Plant Archives Vol. 18 No. 1, 2018 pp. 1113-1121 *ISSN 0972-5210*

COMPARISON OF EFFICIENCY OF ALKALOIDS AND TERPENOID EXTRACTS OF SOME PLANTS IN THE ACCUMULATED MORTALITIES OF THE IMMATURE STAGES OF *MUSCA DOMESTICA* L. (DIPTERA : MUSCIDAE)

Majida M. Al-Mrammadhi and Mohamed R. Al-Hasnawi*

Department of Biology, College of Sciences, University of Al-Qadisiyah, Diwaniyah, Iraq.

Abstract

The effect of crude extracts of the secondary compounds (alkaloids and terpenoids) of *Citrullus colocynthis, Rubus sanctus Shreb and Lycium barbarum* were tested on some biological aspects of the house fly *Musca domestica*. The mortality rate of the immature stages for all secondary compounds was 100% with a concentration of 20 mg/ml compared with the control that was 18-12%. Growth period was 16 and 15.67 days for alkaloids extract of *R. sanctus*, *L. barbarum* and *C. colocynthis* respectively at 10 mg/ml compared with the control with 10 days. As for the tumeric extract, growth period was 15.33, 16.67 and 19.33 days for *R.sanctus* Shreb, *C. colocynthis* L. and *L. barbarum* plants respectively and for the same concentration. The weight of the pupae decreased from 0.20g in the control treatment to 0.12, 0.11 and 0.10 g for the alkaline extract of *C. colocynthis R. sanctus* and *L. barbarum* respectively in the concentration of 10mg/ml while it was 0.15, 0.14 and 0.11g for *C. colocynthis, R. sanctus* and *L barbarum* plants respectively and in the extract. The rate of productivity in alkaloids extract was 52.33, 50.24, 0.0 eggs/female for *L.barbarum, C.colocynthis* and *R.sanctus* respectively at 10mg/ml compared with the control which was limited between 224-223 eggs/female while the productivity was 48.33,41.67, 11.67 eggs/female for the terpenoids extract of the plants *L. barbarum, R.sanctus* and *C .colocynthis*, respectively.

Key words : Plant extracts, *Musca domestica*, accumulative mortality, alkaloids, terpenoids.

Introduction

M. domestica is a domestic insect of widespread medical and veterinary importance, affecting the health of humans and animals through the mechanical transfer of many pathogens to humans and animals. Due to the medical and veterinary importance of this insect, the efficiency of alkaloids and terpenoids were extracted from *Citrullus colocynthis*, *Rubus sanctus* and *Lycium barbarum* and biodegradation was evaluated to be a promising alternative in the manufacture of safe and friendly insecticides and less harmful to non-target organisms, resistance to natural products compared to synthesized pesticides because the latter act on the basis of one active compound, and some are known to contain toxic compounds (Al-Jurani, 1991).

Materials and Methods

Plant sample collection

Leaves of *L. barbarum*, *R. sanctus* and *C. colocynthis* seeds were collected during October. Samples were washed, cleaned and dried in laboratory conditions each separately, and tested to obtain fine vegetable flour; then kept in a bottle tightly closed and deposited in the refrigerator until use.

***M. domestica* :** Mature house flies were collected and ground to fine size (powder) with a mill and placed in breeding cages. In the cage, milk and sugar dishes were put for feeding the adult. The insects were bred and fed according to Hashem and Youssef (1991) method, at 30±1 temperature and 5±65% humidity. Also, in the cage plastic cups with synthetic nutritive medium were put to feed the larvae (655g wheat, 50g dry milk powder + 38g yeast

***Author for correspondence :** E-mail : mohammed-alhasnawi@qu.edu.iq

+ 600ml distilled water), all mixed together to have paste and wet with distilled water for the purpose of attracting adult for oviposition. Eggs were transferred to the incubator at 30±1°C and of ±65% humidity.

Preparation of alkaloids compounds extracts

The method in Harborne (1984) was followed by taking 20gm of powder from each plant sample and placed in the paper extractor container separately then put in the extraction apparatus with 200mL of ethyl alcohol 95 for 24 hours in 40°C; then dried with the rotary evaporator. The resultant material was dissolved in 5ml of ethyl alcohol, and 30ml of sulfuric acid 2% were added to remove the alcohol by using the rotary evaporator again to keep the solution acidic. Then, 10% ammonium hydroxide solution was added until pH = 9. Then, the material was extracted by separation funnel with 10mL chloroform and shaken for several times. The last step was repeated three times and the bottom layer was taken at each time, so that the accumulated solution was approximately 40mL. The sample was dried up and weighed.

Terpenoid compounds preparation

Harborne (1984) method was allowed to prepare crude terpenoid compounds: 20g of dry powder for each plant was weighted and each was extracted with sexhulate with 200mL chloroform for 24 hours at 40°C. The extract was concentrated by the rotary evaporator and dried in the electric oven at 45°C and dry sample was put in closed glass tube in the refrigerator until use. The sample was dried and weighed and test concentrations were prepared and control was treated.

Preparing test concentrations for testing

For the purpose of estimating the biological efficacy of each extract, 2g of the dry material was weighted and solved in 5ml of ethyl alcohol (95%) and the volume was completed to 100ml with distilled water, so the original solution became 2% or 20mg/m and the concentration 2.5, 5, 10, and 20mg/ml were prepared. Control was prepared by adding 5% ethanol to 95% distilled water.

