05		3.930		2.779	1.604	1.604	1.310	

growth medium overlap × treatment method				Biohealth overlap × treatment method		
Treatment method	Loamy sand	loam	Silty clay	0	2.5	5
spray	67.12	71.43	67.41	63.68	69.27	73.01
add	68.98	74.98	71.81	64.34	74.87	76.56
R. L.S.D. 0.05	2.269			2.269		

Table 8. Effect of soil medium and the Biohealth, the method of addition and interference in the number of inflorescences of Tecoma (inflorescence- plant^{-1}).

Effect Growth medium	Effect Biohealth gm.liter^{-1}	Effect Treatment method		overlap of growth medium Biohealth	Effect growth medium	Effect Biohealth	Effect treatment method	
		spray	add				Spray	add
Loamy sand	0	8.67	6.94	7.80	10.81	8.81	11.07	12.60
	2.5	9.28	11.33	10.30				
	5	13.50	15.16	14.33				
loam	0	9.61	10.78	10.19	12.93	12.08		
	2.5	12.17	14.83	13.50				
	5	14.17	17.05	15.11				
Silty clay	0	7.50	9.39	8.44	11.76	14.61		
	2.5	11.28	13.61	12.44				
	5	14.00	14.78	14.39				
R. L.S.D. 0.05		2.084		1.474	0.851	0.851	0.695	

growth medium overlap × treatment method				Biohealth overlap × treatment method		
Treatment method	Loamy sand	Loam	Silty clay	0	2.5	5
spray	10.48	11.81	10.93	8.59	10.91	13.72
add	11.15	14.05	12.59	9.04	13.26	15.50
R. L.S.D. 0.05	1.203			1.203		

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Table 9. Effect of the concentration of methanolic Exteracts of the dry leaves of Tecoma in inhibiting growth diameter of four kinds of bacteria (mm).

Bacteria	Type of extract	Concentrations			Effect of bacteria	Bacteria * Type of extract	
		0.1	0.2	0.3			
E. coli	A	8.67	9.33	11.67	11.63	9.89	**A:** Untreated sandy loam soil
	B	11.00	14.00	13.67		12.89	
	C	11.00	12.00	13.33		12.11	
Staph. aureus	A	14.00	20.33	15.00	17.25	16.44	**B:** Loam soil with addition Biohealth
	B	14.33	23.67	17.00		18.33	
	C	15.00	21.00	13.33		17.78	
Pseudo. Aergnosa	A	10.33	12.33	13.33	12.89	12.00	
	B	11.67	15.33	14.00		13.67	
	C	11.33	14.00	13.67		13.00	**C:** Alluvial silty clay soil with addition Biohealth
Klebsiella pnenmoniae	A	9.67	12.67	13.33	12.59	11.89	
	B	12.00	13.67	13.67		13.11	
	C	10.67	14.33	13.33		12.78	
R.L.S.D 0.05		**2.066**			**0.689**	**1.193**	

Concentrations	Concentrations*Bacteria				Exteract*Concentrations			Average Concentrations
	E.coli	Staph.	Pseudo.	Kle.	A	B	C	
0.1	10.22	14.44	11.11	10.78	10.67	12.25	12.00	11.64
0.2	11.78	21.67	13.89	13.89	13.67	16.67	15.33	15.22
0.3	12.89	16.44	13.67	13.44	13.33	14.58	14.42	14.11
R.L.S.D 0.05	1.193				1.033			0.596

