Journal of Natural Sciences Research www.iiste.org
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.14, No.6, 2023

The Antifeedant, Insecticidal and Insect Growth Inhibitory Activities of Euphorbia Lathyrism L. Plant Extracts on Cetonia Aurata L. (Coleoptera: Scarabaeoidea: Cetoniidae)

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Abstract
Insecticides have been linked to serious toxicological and environmental issues. The purpose of this study is to assess the insecticidal efficacy of dough produced from the roots of caper spurge or paper spurge (Euphorbia lathyris) and to classify chemicals based on their toxicity levels.
Keywords: *Cetonia aurata, Euphorbia lathyrism,* antifeedant, insecticidal
DOI: 10.7176/JNSR/14-6-02
Publication date: April 30th 2023

1. Introduction

Man is in a lot of pain as a result of the decline of insect populations in agriculture and health. In agriculture, insects have a direct impact on the product's growing portion and cause significant damage, resulting in revenue loss. For large products, product loss due to insect pests is estimated to be between ten and thirty percent. Many existing neurotoxic insecticides are harmful to the environment and/or pose a health risk to the public through food contamination, groundwater transmission, or accidental exposure.

Although the ventures using the appropriate use of these pest control materials should be the least, the public's theatrical perception of these ventures is increasing demand for alternative or "organic" produce, necessitating the production of modern, environmentally sound pest control materials. Taller plants are a potential source of new pesticidal materials; in the last decade, the demand for new insecticides or prototypes among plant natural products has increased. (Arnason et al., 1989; Balandrin et al., 1985).

Chemical pesticides have a quick knockdown effect in order to minimize the danger of insect infestation, although this has minimal influence on the nutritional content of crops and agricultural wastes. In addition to being damaging for the soil, animals and human lives, numerous research findations have indicated that indiscriminate use of chemical pesticides over a long period, has resulted in several negative effects such as insect/weed/pest resistance, new pests, toxicity to non-target organisms and unauthorized levels of toxin. Non-target organisms are not the result of a number of studies and investigations (Katyal, and Satake, 1996: Kannaiyan, 2002). Every year, one million people are poisoned by pesticides as a result of higher doses and more frequent applications (Bami et al., 1997). Because of increasing knowledge of the effects of indiscriminate use of synthetic pesticides, the use of botanical pesticides for preservative products from insect pests has gained and increased importance all over the world. As a result of the increasing problems (resistance, nontarget effects) associated with the use of highly toxic synthetic insecticides, there is a pressing need to develop more effective, alternative product protectants such as botanical insecticides and antifeedants.Plant secondary combined has been the subject of extensive research for the past 30 years in an attempt to develop innovative botanical insecticides and antifeedants. Meliaceae, Rutaceae, Asteraceae, Labiateae, Piperaceae, and Annonaceae are among the most promising plant families discovered (Schoonhoven, 1982; Jacobson, 1989; Isman, 2000).

There are approximately 2,500 varieties in the Cetoniinae subfamily, the majority of which are found in the tropics. There are approximately 20 species in Europe, according to Paulian and Baraud (1982). Many members of this subfamily have colorful and distinct color patterns, and it is also possible to match specimens to species solely based on color. Adult Cetoniinaeis diurnal and can be seen flying in bright colors throughout the day (Paulian and Baraud, 1982). Scarabaeoidea can typically be distinguished from other Coleoptera by their antennae, which have an apical club made up of (generally) the last three segments, which are enlarged laterally in Scarabaeoidea (lamellate). Rose chafers can fly quickly because their wing cases are folded down. Pollen, nectar, and flowers, especially roses, are among their favorite foods. (Karolyi et al., 2009) On hot sunny days from May to June or July, and even as late as September, they can be found within roses (Lovett and Jessop,1982).

Scarabbeetles from the subfamily Cetoniinae (Coleoptera, Scarabaeoidea, Cetoniidae) have been observed harming ripe peaches in the coastal region of Croatia for the past fifteen years. Endrodi (1956) and Miksic (1965),

described them as beetles that are attracted to flowers and mature and over-ripe fruits. They've been classified as fig pests, but they've recently been identified as serious peach fruit pests (Baric et al., 2012). Insecticides may not be able to effectively prevent the formation of these beetles because they are highly resistant. These species were identified as Cetoniaaurata and Potosiacuprea after further investigation (Razov et al., 2009).

Euphorbia lathyris L. (sect. lathyris), a member of the spurge family (Euphorbiaceae), is a glabrous, glaucous biennial plant with numerous axillary shoots that grows up to 150 cm in length (Anton, 1974). This species now has a wide distribution as a ruderal plant and cultivated field grass. These appropriated cells are part of a covered system dedicated to the production and storage of latex, a milky white liquid (Mahlberg and Laticifers,1993; Anton, 1974).

This latex is characterized by a high content of isoprenoids, mainly triterpenes with a wide structural variety (Mahlberg, and Laticifers, 1993; Anton, 1974), and a lower content of diterpenoids, the majority of which are toxic, causing severe inflammatory reactions and often acting as procarcinogens. The triterpene fingerprint of Euphorbia latex has been used as a chemotaxonomic symbol, allowing division of Polycyclic triterpenes are another important group of chemical constituents found in significant amounts in the latex of *E. lathyris* (Warnaar,1981; Das and Mahato, 1983). Not only are these substances high in energy, but they also have a wide range of biological and medicinal properties (Brieskorn, 1987; Hemmers and Gülz, 1986). In latexes, multiple isoforms of chitinases are produced, and they have a high insecticidal ability. However, these chitinases seem to have a preference for phytopathogens (Freitas, et al.,2016).

However, the insecticidal efficacy of two chitinase-like proteins (LA-a and LA-b) found in abundance in mulberry latex cannot be explained solely by their chitinolytic properties (Kitajima et al., 2010). This multi-chain enzyme has a similar structure to one found in *Euphorbia lathyris*, but it is larger and has less activity. Euphorbain P is a glucosamine-containing glycoprotein. Lynn and Clevette (Lynn and Clevette, 1988). Similarly, extracts of this plant in water, ethanol, acetone, and other organic solvents have insecticidal, larvicidal, antibacterial, and antiparasitic properties (Dubey and Jagannadham, 2003). This study's findings would support the study to promote a novel pest and insectidal control agent from indigenous plant sources, based on bioactive chemicals. In light of the lately growing interest in the development of insecticides of the plant origin as an alternative to conventional insecticides, this study has assessed the larvicidal activity of *E. lathyris* extracts. This is the first study to show larvicidal, antifedantic, toxic action against the insect and vectors of various solvent extracts of those plants.