Experimental design and statistical analysis

The results of the alkaloid and terpenoid extracts of the tested plants were analyzed in the mortality of the different larval stages according to the factorial experiments with completely randomized design. The least significant difference (LSD) was used below the level of 0.05 probability. The mortality percentages were corrected according to the Abbott formula (Abbott, 1925).

The Effect of the Alkaloid and Terpenoid Extracts on the Mortality of the Immature stage of *M. domestica*

The effect on growth period

Fifty egg replicates were taken within 24 hours of age and treated with and extracts of each plant and each concentration separately by three replicates per concentration by spraying them superficially using a hand sprayer. The fresh larvae were then transferred from each concentration and each plant separately to the previously mentioned nutrient medium. The growth was followed up until adult emergence. Dead insects were removed daily from the treatments and examined microscopically to identify the deformities. Mortality rates and the length of time required for its growth to reach the adult stage were calculated.

The effect on pupae weight

Ten of the pupae were randomly selected from each replicate and from each plant separately. Their weight was recorded with a sensitive balance and compared with the weights in the control in order to determine the effect of the extract on the weight of the resulting pupae.

The effect on female productivity

Five females were taken from treated eggs with five treated males and placed in cages for the purpose of mating in three replicates per concentration. The control equivalents were 5 females with 5 males, both of which were not treated with the extract and left for mating and laying eggs. Number of eggs from each female in each concentration and for each plant was recorded to calculate the productivity of mature females. Also, deformities were identified in different concentrations of extracts for each plant and photographed to know the extent of the effect of the extract on the life stages.

Results and Discussion

Table 1 shows the period of growth of the immature stages of the insect in the extracts of secondary compounds (alkaloids and terpenoid) of the tested plants. The growth period ranged between 10-16 days for the *Rubus sanctus* alkaloids extract in concentrations of 10-2.5mg/ml, while growth was 10-16 days for the *Citrullus colocynthis*. As for *Lycium barbarum*, the growth period ranged between 10-15 days for the same extract and concentrations compared to the control treatment of 10 days. As for the extract of terpenoid, the growth period ranged between 13-19, 10-16 and 10-15 days for *Lycium barbarum*, *Citrullus colocynthis* and *Rubus sanctus* respectively in the concentrations of 10-2.5mg/ml. From the table, it is shown that the duration of the growth of immature stages of the insect increases with the increase of concentrations used and the superiority of the extract of the terpenoid of the plants tested in recording the

longest growth period for immature insects and then alkaloids and this is noted and confirmed by the results of statistical analysis which proves that *L. barbarum* was the best among the plants followed by *C. colocynthis* and *R. sanctus* through the rate of effect of plants. In this regard, Al-Zubaidi *et al*. (2005) pointed out that the extract of the crude terpenoid compounds of *C. spinosa* leaves and its fruit had a significant effect on some biological performance parameters of the house fly. The cumulative mortality in immature stages increased to 72 at 20mg/ml concentration compared to 11 days in the control. Al-Zubaidi *et al.* (2007) found that the extract of terpenoid compounds isolated from leaves, flowers and fruits of *Datura d. Innoxia* had an effect on some aspects of the insect life cycle. Control equivalents are 14 and 13 days of egg treatment and monitoring cumulatively with the compounds 1 and 2 extracted from the leaves and flowers, respectively. Al-Sharifi (2010) showed that the duration of the immature stages of house fly was 20 days for the alkaloid extract of the *E. helioscopia* plant at 10mg/ml concentration and 0.00 days for the terpenoid plant extract with the same concentration. Al-Zubaidi (2010) showed an increase in the duration of the immature stages of house flies treated with different concentrations of fecal extract: 18, 17, and 15 days for alkalioid extract of flowers, leaves and seeds respectively at 10mg/ml concentration. While in the terpenoid extract was 15, 14, and 14 days for the same concentration and plant parts mentioned above. Sarwar *et al*. (2012) noted that many plants contain phenol or alkaloid substances that affect the life of the southern *cowpea* beetle, including *C. colocynthis*, as most of the mortalities occurred during the transformation and transition from one stage to another. The cause maybe the compounds have materials that inhibits the formation of chitin in immature stage, since the larvae cannot build new cuticle, which causes the insect to die (Chalabi, 1998).

