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Toxicity of phenolic compounds to some plants in some biological aspects of *Musca domestic* L. (Diptera: Muscidae).

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ABSTRACT

The study were conducted in order to carry out the toxicity test of phenolic compounds that extracted from *Citrullus colocynthis* L., *Rubus sanctus* Shreb and *Lycium barbarum* L. in some biological aspects of the *Musca domestica*. The results showed that all non-adult phase were destructed in 100% for the phenolic extract of all plants and at a concentration of 20 mg /ml in comparison with control that was restricted between 18-12%. The growth period was 17, 18.33, and 26 days for *C.colocynthis*, *L.barbarum* and *R.sanctus* respectively, while the pupa weights decreased from 0.20 g in the control treatment to 0.14, 0.12, 0.10 g for *C.colocynthis*,*L.barbarum* and *R.sanctus*, respectively, at 10 mg/ml. while the rate of productivity of 55.00,48.33, 29.67 egg/female for the *C.colocynthis* ,*L.barbarum* and *R.sanctus* respectively with the same concentration mentioned above. In addition to identifying the distortions caused by different concentrations of phenolic extracts of plants in different life roles. Phenol compounds were tested for TLC, UV, and FTIR plants.

Keywords: *Musca domestica*, phenolic extract, *Rubus sanctus*, *Lycium barbarum*, *Citrullus colocynthis*

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INTRODUCTION

M. domestica L. is one of the most important insect in the field of medical and veterinary, as its widespread in whole the world which is affecting the health of humans and animals through the mechanical transfer of many pathogens in humans and animals. Due to the medicinal and veterinary importance of this insect, the efficiency of phenols extracted from *C.colocynthis, R. sanctus, L. barbarum*, and the diagnosis of bioactive compounds as to be an alternative in the manufacture of insecticides (safe and friendly to the environment) and less harmful to non-target organisms and the rapid of degradation and the difficulty of mechanical resistance to natural products compared with the pesticides manufactured as the latter works on the basis of one active compound, and some are known to contain toxic compounds (Jurani, 1991).

MATERIALS AND METHODS

Plant samples

Leaf samples were collected for flowering plants, raspberries seeds during October. Wash, clean and dry the plant samples in laboratory conditions, and tested to obtain a precise vegetable powder, keeping in a bottle tightly closed and leave it in the refrigerator until use.

Insect culture

The samples of *M*. *domestica* were collected from stockyard in one of the countryside and placed in breeding cages. Petri dishes contain the milk and a little sugar was Place in the cage. The insect was nurtured and fed according to the method that led by (Hashem and Youssef, 1991) at 30 ± 1 and relative humidity 5 ± 65%, placed plastic cups in the cage to feed the larvae and composed of (wheat bran 655 g + powdered milk powder 50 g + yeast 38 g + 600 ml Distilled water), mix the ingredients together to become a crisp dough and moisten with distilled water to attract adults and lay the eggs. Transfer the eggs to the incubator at 30 ± 1 ° C and relative humidity ± 65%.

Preparation of phenolic compounds extracts

The method of Ribberean-Gayon (1972) was use to prepare the raw phenolic compounds of the plants. It weighed 20 g of dry powder for each plant. It was placed in a 1000 ml flask. 400 ml of acetic acid was added to it. 100 m water for one hour and then leave the mixture to cool down. Then add sodium chloride until the saturation limit has been formed. Two layers have been formed that isolated the top layer (organic) containing the phenolic compounds using the separation funnel and then the concentration, apply this layer with a rotary evaporator and drain after that place the dry material in a sealed glass tube in the refrigerator until use.

Preparation of concentrations for test

For the purpose of estimating the biological efficacy of each extract, weigh 2 g of dry and ethyl alcohol in 5 ml of ethyl alcohol (95%) and complete the volume to 100 ml with distilled water. The original solution (2%) or 20 mg / (2.5, 5, 10, 20 mg / ml). The control treatment was added by adding 5% of the ethyl alcohol to 95% of the distilled water.

Chemical tests

Thin layer chromatography (T.L.C)

The chemical compounds of the plant phenolic extract were separated by the Stahl (1969) method. The solvent system (propanol: acetone: water) was used in the proportion of ml (30: 35: 35) respectively (Khafaji, 2010). Relative Flow (RF) values were determined according to Harborne (1984).

Ultra violet Spectroscopy (U.V.Visb) spectrum

Approximately melted of 0.01 g of phenolic extract was extracted per plant separately in absolute ethyl alcohol and the UV spectra of the compound was measured in the UV-Visible Spectro photometer shimadzu 1650 PC.

Infrared Spectrum Measurement (FTIR)

The IR spectrum of the phenolic extract of each plant was studied separately using KBrdisk Fourier Transforms Infra Red (FTIR).

Effect of phenolic extract of plants tested in some aspects of the *M.domestica*

Effect of phenolic extract in growth period

50 eggs/replicates were taken within 24 hours and treated with phenolic extract concentrations for each plant, each concentration and each separately and by three replicates per concentration. This was spatially done with a hand spray. The fresh larvae were then transferred from each concentration and each plant separately to the previously mentioned nutrient medium. Following the growth to the final stage, the dead insects were removed daily from the treatments and examined microscopically to identify the deformities. The rate of loss of the insect and the time required for its growth to reach the adult insect.

Effect of phenolic extract on weight of pupa

Ten virgins were randomly selected from each replicator and each plant separately. Their weight was recorded with a sensitive balance and compared with the weight of the pupa in the control treatment.