2. Materials and methods

2.1. Plant and Extraction of plant material

The *Euphorbia lathyris* plant was collected from Kayabaş Village in Ordu, Turkey, which is known for its nuts and corn gardens. After the plant was put in clean bags and taken to the laboratory, it was washed with dechlorinated water, shadow dehydrated, and the plant materials were powdered individually using an electric blender at a temperature below the laboratory. A kitchen strainer was used to sieve the powdered *E. lathyris* plant material. 0.250 kilogram of powdered plant material was extracted in stages with ethanol for 48 hours before being filtered. Ingredients were then passed through a rotary vacuum evaporator until all solvents had evaporated, leaving solidified raw extracts. The raw extracts thus acquired were deported in aseptic fulvous colored bottles maintained at 4 ^{o}C in a refrigerator (Munoz et. al.,2013).

2.2. Insects collected

Cetoniaaurata first, second, and third instar insect larvae with a head capsule diameter of (2-2 3-3), (4-4 4-5). (5–6.5 mm) is collected in a sheep pen in Ordu/Kayabaş, Turkey, from an infested 3–4 year old sheep manure-soil mixture. *C. aurata*larvae were grown in plastic for about 200 days (25x30x20). Sections of organically grown carrots (*Daucus carota* L. (Apiaceae)) were fed to them twice a week. They were held in a lab with an L16(26 °C):D8(20 °C) photoperiod, a 2 500 lux illuminance, and a 70-10% relative humidity. They were only fed once in the week immediately before the experiments. The medium clean lengthiness (minimum to-maximum range) of the first to third larval instars were 1100(760to1300) mm (n 27), 1800 (1200 to 2300) mm (n 21), and 4300 (3700 to 4800) mm (n 40), respectively. The medium clean heaviness (minimum to-maximum range) of the first to third larval instars were 71 (26 to 140) mg (n 24), 374 (152 to 780) mg (n 18), and 2,541 (516 to 4,091) mg (n 48), respectively mean weight (90 to 133) 2. (130- 740) 3. (646-3.980)

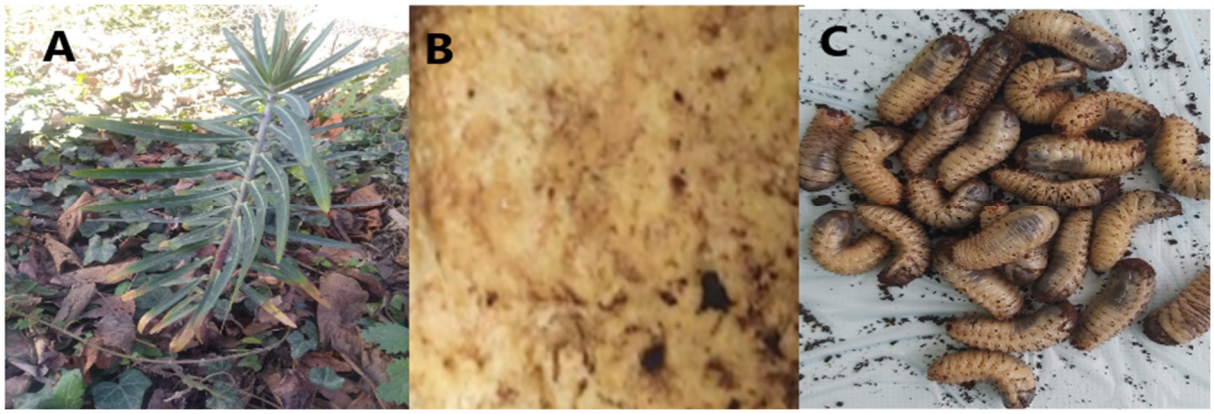

Figure 1. A) *Euphorbia lathyris* **B)** Plant extract mixed nutritional paste. **C)** Cetoniaaurata larvae 3-4 years old sheep manure-soil mixture in the sheep pen.

2.3. Comparison of for Cetoniaaurata Toxic and Death Activity of Plant Extract

Three synthetic diets with different protein resources and different concentrations of plant extracts (20-40-80-160 mg/ml) were calculated, prepared with modifications of the diet proposed by Parra and Mihsfeldt (1992) since this diet is used for different orders of insects; and Diet 1 (mixture of corn, wheat, flour and carrot puree, carrot porridge and yeast-based). Each concentration diet was prepared and then transferred to plastic molds with 50 wells and a diameter of about 1 inch. They were then placed in an incubator and allowed to equilibrate at 30 1 ° C and 70–80 percent relative humidity. For the next 48 hours,each flour disk weighed between 19 and 32 grams. The process used by Xie et al. (1996) was used to make flour discs. Corn, wheat, flour carrot puree, and yeast-based were given to the control group. Five larvae of the first, second, and third instars (20) were placed in each of the 500 ml dark flasks, along with the paste and nutrient mixture, and the flasks were held at 25–30°C, 65–70% relative humidity (RH), and 12:12 hours (light: darkness). To see how the larvae interacted, they were returned to each plastic box and held at 65–70 percent RH until they died. The bioassay was tested daily until the eighth day, and dead larvae were removed immediately. Abbott's formula was used to analyze the data. All of the experiments were repeated three times.

2.4. Antifeedant activity

Foods made with mixtures of plant extracts in various concentrations disc no choice bioassay method is used to investigate antifeedant activities of plant extracts. There were different concentrations of plant extracts applied to each fresh conical cake weighing approximately (19-32 grams). The conical cake was kept in individual hygienic plastic boxes with 50 wells, 7 cm diameter, connected to each other after solvent evaporation at 30 °C temperature. A single pre-starved first, second, and third instar larva of *C. aurata*was placed in each plastic box. For eight days, the larvae were fed treated fresh conical cake. The conical cake that was not treated with plant extract was used as a negative and positive control. There were three trials in all, each with five replicates. Each experimental variant was carried out according to the formula of Kielczewski et al., 1979. Coefficient = (C-T) : (C+T) x 100, where T = consumed food weight rate by larvae in the experimental variant and C = consumed food weight rate by larvae in the control variant. The amount of exhausted food and the body weight of the tested larvae changed significantly with each 1 mg increase in body weight. The larvae were given fresh conical cake after 48 hours. Food was left in boxes for 8 days in both control groups (Lipa and Wiland, 1972). The dead larvae were finally counted and removed (Thiery and Frachon, 1997).

2.5. Morphogenetic changes

For first, second, and third instar larva emergence, investigators used cured and control pupae held in plastic troughs, respectively. The treated and control larvae were compared for morphological anomalies in the first, second, and third instars. Any notable difference in outlook between cured and control was reported as defected.