Effect of Extract type	A	B	C
	12.56	14.50	13.92
R.L.S.D 0.05	**0.596**		

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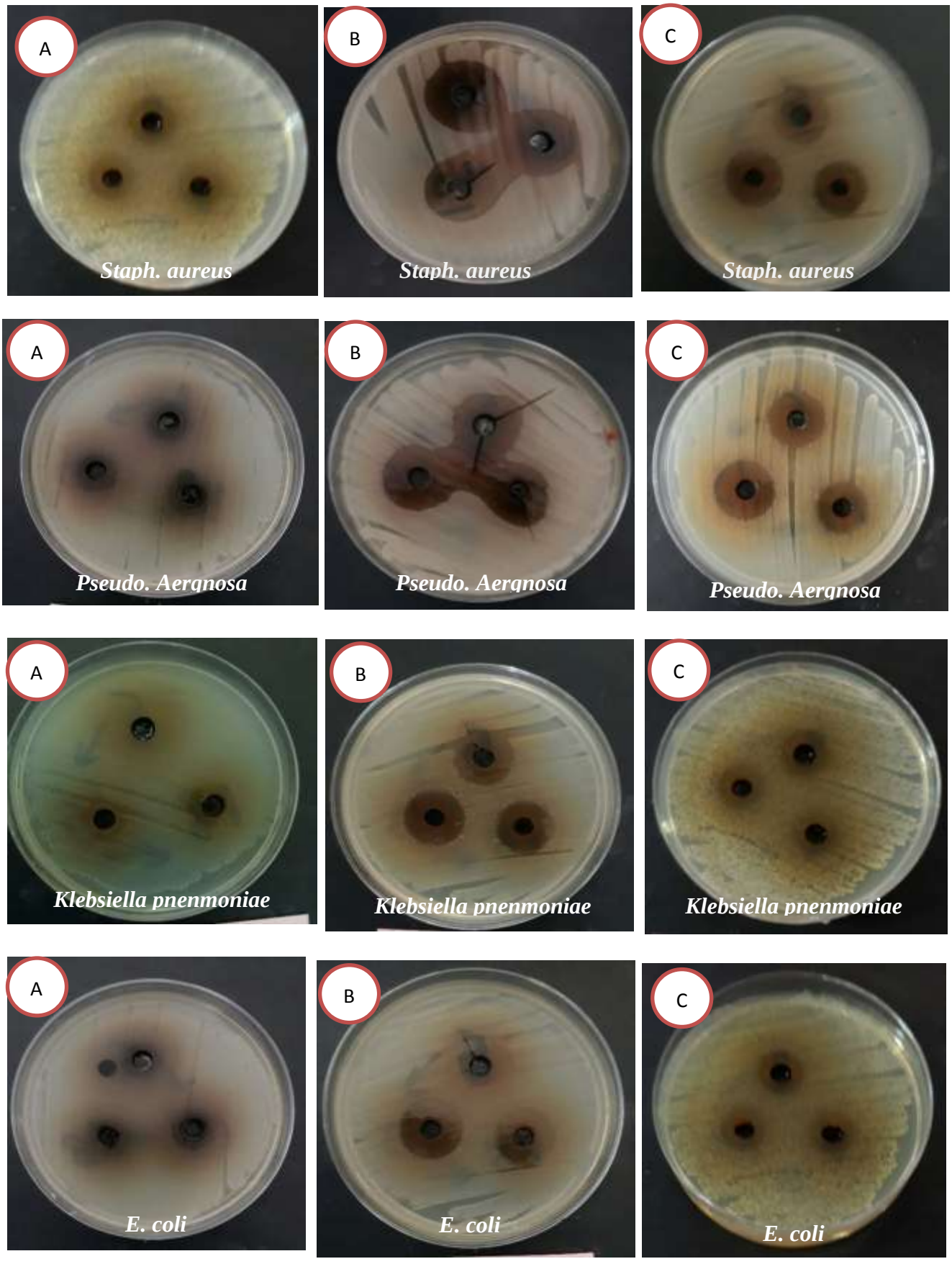

Picture : Effect of methanolic extracts (A, B, C) of leaves of Tecoma in inhibition of bacteria *Staph. aureus* , *Pseudo. Aergnosa* , *Klebsiella pnenmoniae and E. coli*

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Conclusion

This study showed that using of Biohealth at concentration 5 gm.L^{-1} and loam medium soil led to increase vegetative , flowering and medical characters and chemical constitutes.

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