The effects on weights pupae

It is clear from table 2 that the weights of the immature insects in the alkaloid extract ranged in 0.10-0.15g for *R sanctus* in the concentrations of 10-2.5mg/ml while ranged in 0.11-0.16 and 0.12-0.16g for *C colocynthis* and *L barbarum*, respectively for the same extract and concentrations compared with the control equivalent of 0.20g. As for the terpenoid extracts, the weights of the immature insects ranged in 0.11-0.15g for *L barbarum* while ranged in 0.14-0.17 and 0.15-0.17g for *R. sanctus* and *C. colocynthis* respectively for the same extract and in the concentrations 10-2.5mg/ml . The results show that both extracts of the tested plants significantly affected the weights of the pupae and there is an inverse relationship between their weight and the concentrations of the extracts used. When comparing the plants to the same extract, the alkaloid extract of *R sanctus* was better than the same extract for *C colocynthis* and *L barbarum* in recording the lowest weight for the immature domestic fly. The contrary is observed with the effect of the extract of the terpenoid of *L barbarum* which is higher than that of *R sanctus* and *C colocynthis* respectively. The results of statistical analysis show the superiority of the alkaline extract of tested plants in the giving the lowest weight in the pupae over the terpenoid. Also, the statistical analysis shows that there are no significant differences among the tested plants in the rate of weight of pupae through the average effect of the plants. The lowering effect of the extracts on the weights of the pupae may be due to the fact that the larvae treated with these extracts have stopped feeding or these plants contain repellent or anti-feeding materials. On the other hand, the cause may be the tissue damage caused by the extracts in the gastrointestinal layers especially in the muscle layer, which has separated from the placenta layer and is responsible for feeding inside the digestive tract due to prestalic movement. Additionally, perhaps the reason is slow or cease of the absorption process due to damage to the epithelial tissue of the gastrointestinal tract. The reason for the appearance of low-weight larvae may be due to the extruding effect of some chemicals found in the nutrition treated with the extracts. Al-Mansour (1995) reported that the larva treated with plant extracts does not take enough nutrients to moult to pupae. Perhaps nutrition inconvenience due to the interaction of toxic compounds of the extracts, especially protein, or these effective compounds, may interfere with the endocrine system of the larvae while feeding on the medium containing the extracts and this affects the hormone responsible for the process of insect development (Wyalt and Davey, 1996). Thus, larvae cannot develop to the next stage of due to insufficient nutrients inside before and become pupae that are short and deformed as well as lessweight. Or they become dwarfed and deformed pupae with short wings unable to successfully complete their life cycle. These results are consistent with the findings of Rembold *et al*. (1980), who found that the weight of the Mexican bean beetle *Epilachna varievestis* decreased 24 hours after feeding on a diet made from the extract of *Azadirachta indica*. The difference in weight may be due to the difference in the concentrations of the used extracts. From this experiment, it appeared that having mature insects from treated larvae has failed. The emergence of with severe short-winged, distorted or head-elongated insects as in

Table 1 : Effects of alkaloid and terpenoid extracts of the plants on immature growth stages of domestic fly.

Concentration: mg/ml / Plants	Alkaloids					Terpenoids					
	0.0	**2.5**	**5**	**10**	**20**	**0.0**	**2.5**	**5**	**10**	**20**	**Average plant effect**
C. colocynthis	10.00	10.33	11.67	16.00	0.00	10.00	10.67	12.00	16.67	0.00	9.73
R. sanctus	10.00	10.67	12.00	0.00	0.00	10.00	10.67	12.33	15.33	0.00	8.1
L. barbarum	10.00	10.33	11.00	15.67	0.00	10.00	13.33	16.33	19.33	0.00	10.59
Average	10.00	10.44	11.55	10.55	0.00	10.00	11.55	13.55	17.11	0.00	

$$LSD0.05 = \frac{\text{Average effect of plants alkaloid and terpenoid extracts} = 0.25}{\text{Second intervention} = 0.43}$$

Table 2 : Effects of alkaloid and terpenoid extracts on average pupae weight.

Concentration: mg/ml / Plants	Alkaloids					Terpenoids					
	0.0	**2.5**	**5**	**10**	**20**	**0.0**	**2.5**	**5**	**10**	**20**	**Average plant effect**
C.colocynthis	0.20	0.16	0.12	0.11	0.00	0.21	0.17	0.15	0.15	0.00	0.12
R. sanctus	0.20	0.15	0.11	0.10	0.00	0.21	0.17	0.14	0.14	0.00	0.12
L. barbarum	0.20	0.16	0.14	0.12	0.00	0.21	0.15	0.13	0.11	0.00	0.12
Average	0.20	0.15	0.12	0.11	0.00	0.21	0.16	0.14	0.13	0.00	

$$LSD0.05 = \frac{\text{Average effect of plants alkaloid and terpenoid extracts} = 0.03}{\text{Second intervention} = 0.05}$$

Table 3 : Effects of Alkaloid and Terpenoid extracts on average female productivity.

Concentration: mg/ml / Plants	Alkaloids					Terpenoids					
	0.0	**2.5**	**5**	**10**	**20**	**0.0**	**2.5**	**5**	**10**	**20**	**Average plant effect**
C. colocynthis	223.00	87.33	59.00	50.24	0.00	221.67	95.33	64.00	48.33	0.00	84.89
R. sanctus	223.00	70.33	51.33	0.00	0.00	220.33	93.00	62.00	41.67	0.00	76.16
L. barbarum	224.33	89.33	60.00	52.33	0.00	218.67	60.00	27.67	11.67	0.00	73.23
Average	223.44	82.33	56.77	34.19	0.00	220.22	82.77	51.22	33.89	0.00	

$$LSD0.05 = \frac{\text{Average effect of plants alkaline and turbine extracts} = 3.68}{\text{Second intervention} = 6.38}$$

plate 2, confirms the presence of effective substances caused by the abnormalities that occurred in the insect and these substances could be hormonal similarities. In this regard, Al-Sharifi (2010) showed the superiority of the terpenoid extract of *E. helioscopia* in the various performance parameters of the house fly compared to the alkaloids extract. The weight of the larvae decreased from 0.1078g in the control treatment to 0.0078g at concentration of 5mg/ml. The extract of the terpenoid compounds of the plant at concentration of 5 and 10mg/ml resulted in deformations in the growth stages of the insect, such as reducing the size of the larvae resulting from the treatment with the extract and its low weight compared to the control treatment. Also, the extract led to the failure of the full emergence of adult insect, in addition to the destruction of the intestines within the larvae at concentration of 5mg/ml of the extract.