2.6. GC/MS Analysis of Plant Materials

The ethanol extract was filtered with sodium sulfate (2g) before being concentrated to 1ml using nitrogen bubbles. The extracted material was sent to be analyzed by GC MS. The study was carried out on a Shimadzu QP2010 instrument in split mode (ratio 10:1) with a Restek/Rtx®-5 30 m 0.25 mm column and chromatographic grade helium as the carrier gas, using a Restek/Rtx®-5 30 m 0.25 mm column and chromatographic grade helium as the carrier gas. The temperature was set to 80 degrees Celsius for 5 minutes before gradually rising to 300 degrees Celsius at a rate of 15 degrees Celsius per minute. The injector and EI detector (70eV) were both at 280°C and 300°C, respectively. Each 29L plant extract was injected into the GC/MS man with a Hamilton syringe.

2.7. Fixation And Observation By SEM

The stable larvae that died as a result of the experiment were taken to the lab. (n = 10) in a plastic box in the laboratory was set for 24 hours in phosphate buffer pH 7.4 with 4% paraformaldehyde and 2% glutaraldehyde. The healthy and dead larvae were then post-fixed in 1 percent OsO4 in a 0.1 M phosphate buffer for 2 hours at 4 °C, washed four times for 8 minutes each time with a 0.1 M phosphate buffer, and dehydrated using a sequence of increasing ethanol concentrations (20–100%).

The larvae were sputter-coated with gold after lather dehydration with acetone and critical-point drying. A scanning electron microscope was used to complete the investigations at 15kV (Hitachi SU1510 SEM). Three fields of view with magnifications ranging from 1000 were randomly selected from the optic surface of each sample. Each experiment was carried out three times in total. Carlton and Leschen's terminology was used to describe the larval structures (Carlton and Leschen, 2007).

3. Results and Discussion

3.1.Antifeedant activity

The antifeedant index was used to calculate the antifeedant performance of raw plant extracts. In most cases, a higher antifeedant index indicates a lower proportion of feeding. The antifeedant behavior varied significantly depending on the extraction solvents used in previous studies. Different concentrations of antifeedant acuity Based on the weight of fresh conical cake spender by *C. aurata*, plant extracts of 20-40-80-160 mg/ml were evaluated. Table 2 shows the antifeedant effects of various added nutrient concentrations that were studied.

The grade of antifeedant activity is reflected by the increase in the amount of positive signs against extracts of a plant added nutrient. Concentrations of 20-40-80-160 mg/ml of plant extracts of *E. lathyris* were found to be effective against the first, second, and third instar larvae of *C. aurata*among the four different concentrations of added nutrient tested. 160 mg/ml plant extracts of *E. lathyris* (48.16, 61.59, and 61.77) had the highest antifeedant activity against *C. aurata* first, second, and third instar larvae. Whereas plant extracts of *E. lathyris* at a concentration of 20 mg/ml had the lowest absolute deterrence coefficients (22.88, 33.33, and 40.18) on *C. aurata* larvae (instars 1, 2, and 3). The effects of the other tested plants' deterrence coefficients were also calculated, and there were no major variations in their values between 40-80 mg/ml of plant extracts of *E. lathyris.*

3.2. Change in larvae's body weight (Developmental indices)

The weight changes of first, second, and third instar larvae are expressed as a percentage compared to a dry control (Table 1). The highest larvae body weights increase after 7 days was observed in the presence of *E. lathyris* concentrations of 20, 40, 80, and 160 mg/ml. In most cases, *E.lathyris* doses of 20, 40, 80, and 160 mg/ml reduced larvae's (instar 3) food intake per mg, resulting in bodyweight reductions of -2882, -1466, -1332, and -1624in mg, respectively.

All *E. lathyris* nutrient concentrations reduced larvae's (instar 2) food intake per mg, with body weight reductions of -2795, -2334, -2852, and -2542 mg. However, all *E. lathyris* nutrient concentrations increased the food intake of larvae (instar 1) per mg (-286, -570, -426 and -361 mg of bodyweight). The outcomes vary greatly from the control studies (Table 1). All control foods with no added plant extract, on the other hand, fed the larvae well. Body weight fluctuated between 335 for the first instar, 724.4 for the second instar, and 1172.2 for the third instar.

3.3. Food consumption per mg of body weight increase

The highest consumption rates (1076 mg; food used per mg larva) were controlled in the presence of *E. lathyris* concentrations of 20 mg/ml. The larvae were able to develop, but the lowest levels were obtained from *E. lathyris* at concentrations of 80-160 mg/ml, and the larvae were unable to grow. The amount of food consumed per milligram of body weight is increasing. The maximum consumption proportions (886 mg for the first instar, 1860 mg for the second instar, and 2522 mg for the third instar; food used per mg larva) were monitored in the status control group with no extract added. (Table 1).

3.4.Determination of lethal concentration against C. aurata (LC50)

The results indicated that mortality (LC50) of *C. aurata* first, second, and third instar larvae was proportional to the time elapsed after treatment (Table 2). After day 3 (45.45), day 6 (65.23.34), and day 8 (54,838.35), 20mg/ml plant concentration was accepted as the most toxic insecticide with the lowest LC50 values against *C. aurata* first, second, and third instar larvae. Cypermethrin insecticide was the second most toxic substance, with LC50 levels of 40 mg/ml, 80 mg/ml, and 160 mg/ml after 3, 6, and 8 days of exposure (87,88 ± 89.9 88,23 ± 6.84 94,23 ±7.84). The extract was found to be the most toxic chemical among the foods with the addition of different plant concentrates, with LC50 values ranging from 80 mg/ml to 160 mg/ml against first, second, and third instar larvae of *C. aurata* (92.32 5.12 92.11 4.63 94.13 6.45) respectively.