Effect of phenolic extract on female productivity

Five females were taken from eggs lab with five treated males and placed in cages for the purpose of mating with three replicates per concentration. The control coefficients were 5 females with 5 males. Both were not treated with the extract and were left for mating and laying eggs. The phenotypic distortions caused by the phenolic extract concentrations of each plant were also identified and photographed.

Design of experiments and statistical analysis

The results of the phenol-derived experiments for the tested plants were analyzed in the loss of larval stages according to the global experiments model using full-scale experimental experiments with completely randomized design. The least significant difference (LSD) test was used below the level of probability of 0.05 for the significant test results. The percentages of the peril of death were corrected according to equation of Abbott formula (Abbott, 1925).

RESULTS AND DISCUSSION

Effect of phenolic extract on growth period

Table (1) shows the duration of the growth of immature stage of the *M.domestic* in the phenol extract. The growth period ranged between 26.00-12.33 days for the *C.colocynthis* while between 18.33-12.00 and 17.00-11.00 for the *L.barbarum* and *R.sanctus* plants respectively for the same extract in the concentration was 2.5-10 mg / ml As compared to the control treatment of 10 days. It is also noted through the table that the growth period of immature stage of the insect increases with increasing concentrations used. Statistical analysis showed that the *C.colocynthis* was the best among the plants followed by *L.barbarum* and then *R.sanctus* through the rate of influence of plants. Al-Sharifi (2010) showed that the duration of the immature stage of the domestic fly was 0.00 days for the phenolic extract of the E. helioscopia plant and at 10 mg / ml concentration. It also indicated an increase in the duration of the immature stages of *M.domestic*, which were treated with different concentrations of the foliage leaves was 17.7 16.1, 14.3 days in the phenolic extract of the concentration of 10 mg / ml. Most of the fatalities occurred during the migration and transfer from one stage to another. The reason for containing the

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phenolic extract of the tested plants may be the presence of caustic compounds, which are likely to prevent the formation of the two kites in the immature stages, since the larvae cannot construct a new cuticle and that will leading to the destruction of the insect (Chalabi, 1998).

Table (1) Effect of concentrations of phenolic extract of plants in the period of growth of immature stage of *M.domestica*

Rate of plant effects	20	10	5	2.5	0.0	Concentrations Mg/ml / Plant
12.53	0.00	26.00	14.33	12.33	10.00	*Citrullus colocynthis*
9.93	0.00	17.00	11.67	11.00	10.00	*Rubus sanctus*
10.73	0.00	18.33	13.33	12.00	10.00	*Lycium barbarum*
	0.00	20.44	13.11	11.77	10.00	Rate

LSD 0.05 $\frac{\text{For the effect of concentrations of phenolic extract of plants} = 0.25}{\text{For binary interference } 0.43}$

Influence in the weights of Pupa

As showing in the table (2) that there is an inverse relationship between the weight of the Pupa and concentrations of this extract, as well as the superiority of the *C.colocynthis* in achieving the lowest weight of the Pupa followed by the *L.barbarum* and *R.sanctus*, which did not differ between them. This is confirmed by the results of statistical analysis. The weights of Pupa reached 0.10 - 0.16 g for the phenolic extract for *C.colocynthis* and *L.barbarum* and *R.sanctus*. The weight of pupa ranged between 0.12- 0.18 and 0.14-0.99 g respectively for the same extract and in concentrations 10-2.5 mg / ml compared with control treatment of 0.21 g. The reason for the decrease in the weight of pupa may be due to sensitivity the larvae of toxic substances found in plants or the effect of these For substances in the transformation of the resulting larvae of larvae treated, which adversely affected the weight of virgins or may be due to the avoidance of larvae from feeding and starving before turning into a pupa. Seenivasan *et al*. (2004) noted that *C. colocynthis* is a nutritionist, Of the fertility of insects .. In this regard, Al-Kaabi (2005) pointed out that the superiority of the phenolic and alkaline extracts of *D. innoxia* on the plant *C.calocynthis* in the weights of the offspring of the insect of the corn leg digger *Sesamia cretica* where treatment with phenol planters more effective in reducing the weights of Pupa It stood at 101.20 and 99.80 mg of vegetarian *D.innoxia* and *C.colocynthis* respectively. The reason for the appearance of low-weight pupa may be due to the extruding effect of some chemicals found in the larval food treated in the extract. Al-Mansour (1995) reported that the processed larvae fed with plant extracts do not take enough food to turn into a poor pupa, Food availability due to the interaction of toxic compounds of the extracts with food, especially protein, or these effective compounds may interfere with the endocrine system of the larvae while feeding on the medium containing the extracts affect the young hormone responsible for the process of evolution and formation in the insects .Wyalt and Davey (1996) Enables larvae moult and develop the next phase of insufficient food item inside her body before Vtaatadhir growth produces completeness pupa short distorted few weights or graduated adults distorted short wings stunted you cannot successfully complete the life cycle.