The effect on productivity

Table 3 shows the effect of the extracts of secondary compounds (alkaloids and turbines) for the tested plants in the rate of productivity of female domestic flies resulting from the eggs with plants extracts. As we note through the table, the productivity rate reached 0.00-70.33 egg/female in the alkaline extract of *Rubus sanctus* and in concentration of 10g compared with the control treatment of 223.00g, while the female productivity ranged in 50.24-87.33 (52.33-89.33) egg/female of *Citrullus*

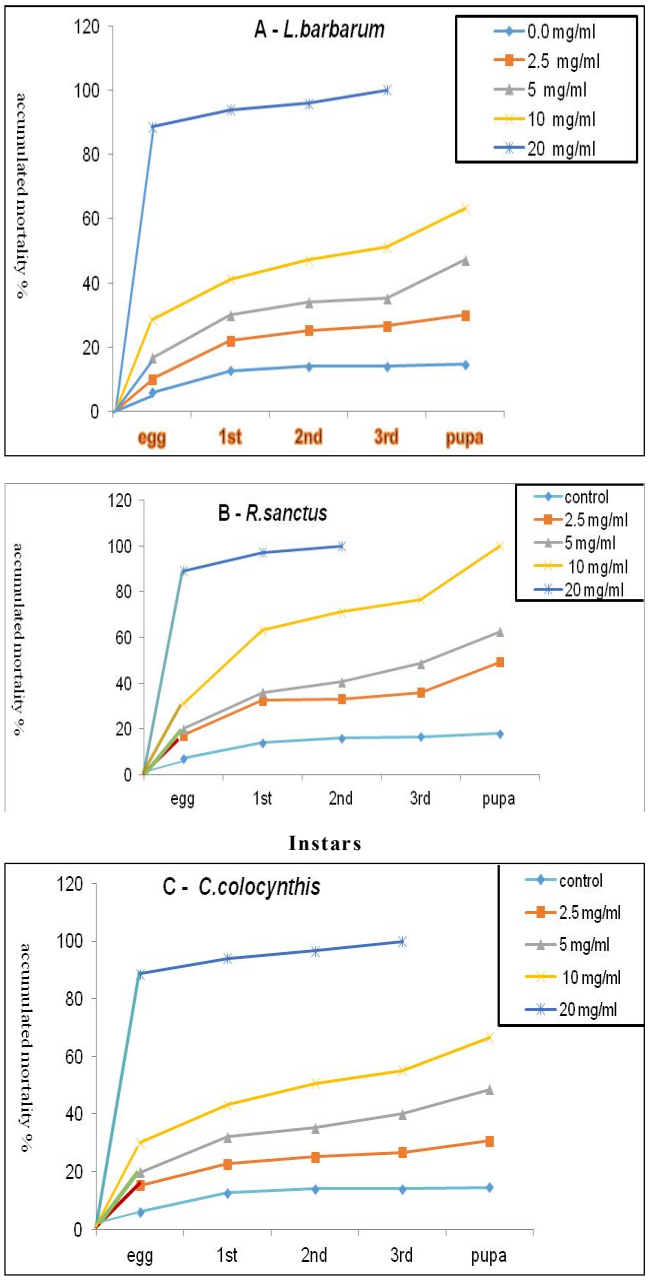

Fig. A, B, C : Effects of plants alkaloid extracts on accumulated mortality in immature stages.

colocynthis and *Lycium barbarum* respectively with the same extract and concentrations. As for the extract of turbines for the tested plants, the productivity ranged in 11.67-60.00, 41.6-93.00 and 48.33-95.33 egg/female for each of the *Lycium barbarum*, *Rubus sanctus* and *Citrullus colocynthis* in the concentrations of 10-2.5mg/ml and the insects could not lay eggs in concentrations higher than 20mg/ml for both extracts and all tested plants. The results show that there was an inverse relation between the rate of productivity and the concentrations used, and also the superiority of the extract of the turbines of the plants tested in recording less over the alkaline extract, which is proven from the results of the statistical analysis. Through the rate of the effect of plants, the *Lycium barbarum* was better in recording the lowest rate of production followed by *Rubus sanctus* and *Citrullus colocynthis*. In this regard, Al-Mansour (1997) noted that the extract of the turbine compounds of the leaves of the *Iutea* plant led to decrease in the productivity of the *B. tabaci* fly in laying eggs. Both Al-Rubaie and Al-Zubaidi (2003) indicated that the crude alkali extract from *D. innoxia* fruit and flowers reduced the productivity of female domestic fly to 69.2, 42.2 and 32.6 egg/female respectively in the concentration of 20mg/ml compared to 228 egg/female in the control treatment. Al-Zubaidi *et al*. (2005) noted that the crude turbine extract of *C. spinosa* leaves and fruits had significant effect on some of the performance parameters of the domestic fly, As the yield of the treated insects was decreased from 1147 egg/female to 498 and 555 egg/female with concentration of 20mg/ml. Yousef (2008) showed that the turbine extract of *E. helioscopia* affected *C. molestus* mosquito productivity making it less as the number of eggs per female ranged in 26.22-90.00 in concentrations of 0.75-0.00mg/ml. As shown by Al-Zubaidi (2010), the productivity of female domestic flies when treated with alfalfa extract from flowers, leaves and seeds of *Albizzia lebbeck* was 0.0 egg/female compared to the control treatment of 128.5, 138.0, 126.0 egg/female; while the female productivity was 30.0 egg/female in the seed extract compared with the control treatment and 137.3 egg/female for the same concentration mentioned above. As Al-Sharifi (2010) showed, the rate of productivity per female of the domestic fly using alkaline extract for *E. helioscopia* was 35 eggs/female and 0.0 eggs / female of the same plant extract with the same concentration of the turbine extract. It can be said that the reason for the inability of the insect to lay eggs in the alkali extract of *Rubus sanctus* in concentration of 10mg/ml may be attributed to the inhibition of growth ovary and ovarian tubes and prevention the growth of the ovarian follicles.