3.5. Identification of the ethanol extracts composition by GC-MS

A total of 100% of the *C.aurata* died after eating the extract. According to the GC-MS analysis, Piperidinones were the presiding compounds of the larvae fraction (26.78%), with L-Proline (10.88%), Ethyl 9-hexadecenoate (5,13%), n-Hexadecanoic acid, (3.91%),Octadecanoic acid, (3.37%),Octadec-9-Enoic Acid,(11.23%),6-Octadecenoic acid,(9.35%) and Terephthalic acid, (5.92%) of the larval extracts , respectively (Table 3).The composition and identification of the main compounds present in the methanol extracts of *E. lathyris* are indicated in Table 5-6. Fifty five compounds were determined by GC–MS. The main compounds were Octadecanoic acid, 17, 19, 20, 31, (16.34%) -Ethyl Linoleate, 18,30 (12.79%), Norolean-12-Ene, D:B-Friedo-B':A'-neogammacer-5-en-3-one, 53, (4.30%), 24 Methyl-23-Dehydro-Cycloartanol 50, (6.48%), Hexadecanoic acid, 12,13,26,(6,22%), 2-Hexadecen-1-ol, 14, (3.96%). (Table 4.5. 1). The key compounds present in the methanol extracts of healthy *C. aurata* larvae consuming non-plant nutrient paste, as well as their structure and identification, are described in the table below (Table 4.5)Fifty four compounds were determined by GC–MS. The predominated compounds were D-Proline, 10, (54.10%),4,7-Methano-1H-inden-1-one, 5, (4.68%), DL-Valine, 9,(4.09%),1-Pentacosanol, 36 (2.27%), Pentadecanoic acid,(5.52%) and Cholest-5-en-3-ol, 53, (3.74%) (table. 6). A total of 100% of the volatile component of the *E. lathyris* fresh (essential oil) extract was identified in accordance with the GC-MS analysis, Propylene glycol were the presiding compounds of the *E. lathyris* fresh extract (40.10%), with Lactate (22.91%), Valeraldehyde (6,23%), Butyraldehyde, (3.3%), Ethyl vinyl ketone, (2.02%),Octadec-9-Enoic Acid,(11.23%),6-Octadecenoic acid,(9.35%) and Terephthalic acid, (5.92%). of the larval extracts , respectively (Table 6).The composition and identification of the main compounds present in the volatile component of the *E. lathyris* fresh extract are indicated in Table 6.7.

3.6. Changes in internal and external morphology of larvae

Metamorphic abnormalities were observed in larvae exposed to extracts of promising four plants at concentrations of added nutrients ranging from 80 to 160 percent. The cured *C. aurata* first, second, and third instar larvae were unmistakably smaller, their bodies smaller, their colors darkening, shrinking in size and drying, in other words shrinkage, particularly in the section where the waste foods in the last segment are located. (Figure 2A, 2B, 2C and 2D).However, a thorough inspection of the inner and outer skin of the larvae in which the extracts were contained revealed that the chitin layer had completely melted and darkened as a result of the dissection performed on the larvae and control larvae that died from lice extraction. (Figure 2 A1, A2).

3.7. EDX analysis

The consequences indicate that the major, elements of the outer skin Healthy *C. aurata* larvae are carbon, oxygen and potassium followed by chlorine and sulfur atoms in descending order. However, the presence of elements in the inner skin of healthy larvae of the control group was similar to that of the outer skin. Unlike chlorine, lead is present in the inner skin. (Table 3). We found that the percentage of oxygen in the inner skin is greater than the outer skin, and also that sulfur is substituted for nitrogen in the outer skin. In this essay, elemental analysis was carried out with extracted samples of healthy and dead (fed from plant extract) *C. aurata* larvae (fed from root paste without plant extract. We determined that carbon element is high in healthy larvae and oxygen element is high in dead larvae. Also, most of the elements was detected on the inner skin of healthy larva. (Table 6). It is showed that the greatest nitrogen content was in dead *C. aurata* larvae from food supplemented with plant extract outer skin material, while the highest magnesium content in healthy *C. aurata* larvae fed from root paste without plant extract inner skin.

3.8. Morphological observationsLight microscopic and SEM observations

Light microscopic observations revealed that the treated with *E. lathyris* extract paste first second and third instar insect larvae of *C. aurata* are relatively small, loss of black-brown.

Table 1. Antifeedant effects of plant root paste in 4 different concentrations of E. lathyris on feeding mg of C. aurata larvae (1st Instar, 2nd Instar and 3rd instar).

Plant	Parts used	Food placed on dish	Total Food consumption					Absolute coefficient of Deterrence			Food consumption per larva			After 5 day change in 1g body weight per larva			After 5 day, % change in 1 g body weight per larva		
E. lathyris	root	1.inst.	2.inst.	3.inst.	1.inst.	2.inst.	3.inst.	1.inst.	2.inst.	3.inst.	1.inst.	2.inst.	3.inst.	1.inst.	2.inst.	3.inst.	1.inst.	2.inst.	3.inst.
Control	root	21,32	22.65	23,35	4,43	9,30	12,61				886	1860	2522	335	724.4	1172.2	19,56	28,66	24,76
2 0mg/ml	root	22,00	19,51	22,15	2,78	4,65	5,38	22,88	33,33	40,18	556	930	1076	-286	-2795	-2882	14,62	-109,99	-64,04
40 mg/ml	root	21,79	21,13	22,53	2,12	3,54	4,13	35,26	44,85	*50,65	.424	708	826	-570	-2334	-1466	-70,14	-80,64	-30,35
80 mg/ml	root	24,00	23,53	19,50	1,98	2,37	3,27	37,98	**59,38	**58,81	396	477	654	-426	-2852	-1332	-27,16	-116,31	-25,83
160 mg/ml	root	25,14	23,30	25,50	1.58	2,21	2,98	48,16	**61,59	**61,77	.315	442	596	-361	-2542	-1624	-7,76	101,11	34,47

Table 2. Toxic effects of four different concentrations of root paste and control on *C. aurata*larvae

Sample	Healthy larva			Dead larva%								
E. lathyris	1st instar	2nd instar	3rd instar	1st instar			2nd instar			3rd instar		
				3 day	6day	8day	3 day	6day	8day	3 day	6day	8day
Control	20	20	20	00±0.00	10±5.67	15±8.75	00±0.00	10±5.67	15±8.75	00±0.00	15± 3.45	15± 2.34
20mg/ml	20	20	20	45± 4.45	72± 5.76	83± 4.21	65 ± 23.34	70 ± 94. 33	75 ± 4726	54,83±8.35	68±6.74	78,83±7.32
40 mg/ml	20	20	20	66,56±6.32	69,45±6.36	76,77±6.32	63,35 ± 3.71	80,65 ± 4.92	87,35 ± 2.94	63.,88 ±6.43	66.,88 ±3.68	76.,88 ±4.89
80 mg/ml	20	20	20	66.74 ±5.12	7667 ±5.12	92.32 ±5.12	67.11 ± 5.82	82.11 ± 5.92	92.11 ± 4.63	65,83±4.65	70,83±8.47	78,83±7.32
160 mg/ml	20	20	20	68,23 ± 89.9	72,83 ± 78.5	87,88 ± 89.9	67,23 ± 2.61	80,55 ± 7.11	88,23 ± 6.84	73.13 ±2.47	88.13 ±3.32	94.13 ±6.45

Table 3. EDX analyses of the inner and outer parts of the skin surfaces of healthy and dead *C. aurata* larvae