Table (2) Effect of concentrations of phenolic extract of plants in the rate of weight of pupa

Rate of plant effects	20	10	5	2.5	0.00	Concentrations mg/ml / Plants
0.11	0.00	0.10	0.12	0.16	0.21	*Citrulus colocynthis*
0.12	0.00	0.14	0.15	0.19	0.21	*Rubus sanctus*
0.13	0.00	0.12	0.14	0.18	0.21	*Lycium barbarum*
	0.00	0.12	0.13	0.17	0.21	Rate

LSD 0.05 $\frac{\text{For the effect of concentrations of plant phenolic extract} = 0.03}{\text{For binary interference } 0.05}$

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Influence in the rate of productivity

Table (3) shows the effect of phenol extract on plants in the rate of productivity of females of *M.domestic* produced from eggs of plants with phenolic extract, noting that the productivity of the insect was 29.67 - 78.00 eggs / female of the *C.colocynthis* compared to control of 219.33 eggs /female while ranged between 48.33 - 88.00 55.00 - 98.00 eggs /female for *L.barbarum* and *R.sanctus* respectively extract mentioned and concentrations of 2.5-10 mg /ml as the female insect could not lay eggs at the highest concentration of 20 mg / ml of plants tested Kaveh, statistical analysis confirmed by the effect of vegetation rate that *C.colocynthis* was the best in recording the lowest rate of productivity then *L.barbarum* and *R.sanctus*. Al-Kaabi (2005) pointed to the superiority of the phenolic extract of *C. cocolynthis* in reducing the number of eggs produced by the female *S.crecica,* which emerged from the larvae fed to 60 eggs /female. The decrease in female productivity may be attributed to the chemical compounds that it contains Abstract has been discouraged from feeding the insect in the larval role, which led to the inhibition of egg formation process later because this process depends on the material that was stored during the feeding larvae (Jurani, 1991). In this regard, he noted (Degeyter *et al*., (2007 that phenolic compounds have negative effects in insects lead to reducing fertility. It can be said that the reason for the inability of the insect to lay eggs may be due to the inhibition of ovarian growth and tubes, ovaries and prevent vesicles ovarian growth.

Table (3) Effect of concentrations of phenolic extract of plants in the rate of female production of *M. domestica*

Rate of plants effects	**20**	**10**	**5**	**2.5**	**0.00**	Concentration mg/ml / Plants
76.13	0.00	29.67	53.67	78.00	219.33	*Citrulus colocynthis*
89.46	0.00	55.00	72.67	98.00	221.67	*Rubus sanctus*
84.26	0.00	48.33	65.00	88.00	220.00	*Lycium barbarum*
	0.00	44.33	63.78	88.00	220.33	Rate

$$\text{LSD } 0.05 \quad \frac{\text{For the effect of concentrations of plant phenolic extract} = 3.68}{\text{For binary interference } 6.38}$$

Figure 1. Effect of Abstract phenolic in the cumulative loss for the roles of non-adult

Figure A-B and C shows that the effect of phenol extract on the loss of immature stages of *M.domestic* was similar to that of the tested plants. There were no significant differences between the used concentrations. The larval stages were all destroyed when they reached the third phase. The loss rate was 100% at 20 mg/ml. compared with the control treatment, which amounted to about 16% and should be noted that oddball larval have all been destroyed and did not reach the role of the pupa it may be the reason for that is the accumulation of active compounds found in extracts within the tissues of the gut of the insect, causing their death, as we note through the form superiority Almst Thief phenolic plant *C.colocynthis* to extract phenolic to *L.barbarum* and *R.sanctus* in the loss of roles of non-adult household fly, amounting to the loss of 53.2% of the *C.colocynthis* ratio of concentrate 10 mg /ml while it was 50%, 52.6 *L. barbarum* and blackberries, respectively, and by focusing itself. He (Al-Zubaidi and Halify. 1989) that the effect of extracts crude phenolic in increasing the proportion of Alhlakat cumulative roles of non-adult household fly may be due to the sensitivity of larvae of materials Acommhalmugodh in the plant or poisoning of the gut responsible cells for absorption and low metabolism or the larval treatment refrain from malnutrition as a result of its exposure to extract and then kill her.

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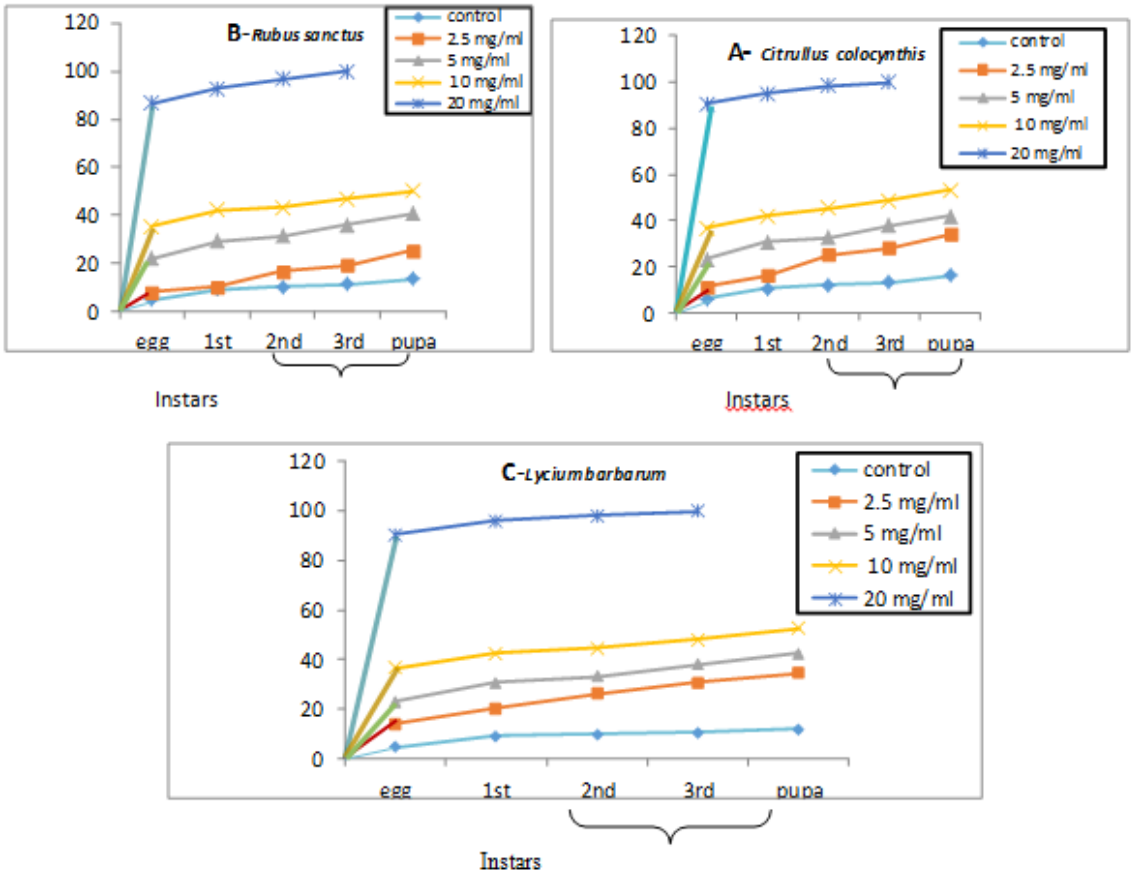