Effect of alkaloids and terpenoids on cumulating mortality

It is clear from figs. A, B and C that alkaloid extracts significantly affected the cumulative mortality ratios of the immature stages of the domestic fly with the different concentrations used. A correlation between the cumulative mortality ratios and the concentrations of the extract was also found. The alkaloid extract of *R sanctus* leaves was superior to that of *C colocynthis* seeds, which in turn was superior to that of *L barbarum*. The insects

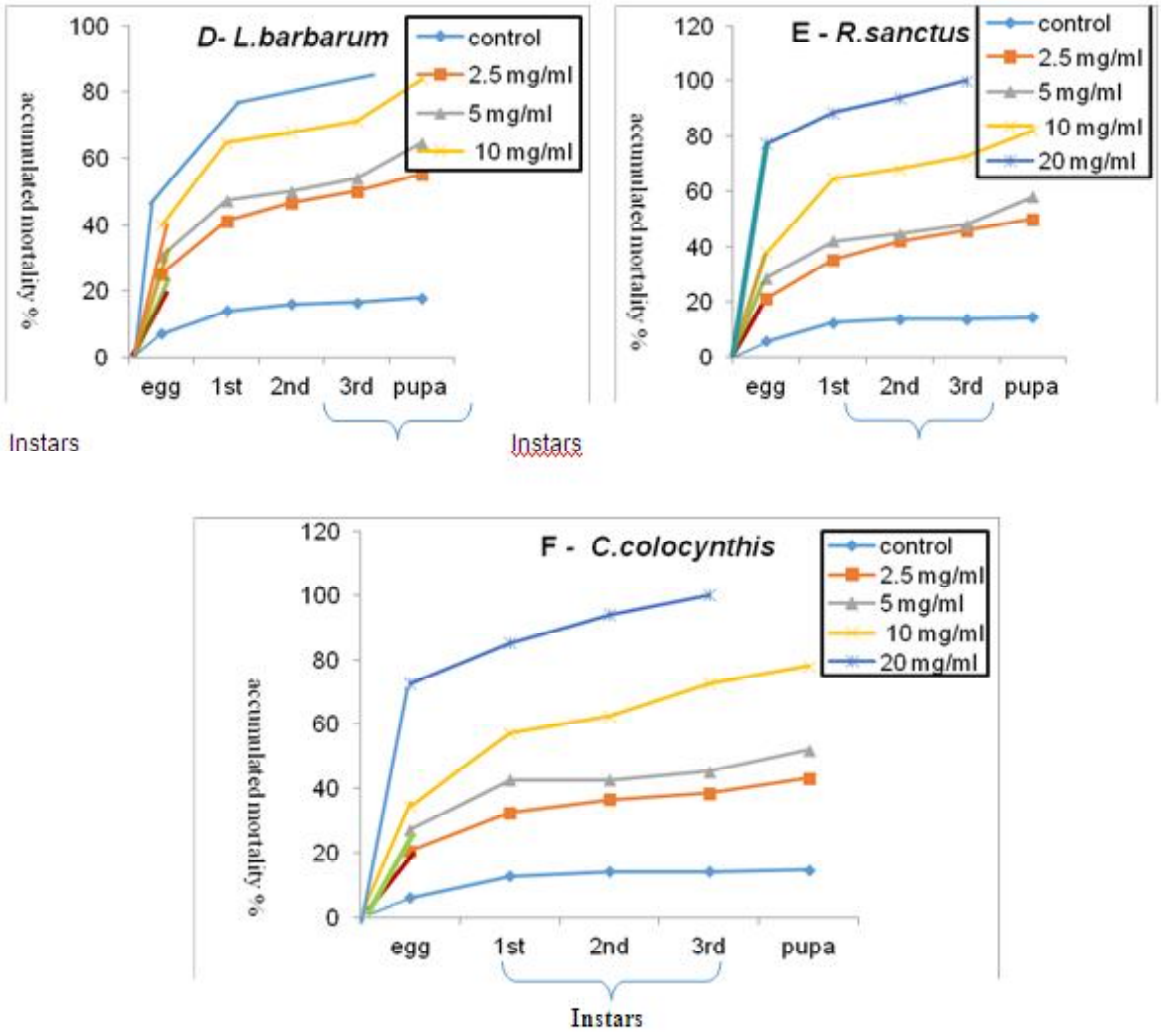

Fig. D, E and F: Effects of plants Terpenoid extracts on accumulated mortality in immature stages.

in the larval stages died when they reached the second stage in the alkaline extract of *R sanctus*, reaching 100%. As for *C colocynthis* and *L barbarum*, the larvae were died when they reached the third instar. In this regard, Al-Rubaii (1999) pointed out that the superiority of the alkaline extract of *datura* fruits over the leaf and flower extracts increased the cumulative mortality of the immature larvae of domestic flies to 88.4, 95 and 100% respectively in concentration of 20mg/ml compared to 36.6% in the control. Al-Saadi (2004) studied the effect of some plant powders and alkaline extracts of *D. metel*, *Lycium barbarum* and *Solanum nigrum* on mortality rates, number of resulted insects and the decrease in the first generation F1 population of *Callosobruchus maculates*. The results show the efficiency of the alkaline extract of *datura* and *Lycium barbarum* at 1.5% concentration, which gives high effect in the percentage of mortality (100%) when the seeds are treated. The lowest effect on mature mortality was 0.5% while it was 96.99% and 76.31% for *datura* and *Lycium barbarum*, respectively. Both Al-Husseini and Al-Rabaii (2007) indicated that the crude alkaline extract of *P. haralaa* had significant effect on some aspects of the performance of the domestic fly, with the highest egg mortality rate of 80.8% at 20mg/ml. Cumulative mortality was 100% in immature larvae with concentration of 5mg/ml for the same extract compared with 5% in the control treatment. Al-Sharifi (2010) also showed that the cumulative mortality rates for the immature stages of domestic flies increased from 11.60% in the control treatment to 98.2% at 20mg/ml concentration for the alkaline extract of *E. helioscopia* plant.