Element	Healthy*C. aurata* larvae fed from root paste without plant extract outer skin Weight %	Healthy *C. aurata* larvae fed from root paste without plant extract inner skin Weight %	Dead *C. aurata* larvae from food supplemented with plant extract outer skin Weight %	Dead *C. aurata* larvae from food supplemented with plant extract inner skin Weight %
C	69.18	68.12	44.08	63.62
O	30.11	30.29	38.35	36.11
K	0.39	0.28	00	0.14
Cl	0.17	00	00	00
S	0.14	0.33	00	0.12
P	00	0.58	00	00
Mg	00	0.40	00	00
N	00	00	17.57	00
Na	00	00	00	00
Ca	00	00	00	00
Total	100	100	100	100

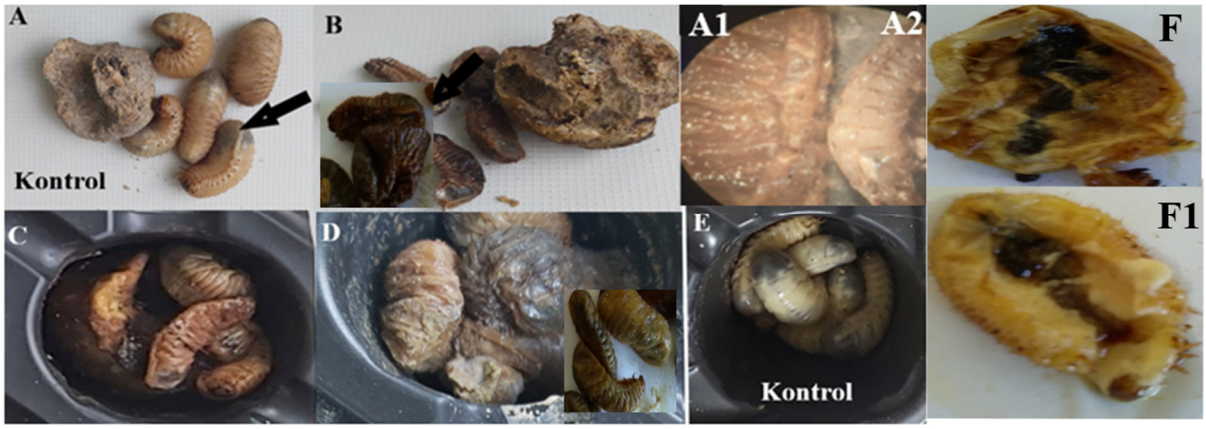

Figure 2. A) Healthy larvae fed from root paste without plant extract **B)**. Dead larvae as a result of feeding. **C)** Colorlessness and deformations in the bodies of dead larvae feeding on food **arrows,** indicates the location of the waste materials in the last tab of the healthy and dead insects **D**) 8-day controls during the experiment **E)** Shrinkage and deformation in the body of the 3rd instar larva that feeds. **A1)** internal structure of larvae dying from plant extract **A2)** internal structure of control larva without plant extract. **F1)** Damage to the internal structure of healthy larvae F**)** Damage to the internal structure of dead larvae as a result of feeding with nutrient containing plant sap.

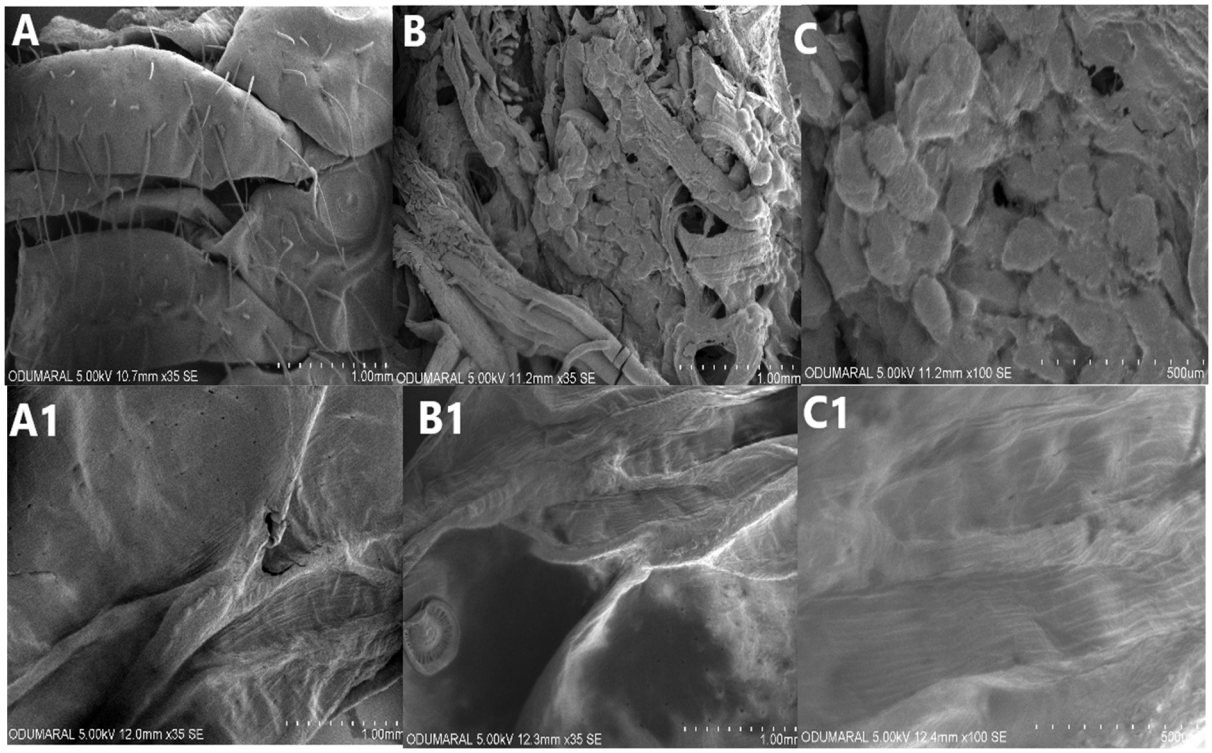

Figure 3. Normal and malformed of outer and inner skin of *C. aurata* after treatment with *E. lathyris*and without *E. lathyris*. (**A**) Normal 3rd outer skin of instar larva. (feathers).(**B**) Normal 3rd inner skin of instar larva. (cuticle lamellae). (**C**) Normal 3rd inner skin of instar larva. (cuticle tissue). (**A1**) Malformed of outer skin of *C. aurata* after treatment with *E. lathyris*. The hairs on the skin disappear and there are traces of the hair follicles. (**B1**) Malformed of inner skin of *C. aurata* after treatment with E. lathyris. The extinction of the cuticle lamellae Malformed of inner skin of *C. aurata* after treatment with *E. lathyris*.(**C1**).Where the cuticle tissue melts completely.