Effect of phenolic compounds in the deformities of life roles

Plate No.1 shows the Deformities in different larval stages A number of phenotypic abnormalities in the tested dead larvae, such as larval larvae and mortality during the subsequent stages of the larvae, are observed. The probable cause of these abnormalities is that the toxic compounds in the plant can have an antagonistic reaction to insect hormones Especially the Juvenile hormone and Moulting hormone and thus prevent the occurrence of snails in the correct manner and also note the emergence of black spots on the bodies of larvae or larval larvae whole or the death of larvae during the dissolution into the stage larvae or later or the stage of virginity or the emergence of intermediate between the larvae and pupa or the emergence of The larvae or the larvae (Albino)) and then die without completing the life cycle or elongation in the larvae and larger in size than the normal limit of the treatment of control or shortness in the larvae or deformities in the abdominal rings and explain the reason for the sensitivity of the insect to the substances found in the tested plants, which shows the act Inhibitory of these plants on larval growth that resembles the work of growth regulators (Harborn, 1984) in this regard, noted Tabssum *et al.,* (1996) that the beet plant extracts led to the events of high mortality in the third phase of a fly household also noted Sarwar *et al* ., (2012) that many of the plants include materials phenolic or Gulwanah T Impact of life in the southern cowpea beetle including *C.colocynthis*. Most of the fatalities occurred during the migration and transition from one stage to another. The reason for containing the extract of the tested plants may be due to the formation of Kaite inhibitors, which are likely to prevent the formation of the two kites in the immature stages, since the larvae can not construct a new Qtelk which leads to destruction insect (Chalabi, 1998).

Describes the plate (2) distortions of pupa, where s award note Abstract efficiency phenolic in reducing weights pupa rates resulted pupa short and distorted few weight compared with those in the control treatment. The reason for the emergence of low-weight pupa may be due to the effect of the extruder of some chemicals found in the diet of larvae treated with phenolic extract. Al-Mansour (1995) said that the larva treated with plant extracts do not take the need of sufficient food, so turn into a poor pupa.

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Plate (3) The abnormalities caused by adults treated by concentrations of phenolic extract of plants were the occurrence of abnormalities in pupa and the absence of adults, as the concentration of 15 mg / ml was reduced to 26% by total withdrawal due to the presence of similar growth regulators in the plant. Toxicity is due to the fact that the active compounds act as infectious toxins, thus disrupting bowel movement and affecting the functioning of digestion and absorption (Metsculu *et al*., 2001). It also emerged from this experiment failed to exit adults of pupa resulting from larvae treated and the appearance of insects with a distorted or short-winged wings in the wings or elongation in the head of the insect, which confirms the presence of effective substances caused distortions and may be similar hormonal substances. In addition, the extract resulted in the failure of the full emergence of the stage of the pupa and the destruction of the intestine in the virulence. We note the high rates of abnormalities in adult females that are treated with the phenolic extract of the plants tested by 65% compared with the adult control of up to 11%, Celis *et al*. (2008) indicates that secondary compounds, including phenols, act as growth regulators that inhibit or inhibit morphological transformation or induce early dislocation as altered hormones regulate the nucleus and cause formal abnormalities or infertility and insect death.