Figs. D, E and F show that terpenoid extract effect of *R sanctus* was similar to the effect of the alkaline extract of *C colocynthis* and *L barbarum* in the cumulative mortality of the immature flies as larvae died upon reaching third instar. Cumulative mortality rate in terpenoid extract was similar over all tested plants, as all

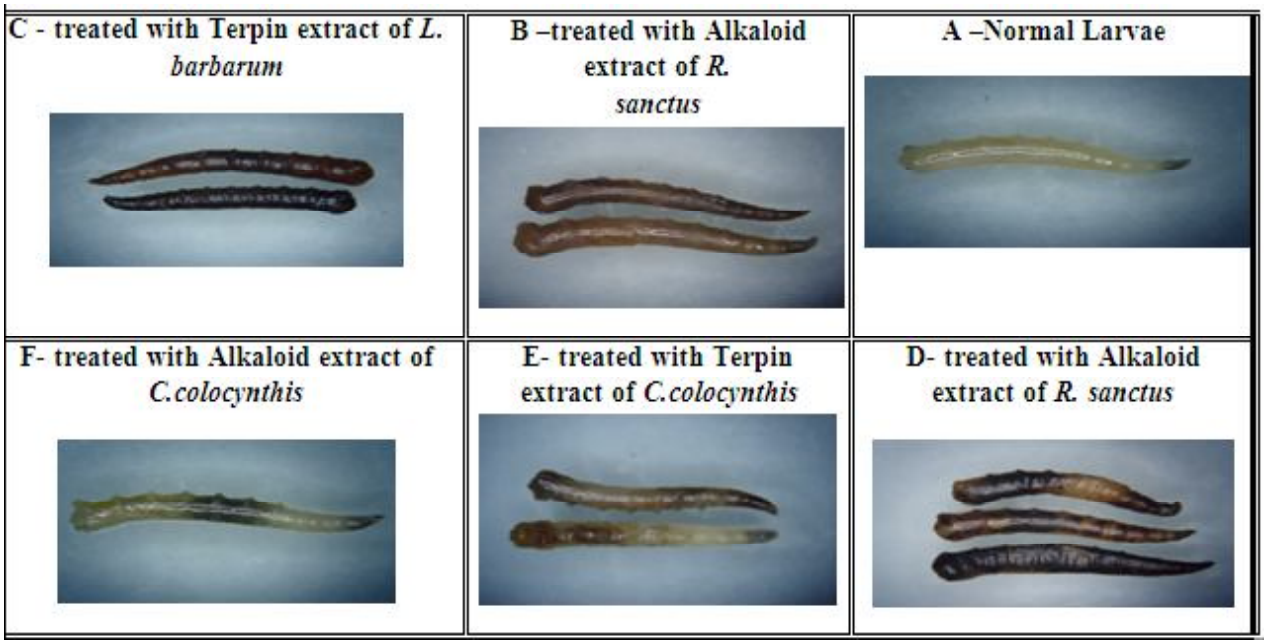

Plate 1 :

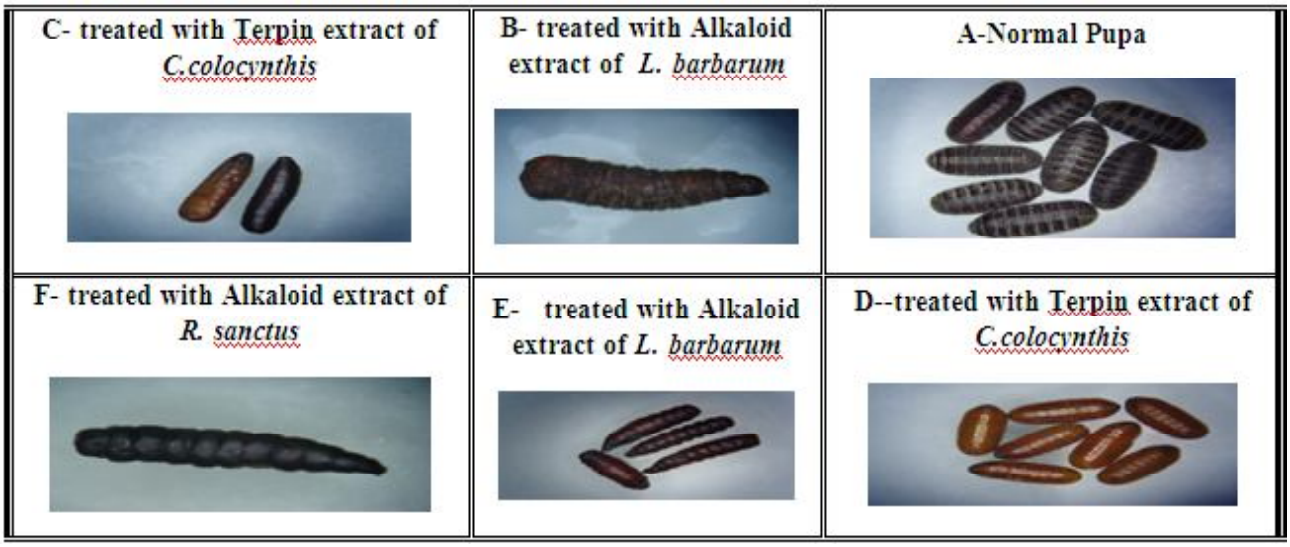

Plate 2 :