Table 4. Phytochemical screening of *E. lathyris* leaves, root and stem solvent extracts by GC-MS

Peak#	R.Time	Area	Area%	Height	Height%	Name
1	3.582	405838	0.23	107425	0.18	2,4(1H,3H)-Pyrimidinedione, 5-methyl- (CAS)
2	3.665	230033	0.13	109072	0.18	4-methyloxazole
3	3.898	348163	0.20	126035	0.21	
4	3.959	280811	0.16	168950	0.28	2,3-Dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-one
5	4.057	431267	0.25	453039	0.75	Butanedioic acid, diethyl ester (CAS)
6	5.845	8714163	5.03	620511	1.02	2-AMINO-9-(3,4-DIHYDROXY-5-HYDROXYMETHYL-TETRAHYDRO-FUR
7	7.129	1500771	0.87	219952	0.36	
8	7.354	980322	0.57	194936	0.32	Quinic acid
9	7.462	1970391	1.14	356521	0.59	.beta.-D-Glucopyranoside, methyl (CAS)
10	7.712	2151899	1.24	510361	0.84	
11	9.086	258906	0.15	158503	0.26	Tetradecanoic acid, ethyl ester (CAS)
12	10.850	2668834	1.54	1279755	2.11	n-Hexadecanoic acid
13	11.202	7324787	4.23	4415966	7.28	Hexadecanoic acid, ethyl ester (CAS)
14	12.431	6870888	3.96	4249842	7.01	2-Hexadecen-1-ol, 3,7,11,15-tetramethyl-, [R-[R*,R*-(E)]]- (CAS)
15	12.611	605855	0.35	289685	0.48	9,12-Octadecadienoic acid (Z,Z)-, methyl ester (CAS)
16	12.683	1022909	0.59	247910	0.41	9,12,15-Octadecatrien-1-ol (CAS)
17	12.888	28321961	16.34	11284895	18.61	Octadecanoic acid
18	12.976	22158937	12.79	11728218	19.34	ETHYL LINOLEOLATE
19	13.165	1021095	0.59	645920	1.07	Octadecanoic acid, ethyl ester (CAS)
20	14.961	200516	0.12	111615	0.18	Octadecanoic acid, ethyl ester (CAS)
21	15.346	179557	0.10	104612	0.17	
22	15.444	487086	0.28	251152	0.41	
23	15.602	171575	0.10	90947	0.15	2-Heptanone (CAS)
24	15.685	186742	0.11	92334	0.15	
25	15.797	227180	0.13	97108	0.16	
26	15.985	782737	0.45	292828	0.48	Hexadecanoic acid, 2,3-dihydroxypropyl ester (CAS)
27	16.613	251279	0.14	146771	0.24	Heptadecanoic acid, ethyl ester (CAS)
28	17.395	175387	0.10	98074	0.16	
29	17.443	1043220	0.60	401267	0.66	9,12-Octadecadienoic acid (Z,Z)-, 2,3-dihydroxypropyl ester
30	17.520	2488771	1.44	844833	1.39	ETHYL LINOLEOLATE
31	17.621	1457103	0.84	459920	0.76	Octadecanoic acid, 2,3-dihydroxypropyl ester (CAS)
32	17.862	724874	0.42	380605	0.63	Terephthalic acid, di(2-ethylhexyl) ester
33	18.450	541353	0.31	295449	0.49	2,6,10,14,18,22-Tetracosahexaene, 2,6,10,15,19,23-hexamethyl- (CAS)
34	18.549	390191	0.23	169531	0.28	
35	18.589	307847	0.18	130855	0.22	
36	18.904	1272350	0.73	664202	1.10	1-Heptacosanol (CAS)
37	20.785	1721946	0.99	762680	1.26	Vitamin e
38	21.837	298977	0.17	99218	0.16	Ergost-5-en-3-ol, (3.beta.,24R)- (CAS)
39	22.121	408055	0.24	95779	0.16	Stigmasta-5,22-dien-3-ol, (3.beta.,22E)- (CAS)
40	22.717	3945195	2.28	1321134	2.18	Stigmast-5-en-3-ol, (3.beta.)- (CAS)
41	22.805	3464644	2.00	1043255	1.72	D-Friedoolean-14-en-3-one (CAS)
42	22.951	5261577	3.04	1458320	2.41	
43	23.144	7986701	4.61	2195660	3.62	
44	23.283	7285344	4.20	1942945	3.20	NOROLEAN-12-ENE
45	23.599	4431016	2.56	1166998	1.92	9,19-Cyclolanost-24-en-3-ol, acetate
46	23.692	619777	0.36	182433	0.30	
47	23.792	3374093	1.95	893387	1.47	METHYL COMMATE B
48	23.972	470664	0.27	96804	0.16	
49	24.166	1750271	1.01	383318	0.63	
50	24.322	11238048	6.48	2958812	4.88	24 METHYL-23-DEHYDRO-CYCLOARTANOL
51	24.406	4825949	2.78	1107645	1.83	
52	24.738	2195545	1.27	414554	0.68	
53	25.008	7448050	4.30	1352761	2.23	D:B-Friedo-B':A'-neogammacer-5-en-3-one (CAS)
54	25.246	1816013	1.05	272561	0.45	
55	26.834	2478346	1.43	512062	0.84	(-)-.alpha.-Selinene
56	26.950	1306419	0.75	267363	0.44	
57	33.281	1027207	0.59	128737	0.21	
58	37.039	1806184	1.04	180635	0.30	
		173315619	100.00	60636660	100.00	

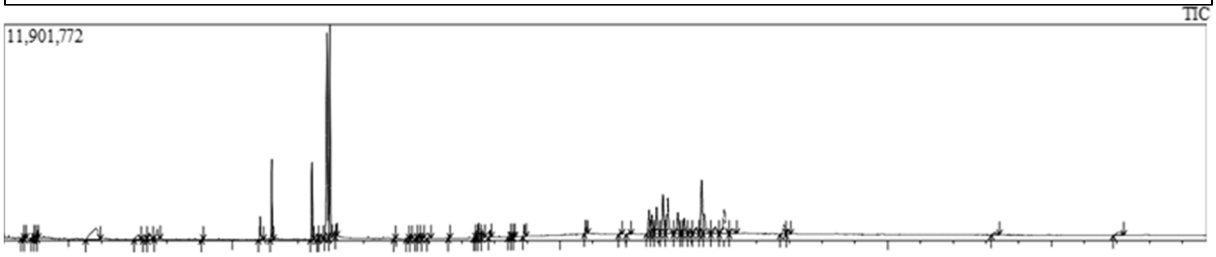

Table 5. Phytochemicals screening of Essential oils of *E. lathyris* leaves , root and stem by GC-MS