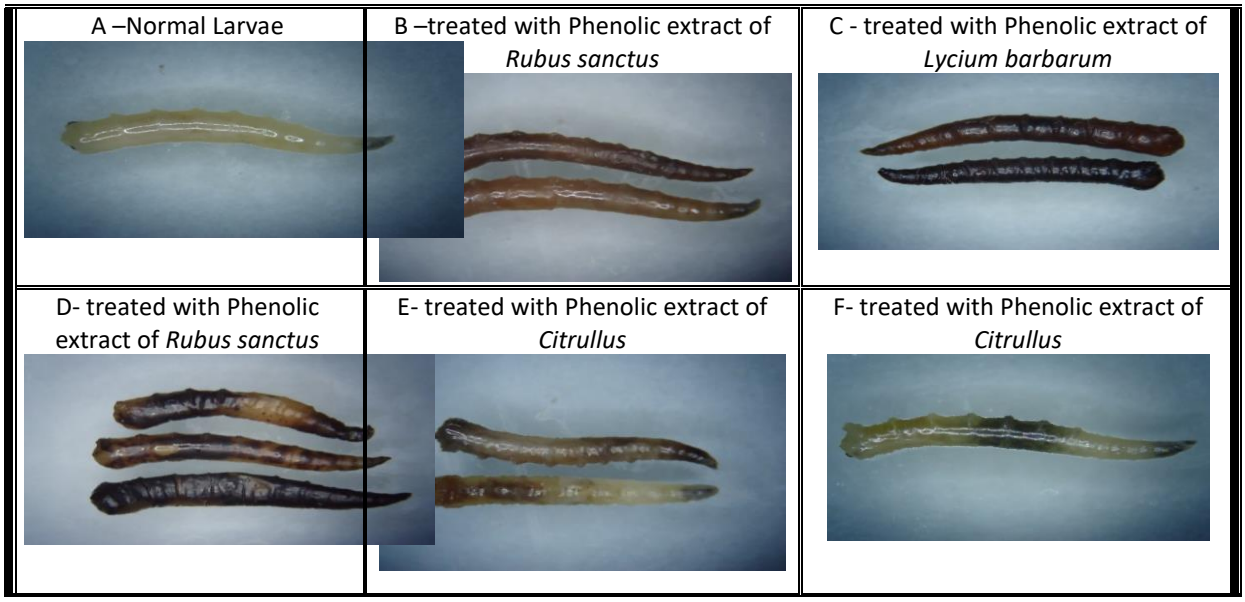

Plate No.1

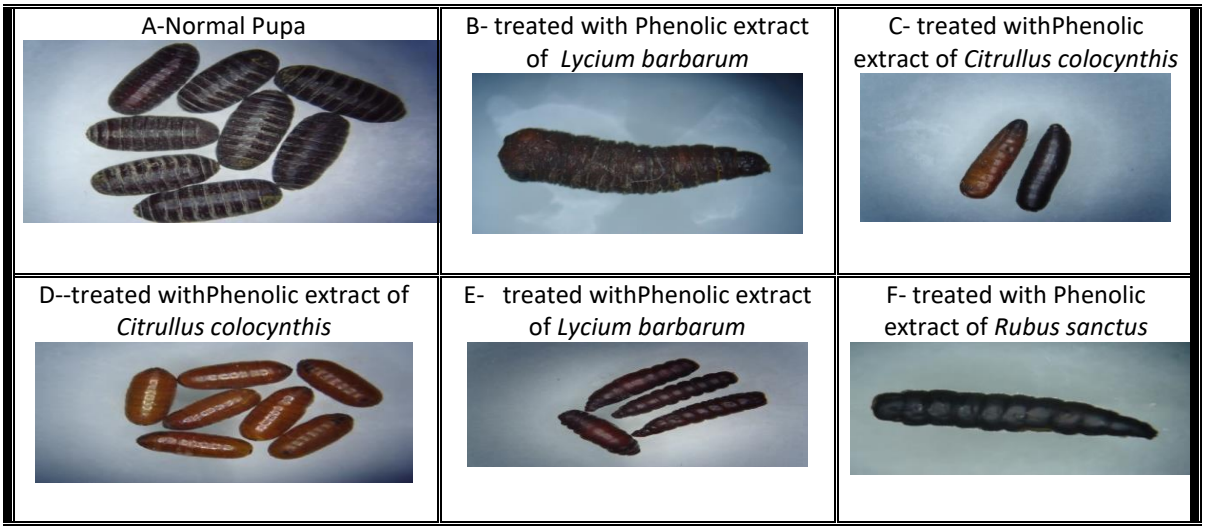

Plate No.2

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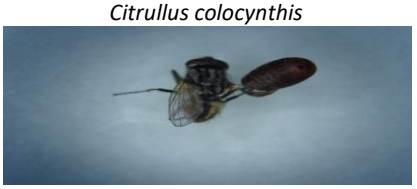
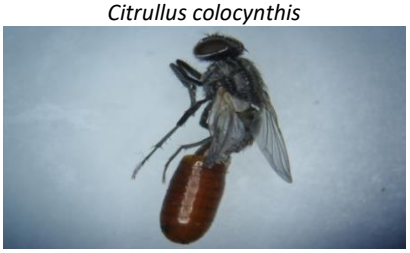
A - Normal adult 	B--treated withPhenolic extract of *Citrullus colocynthis* 	C--treated withPhenolic extract of *Citrullus colocynthis* 
D -treated withPhenolic extract of *Citrullus colocynthis* 	E -treated withPhenolic extract of *Lycium barbarum* 	F -treated withPhenolic extract of *Citrullus colocynthis* 
G -treated withPhenolic extract of *Citrullus colocynthis* 	H -treated withPhenolic extract of *Rubus sanctus* 	J-treated withPhenolic extract of *Citrullus colocynthis* 

Plate No.3

TLC test

Table (4) shows: RF values of compounds isolated from phenolic extract of plants using T.L.C