larvae died upon reaching third instar (100%) at the highest concentration. We also noticed that terpenoid *L barbarum* extract was better than that of *R sanctus* and *C colocynthis*, as cumulative mortality rate was 81, 84, 78% for them respectively in 10mg/ml concentration, compared to 18% in the control. In this regard, Rockestien (1991) mentioned that saponin is associated with cholesterol and interferes with endocrine functions. Its effects may alter the permeability characteristics of the med intestine, leading to toxic effects and then mortality. Bi-turbines have the potential to inhibit oxidative phosphorylation in the mitochondria or because of their ability to cause disturbances in natural hormones processes, especially the synthesis of moulting hormone (Salami, 1998). Al-Aridhi (2005) that cumulative mortality rates of immature domestic flies treated with crude extracts of leaves of *Clerodendrum inerum* was 100% at 10mg/ml concentration compared to 5% in the control; whereas that rate was 58.4% at 5mg/ml concentration, as insect life cycle was completed. The results are consistent with Al-Sharifi (2010) of the superiority of *E. helioscopia* turbine extract compared to crude alkaline extract in cumulative mortality rate of immature domestic flies (100%) at 20mg/ml compared to 11% in the control.

Effects of alkaloid and terpenoid compounds on deformities in life stages

Plate 1 shows deformities in various larval stages.

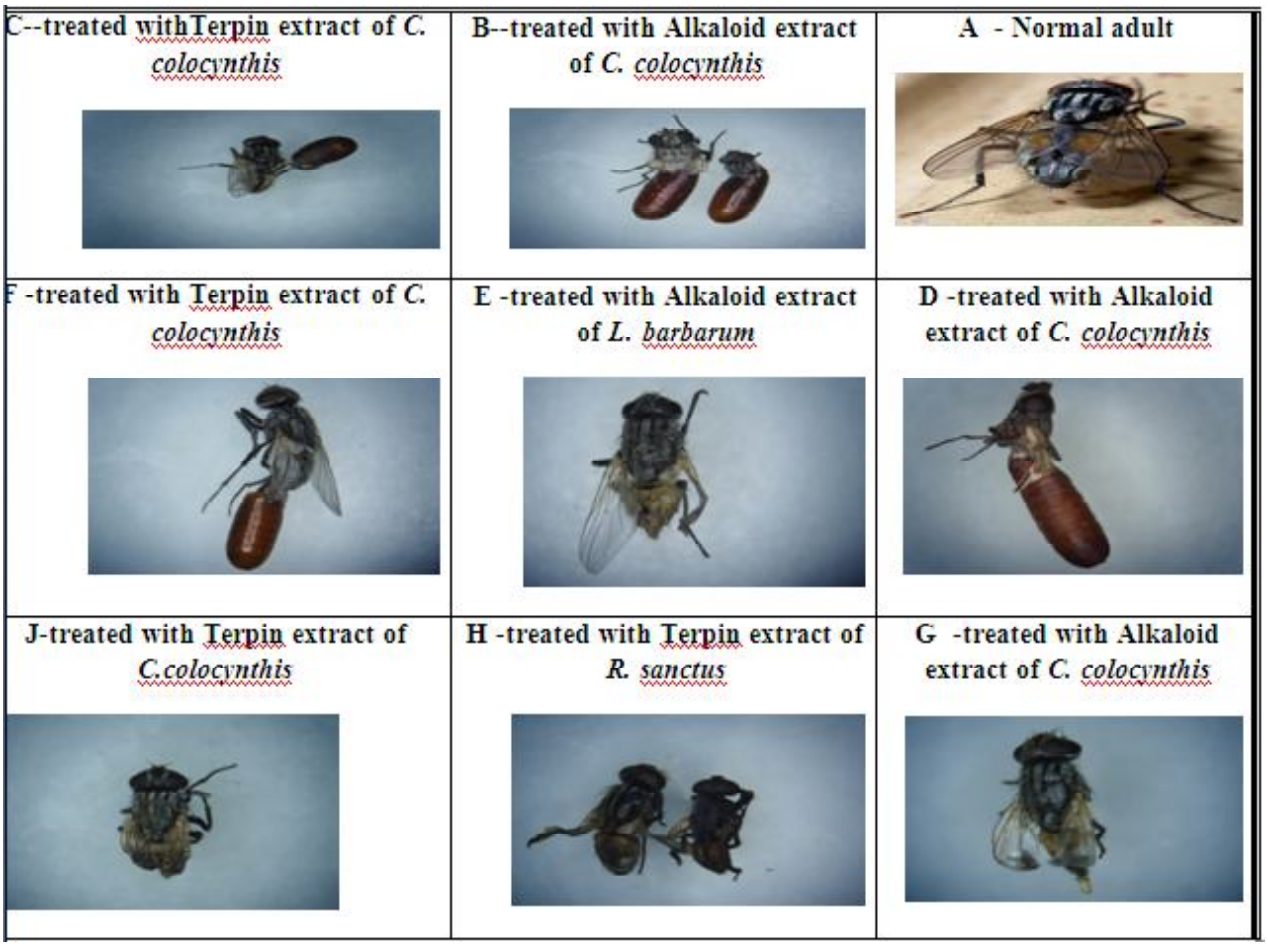

Plate 3 :