Peak#	R.Time	Area	Area%	Height	Height%Name
1	1.121	1116971	4.08	1093099	6.34
2	1.199	523390	1.91	377636	2.19
3	1.246	551629	2.02	400972	2.33
4	1.279	10967683	40.10	7588205	44.04Propyleneglycol
5	1.329	6264479	22.91	3911693	22.70Lactate<ethyl->
6	1.447	291957	1.07	230754	1.34
7	1.496	433518	1.59	264144	1.53
8	1.587	79634	0.29	65481	0.38 Isobutylalcohol
9	1.635	32953	0.12	28331	0.16 Isobutylalcohol
10	1.776	30439	0.11	17559	0.10
11	1.845	39207	0.14	22662	0.13Acetate<isobutyl->
12	1.916	241179	0.88	152056	0.88Piruvate<ethyl->
13	1.962	569142	2.08	296364	1.72Piruvate<ethyl->
14	2.269	851599	3.11	507929	2.95Valeraldehyde
15	2.313	579811	2.12	361761	2.10Valeraldehyde
16	2.375	476995	1.74	285404	1.66Butyraldehyde<2-methyl->
17	2.419	425347	1.56	227643	1.32Butyraldehyde<2-methyl->
18	2.602	92390	0.34	51203	0.30Ethylvinylcarbinol
19	2.645	189280	0.69	90546	0.53Ethylvinylcarbinol
20	2.696	551382	2.02	142374	0.83 Ethylvinylketone
21	2.806	97894	0.36	49570	0.29Acetylpropionyl
22	2.847	180815	0.66	81328	0.47Valeraldehyde
23	2.885	133546	0.49	50052	0.29
24	3.060	41339	0.15	17757	0.10Acetoin
25	3.425	68153	0.25	37641	0.22Butenol<3-methyl->
26	3.455	158230	0.58	89021	0.52Isoamylalcohol
27	3.489	201646	0.74	85120	0.49Isoamylalcohol
28	4.123	104456	0.38	52186	0.30Phenethylalcohol
29	4.189	69814	0.26	29534	0.17Formate<amyl->
30	4.260	162224	0.59	57635	0.33Pent-2(Z)-enol
31	4.595	40529	0.15	11209	0.07Ethyln-propylketone
32	4.935	285720	1.04	77223	0.45Capronaldehyde
33	6.535	44291	0.16	10406	0.06Hex-2(E)-enal
34	6.640	164378	0.60	47777	0.28Hex-3(Z)-enol
35	7.101	70154	0.26	26968	0.16Hexanol<n->
36	7.804	34551	0.13	13566	0.08Amylmethyl ketone
37	10.247	110985	0.41	38523	0.22Benzaldehyde
38	11.182	207814	0.76	63673	0.37Oxybenzene
39	13.137	61508	0.22	18311	0.11 Benzylalcohol
40	13.477	52652	0.19	17190	0.10Phenylacetaldehyde
41	13.916	118468	0.43	38211	0.22Furan<alpha-ethyl->
42	18.433	85469	0.31	27170	0.16Benzoate<ethyl->
43	19.478	38969	0.14	15133	0.09Octanoate<ethyl->
44	25.386	85743	0.31	26469	0.15Patchoulene<beta->
45	26.753	247118	0.90	76889	0.45Patchoulene<beta->
46	30.002	139848	0.51	42216	0.25
47	41.386	33737	0.12	12435	0.07
		27349036	100.00	17229029	100.00

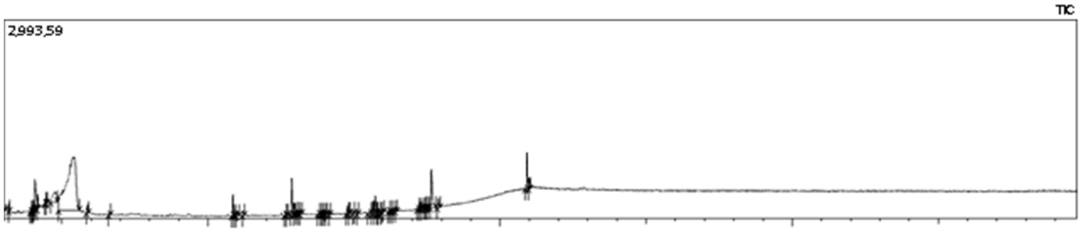

Table 6. Phytochemicals screening of ethanol solvent extracts of *C. aurata* without *E. lathyris* extracts by GC-MS