Color spot using Ferric Chloride Detector Fecl3	Spot color on Radiation lamp Ultraviolet	Color Spot in Visible light	R.F(mm)	Symbol spot	Plant Name
Brown	Brown	Brown	0.22	A	*R.sanctus*
Brown-green	Light brown	Light Yellow	0.54	B	
Green	Dark Brown	Umber	0.70	C	
Colorless	Purple	Colorless	0.81	D	
Colorless	Yellowish green	Colorless	0.09	**A**	*L.barbarum*
Light Yellow	Light purple	Light Yellow	0.46	**B**	
Green	Dark brown	Yellow	0.53	**C**	
Greenish yellow	greenish blue	Light Yellow	0.59	**D**	
Colorless	Dark purple	Colorless	0.67	**E**	
Colorless	Light purple	Colorless	0.52	**A**	*C.colocynthis*

Infra-Red Spectrum (FTIR)

A-FTIR spectrum for the phenolic extract of *R. sanctus*

The FTIR of the phenolic extract of each plant has been interpreted and determined based on the literature (Silverstein, 2008, Silverstein, 1990, Bark, 1988) on the spectra of the molecules that make up this type of compounds. The spectra of these organic compounds are complex because of the interferences between the beams of the aromatic ring molecule and the associated aggregates. Because these spectra are complex, some of them have to be divided into two spectral regions for easy interpretation.

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1-The area of the spectrum confined between (1700 – 4000) cm^{-1}

A- Wide-band appearance at site (3425) cm^{-1} is due to the frequency of hydroxyl group of water molecules and phenol compounds combined with the amine secondary group (N-H).

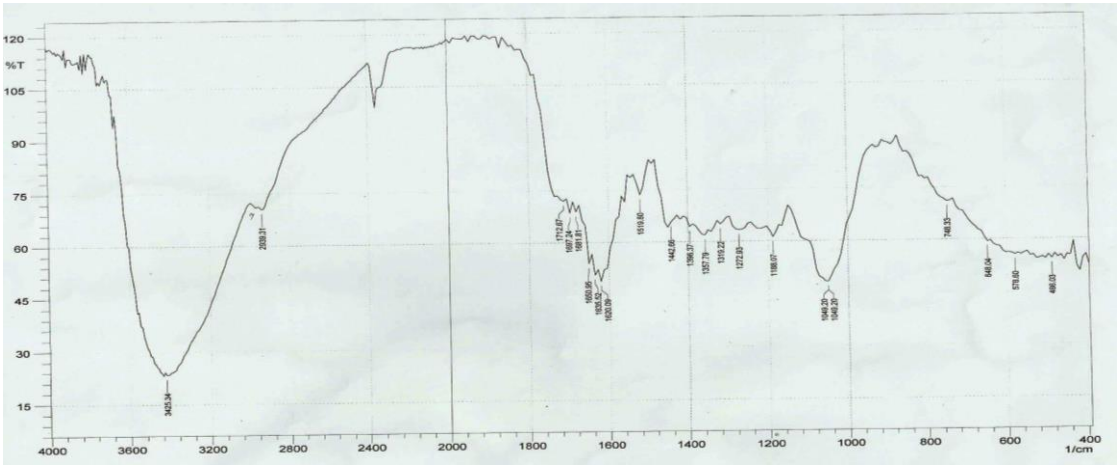
B. Appearance two packages at the site (2939, 2970)$^{cm-1}$ were found in the elliptical frequency of the links .∿ (CH) while bounds package aromatic.∿ (CH appearance at 3890 cm^{-1} .

2-the spectrum area confined between (1700 - 500) cm^{-1}

A - the appearance of the package at the site of 1650cm^{-1} return to the radio frequency of the group Carbonyl ∿ (C = O) and overlapped with other packages, noting that the CO frequency shows a strong package alone at a location approximately higher at 1700-1680

B - The package at site 1635 cm^{-1} returns to the latency of the bond ∿ (C = N).

C - The beam at frequency 1515 cm^{-1} returns to mass spectrometer of the bond ∿(C = C).



FTIR spectrum of the phenolic extract of *R. sanctus*

FTIR spectrum for the phenolic extract of the *L. barbarum* plant

1-the spectrum area confined between .(4000 - 1700) cm^{-1}

A - two packets at site (3440, 3425)cm^{-1} are due to the diphtheric frequency of N (O-H) and N (N-H) respectively.

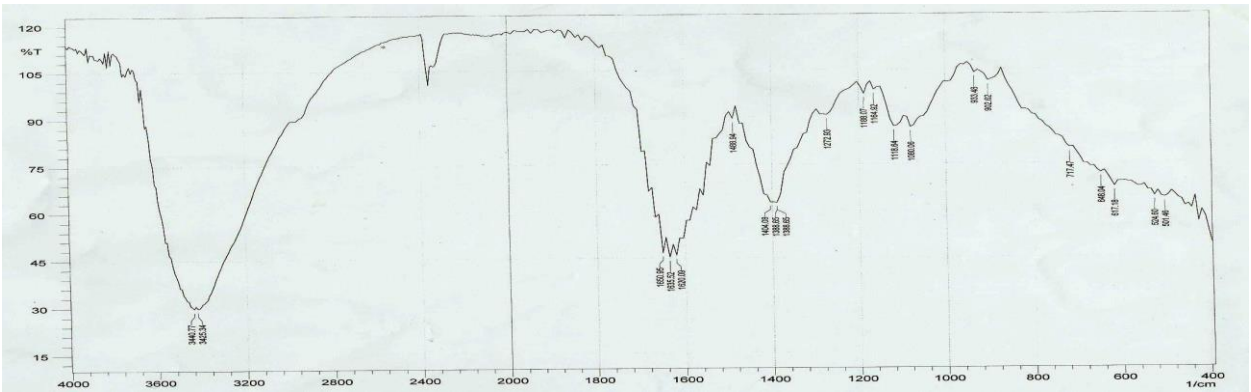
B. The emergence of two packages at site (2945-2970)cm^{-1} was due to the ammotic frequency of the aliphatic (C-H) groups. The aromatic C-H package appeared at 3074

2-The spectrum area confined at .(1700-500) cm^{-1}

A- the presence of two packets of two bands at .(1630 ,1558) cm^{-1}- were found in the elliptical frequency of the links C-O (N = C = N), respectively

B - the emergence of a package at the frequency of 1419 cm^{-1} return to the mass of the bonds (C = C) aromatics.