We observe number of phenotypic abnormalities in the tested dead larvae, such as small larvae and their death while transforming to the subsequent stages. The probable cause of these mutations is that the toxic compounds in the plant can have an anti-inflammatory reaction, especially juvenility and molting hormones, thus preventing the occurrence of proper molting. We also notice the appearance of black spots on larval bodies during clotting to the later larval stage; virulence, emergence of larvae; immature flies; appearance of the virulence; Albino; subsequent death without completing life cycle; occurrence elongation in the larvae; larger size than the normal limit in the of control; shortness in larvae; or abnormalities in the abdominal rings. This is due to the insect sensitivity of the toxic substances found in the tested plants, indicating the inhibitory effect of these plants on larval growth similar to that of growth regulators (Harborn, 1984). In this regard, Tabssum *et al*. (1996) pointed out that the extracts of beet plant resulted in high mortality in the third stage of domestic fly. Sarwar *et al*. (2012) noted that many plants contain phenol or alkaline substances that affect the life of the southern cowpea beetle, including *C. colocynthis*, as most of the mortalities occurred during the transformation and transition from one stage to another. The cause may the compounds have substances that inhibit the formation of caytine in immature insects, since the larvae cannot build new quticle, which causes the insect to die (Chalabi, 1998).

Plate 2 shows the deformities of larvae, as we noticed efficiency of the alkaline and turbine extracts in reducing the larval weights and produced short individuals with small weight compared with the control. The reason for this maybe due to the extruding effect of some chemicals in the diet of larvae treated with extracts. Al-Mansour (1995) reported that the larva treated with plant extracts does not take enough nutrients to turn into immature insect. Perhaps nutrition inconvenience due to the interaction of toxic compounds of the extracts, especially protein, or these effective compounds, may interfere with the endocrine system of the larvae while feeding on the medium containing the extracts and this affects the hormone liable for the process of evolution In the insects (Wyalt and Davey, 1996). Thus, larvae cannot develop to the next phase of due to insufficient nutrients inside

before and become immature insects that are short and deformed as well as underweight. Or, they became dwarfed and deformed mature insects with short wings incapable of successfully completing their life cycle.

Plate 3 shows that the disturbances of adults due to treatment with concentrations of alkaline and turbine extracts of plants were caused by abnormalities in early growth stages. The concentration of 15mg/ml reduced the total withdrawal by 26% due to the presence of similar growth regulators in the plant, or this toxicity is due to the fact that the active compounds act as infectious toxins obstructing the bowel movement and affecting the circulation of digestion and absorption (Metsculu *et al*., 2001). It is also shown from this experiment the failure to have adults from larvae treated and the appearance of insects with distorted, short-winged wings or elongation in the head of the insect, which confirms the presence of effective substances causing distortions and may be similar hormonal substances. Also, extracts led to the failure of the full emergence of the stage of the immature flies in addition to the destruction of the complete ones. We noticed the high rates of malformation in adult females that are treated with extracts of plants tested by 65% compared with the control of up to 11%. Celis *et al*. (2008) indicated that these extracts act as growth regulators that inhibit or discourage formal transformation or induce early dislocation as hormones alter the organization of growth and cause formal abnormalities, infertility or insect death.

References

Harborne, J. B. (1984). *Phytochemical methods*. Chapman and Hall. New york 2nd Ed. 288pp.

Abbott, W. S. (1925). A method of computing the effectiveness of an insecticide. *J. Econ. Entomol*., **18** : 265-267.

Al-Zubaidi, F. S., Hadi M. AL-Rubaie and L. AL-Okaily (2005). Terpenoids crude extract of *Caparis spinosa* affecting some biological aspects of house fly, *Musca domestica* L.(Diptera : Muscidae). *J. AL-Nahrain Univ*., **8(1)** : 28-30.

Al-Zubaidi, E. S. (2010). The effect of extracts alkaloids, phenols and terpenoids of *Albizzia lebbeck* (L.) Benth. On the biological performance of house fly *Musca domestica* L. (Diptera: Muscidae). Thesis, Unive. Of Baghdad –College of Science. 68pp.

Sarwar, M., N. Ahmed, M. Bux and M. Tofique (2012). Potential of plant materials for the manangement of cowpea Bruchid *Mallosobruchus maculates* (Coleoptera : Bruchidae) in gram *Cicer arietinum* during storage.

Wyalt, G. R. and K. G. Davey (1996). Cellular and molecular action of juvenile hormone, 2. Roles of juvenile hormone in adult insects. *Adv. Ins. Physiol*., **26** : 1-155.

Rembold, H., G. K. Sharma, Ch. Czoppelt and H. Schmutteres (1980). Evidence of growth disruption in insects without feeding inhibition by neem seed fractions. *J. Plant Dis. and Protect*., **87(516)** : 290 -297 .

Tabssum, R., S. Narulain, S. H. Nagvi and M. A. Azmi (1996). Toxicity and I.G.R. Effect of two *neem* extracts on *Musca domestica* (PCSIR Strain) p. J .S . :125 (2).

Metspulu, L., K. Hiiesaar, J. Joudu and A. Kuusik (2001). Effects of certain toxic plant extracts on the Larva of Colorado potato beetle *Leptinotarsa decemlineata* (say). Institute of plant protection, Estonian Agriculture University. pp 93-100.

Celis, A., C. Mendoza, M. Pachon, J. Cardona, W. Y. Delgado and L. Cuca (2008). Extractos vegetales utilizados como biocontroladores con enfasisenla familia Piperacea. Una Revision. *Agronomia Colombiana*, **26** : 97-106.