C - A set of beams at (601-648) cm^{-1} dating back to the Fennel totals.



FTIRspectrum of the phenolic extract of *L. barbarum*

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C) FTIR spectrum of the phenolic extract of *C. colocynthis*

1 -The area of the spectrum confined between (1700 – 4000) cm^{-1}.
A-The beams at position (3425-3440) cm^{-1} refer to the mitotic frequencies of the bonds ∿(O -H, ∿ (N -H).
B - the emergence of two packets at (2929 - 2992) very weak due to the frequency of the links N (C - H).
2 -The spectrum area confined at .(1700-500) cm^{-1}
A - The emergence of several packages at site (1650 - 1697)cm^{-1} returns to the umbilical frequency of the bonds ∿ (C = O), ∿ (C = N), respectively.
B - the appearance of the package at the site 1620 cm^{-1} revert to the latent frequency N (C = C) aromatics
C - the emergence of packages at the site 648 cm^{-1} belong to the totals of Fennel.

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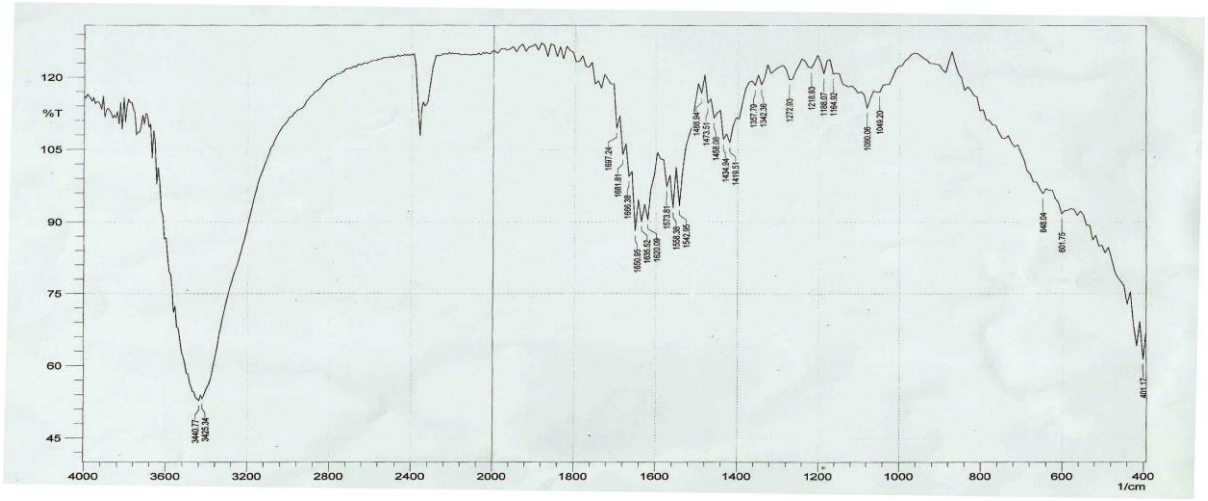

FTIR spectrum of the phenolic extract of *C. colocynthis*

Spectral studies

Measurement of the ultraviolet-visible spectrum of UV-visb

A - UV spectrum of the phenolic extract of the *R.sanctus*

The UV spectral spectrum of the rhesanctus phenolic extract of the *R.sanctus* plant in the ethyl alcohol solvent showed three bands at different wavelengths, giving a maximum absorption peak at the maximum wavelength λ max = 324.5 nm and other absorption bands at wavelength 287, 214 nm where it appeared In different locations of the spectrum. The package at 324.5 nm does not return to the local excitation $(n \longrightarrow \pi^*)$ of the aromatic ring. The other beams are transitions of type $(\pi \longrightarrow \pi^*)$where the sum of the compensated batches of the aromatic ring containing the electronic dipoles has less absorption power, which is shown at wavelengths higher than the weak super absorbent band at wavelength 287, 214 are transitions of type $(\pi \longrightarrow \pi^*)$ where it has a low absorption intensity because it is not allowed transitions since these values are identical to the ultraviolet ray of the original compound, which appeared at the wavelength of 324.5nm as verified in the literature (Weast, 1975). Scientific evidence that the compound extracted from the plant is a phenolic compound.

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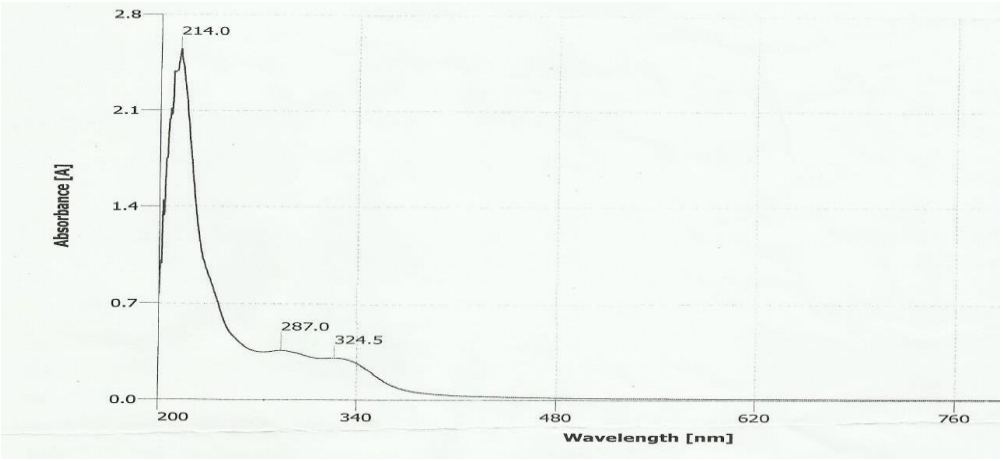

Figure (1) UV spectrum of phenolic extract of *R.sanctus*

B-UV spectrum of the *C. calyocythis* cantaloupe plant

The ultraviolet radiation spectrum of the phenolic extract of the cantaloupe plant in the ethyl alcohol solvent showed four beams at different wavelengths, giving a maximum absorption peak at the maximum wavelength λ max = 625 and other absorption bands at wavelength 280.0 nm and 205.5 where they appeared at different locations Of the spectrum. The package at 625 nm is due to local excitation (n⟶π^*) of the aromatic ring. The other beams are transitions of type (π⟶π^*), which belong to the compensated masses of the aromatic ring, which contain the electronic couplers, which have a lower absorbance power, which appear at wavelengths higher than the weak super absorbent beam at the wavelength.((π⟶π^*) where it has low absorption strength because it is not allowed because these values are identical to the UV-ray spectrum of the original compound, which appeared at 625 nm wavelengths in the literature (Weast, 1975). The compound derived from the plant is a phenolic compound.

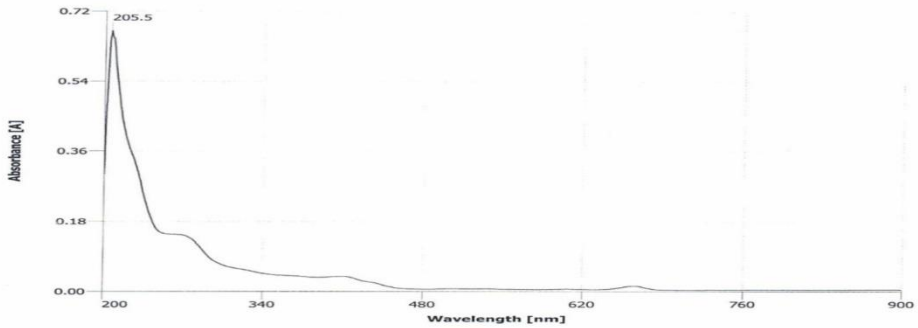

Figure (2) UV spectrum of *C. calyochynthis* cantaloupe plant

C-UV spectrum extract phenolic *L.barbarum*

The ultraviolet-visible spectrum of the phenolic extract of the *L.barbarum* plant in the ethyl alcohol solvent showed three bands at different wavelengths, giving a maximum absorption peak at the maximum wavelength λ max = 321 nm and other absorption bands at wavelength 212.5, in different locations of the spectrum. The absorption pack at 321 nm is due to the localized excitation (n⟶ π^*) of the aromatic ring. The other beams are transitions of type (π⟶π^*), where the sum of the compensated batches of the aromatic ring containing the electron pairs has less absorption power, which is shown at wavelengths higher than the weak super absorbent beam at wavelength 287, 324 are transfers of type (π⟶π^*), where they

have low absorption intensity because they are not allowed transitions since these values have been matched to the ultraviolet-visible spectrum of the original compound, which appeared at wavelength 214 as verified in the literature (Weast, 1975) a scientific compound that is extracted from the plant is a phenolic compound.

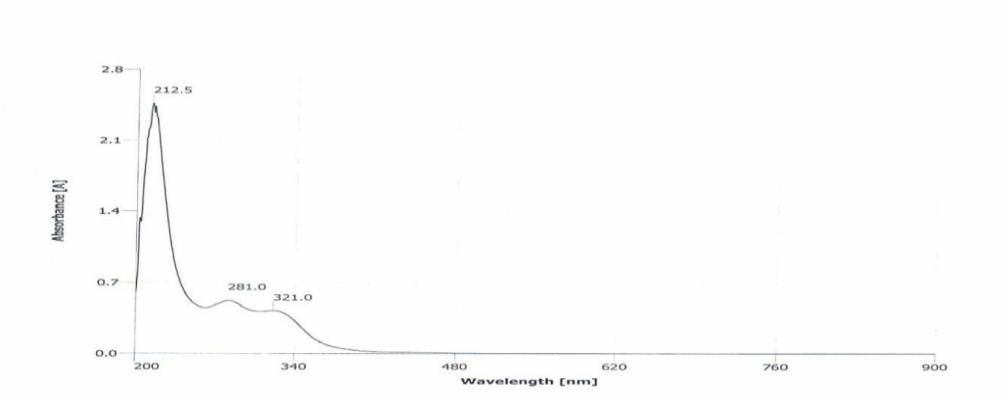

Figure (3) UV spectrum of the phenolic extract of *L.barbarum*

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