Peak#	R.Time	Area	Area%	Height	Height%	Name
1	3.185	121716	0.36	123232	1.81	Decane (CAS)
2	3.947	65899	0.20	34012	0.50	N,N-DIMETHYLHOMOSERINE LACTONE
3	3.993	190877	0.57	94943	1.40	Octanoic acid (CAS)
4	4.036	62539	0.19	46580	0.69	
5	4.079	1575042	4.68	452120	6.65	4,7-Methano-1H-inden-1-one, 2,3,3a,4,7,7a-hexahydro- (CAS)
6	4.169	277477	0.83	220793	3.25	Dodecane (CAS)
7	4.433	79794	0.24	45456	0.67	BENZENEACETIC ACID
8	4.474	143020	0.43	101041	1.49	Nonanoic acid (CAS)
9	4.751	1375025	4.09	156169	2.30	DL-Valine
10	5.437	18190253	54.10	810266	11.92	D-Proline
11	5.882	217854	0.65	127297	1.87	2,5-Pyrrolidinedione, 3-(1-chloroethyl)-4-methyl- (CAS)
12	6.630	80038	0.24	45954	0.68	Dodecanoic acid (CAS)
13	10.861	577060	1.72	320242	4.71	n-Hexadecanoic acid
14	10.906	219441	0.65	89714	1.32	3,9-DIAZATRICYCLO[7.3.0.0(3,7)]DODECAN-2,8-DIONE
15	11.013	243187	0.72	71112	1.05	
16	11.219	105389	0.31	67159	0.99	Hexadecanoic acid, ethyl ester (CAS)
17	12.668	115709	0.34	52864	0.78	OCTADEC-9-ENOIC ACID
18	12.709	94990	0.28	37522	0.55	
19	12.875	1126986	3.35	548332	8.06	Octadecanoic acid
20	12.957	505633	1.50	175607	2.58	ETHYL OCTADEC-9-ENOATE
21	13.013	62349	0.19	33938	0.50	
22	13.105	77342	0.23	36861	0.54	
23	13.185	86750	0.26	55813	0.82	Octadecanoic acid, ethyl ester (CAS)
24	13.800	31470	0.09	16899	0.25	
25	13.876	75946	0.23	38825	0.57	
26	13.916	62483	0.19	34089	0.50	1-Heptacosanol (CAS)
27	14.009	190667	0.57	69769	1.03	6-Nitro-cylohexadecane-1,3-dione
28	14.064	39163	0.12	18621	0.27	
29	14.166	55615	0.17	31584	0.46	
30	14.782	261928	0.78	124397	1.83	9-OCTADECENAMIDE
31	14.829	62540	0.19	34789	0.51	
32	14.985	49126	0.15	26061	0.38	
33	15.118	55524	0.17	30774	0.45	1H-Purin-6-amine, [(2-fluorophenyl)methyl]- (CAS)
34	15.544	116264	0.35	28617	0.42	
35	15.656	416960	1.24	183454	2.70	1-Heptacosanol (CAS)
36	15.726	761649	2.27	269167	3.96	1-Pentacosanol
37	15.791	108034	0.32	55995	0.82	
38	15.845	233003	0.69	62538	0.92	
39	15.920	119366	0.36	35428	0.52	
40	16.006	99896	0.30	50191	0.74	Hexadecanoicacid, 1-(hydroxymethyl)-1,2-ethanediyl ester (CAS)
41	16.199	50124	0.15	19830	0.29	
42	16.281	69430	0.21	31666	0.47	
43	16.355	89744	0.27	34690	0.51	Docosane (CAS)
44	16.440	130683	0.39	68421	1.01	HEXATRIACONTANE
45	17.214	99138	0.29	38836	0.57	
46	17.261	250914	0.75	108954	1.60	Nonadecyl trifluoroacetate
47	17.327	364331	1.08	117509	1.73	
48	17.437	87711	0.26	44482	0.65	
49	17.477	112227	0.33	50015	0.74	
50	17.545	60455	0.18	24194	0.36	
51	17.651	1854781	5.52	576531	8.48	Pentadecanoic acid, 2-hydroxy-1-(hydroxymethyl)ethyl ester
52	17.885	387062	1.15	136023	2.00	Terephthalic acid, di(2-ethylhexyl) ester
53	20.915	1255841	3.74	525899	7.74	Cholest-5-en-3-ol (3.beta.)- (CAS)
54	21.000	474356	1.41	163649	2.41	
		33620801	100.00	6798924	100.00	

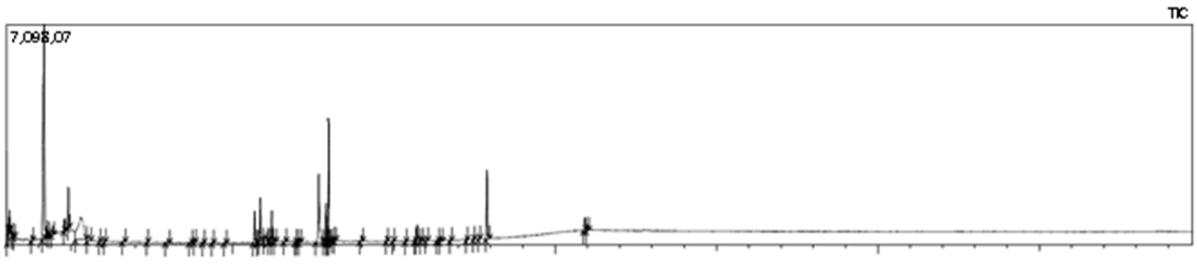

Table 7. Phytochemicals screening of ethanol solvent extracts of *C. aurata* with *E. lathyris* feed extracts by GC-MS

min

Peak Report TIC

Peak#	R.Time	Area	Area%	Height	Height%	Name
1	3.039	1016472	1.31	437456	1.39	Diglycerol
2	3.096	941334	1.22	657013	2.08	Phenol (CAS)
3	3.189	197055	0.25	162276	0.51	Decane (CAS)
4	3.243	136792	0.18	85880	0.27	
5	3.805	355919	0.46	164422	0.52	Propanoic acid, 3-(methylthio)- (CAS)
6	4.172	20744190	26.78	6922760	21.93	Piperidinone (CAS)
7	4.248	210813	0.27	181759	0.58	4-(1-hydroxy-ethyl) .gamma. butanolactone
8	4.323	112388	0.15	110122	0.35	4-(1-hydroxy-ethyl) .gamma. butanolactone
9	4.444	737672	0.95	294962	0.93	Benzeneacetic acid
10	4.795	460512	0.59	384206	1.22	1H-Indole (CAS)
11	4.921	1980856	2.56	1321727	4.19	Hydrocinnamic acid
12	5.299	8413356	10.86	720580	2.28	L-Proline (CAS)
13	5.537	717972	0.93	150915	0.48	Phenol, 4-(2-aminoethyl)- (CAS)
14	5.892	127157	0.16	76377	0.24	
15	6.048	153908	0.20	91767	0.29	2H-Indol-2-one, 1,3-dihydro- (CAS)
16	6.640	158436	0.20	56387	0.18	DL-Arabinitol
17	7.376	140729	0.18	87332	0.28	
18	8.003	352412	0.45	100891	0.32	MOME INOSITOL
19	8.713	131339	0.17	63748	0.20	Tetradecanoic acid (CAS)
20	8.837	140698	0.18	56710	0.18	TRYPTAMINIUMCHLORIDE
21	9.106	92553	0.12	59968	0.19	Tetradecanoic acid, ethyl ester (CAS)
22	9.401	102503	0.13	55969	0.18	Pentadecanoic acid(CAS)
23	9.786	163796	0.21	85421	0.27	Pentadecanoic acid, ethyl ester
24	10.692	2056938	2.66	1014393	3.21	OCTADEC-9-ENOIC ACID
25	10.774	230654	0.30	96459	0.31	OCTADEC-9-ENOIC ACID
26	10.869	3031579	3.91	1412269	4.47	n-Hexadecanoicacid
27	11.029	3359767	4.34	1880337	5.96	Ethyl 9-hexadecenoate
28	11.127	133473	0.17	76002	0.24	Ethyl 9-hexadecenoate
29	11.223	1622548	2.09	1001543	3.17	Hexadecanoic acid, ethyl ester (CAS)
30	11.322	203024	0.26	94623	0.30	9-Octadecenoic acid (Z)- (CAS)
31	11.656	416298	0.54	142747	0.45	Octadecanoic acid, ethyl ester (CAS)
32	11.952	96882	0.13	59349	0.19	Heptadecanoic acid, ethyl ester
33	12.013	93586	0.12	47837	0.15	ETHYL 9-HEXADECENOATE
34	12.115	99755	0.13	49439	0.16	ETHYL 9-HEXADECENOATE
35	12.679	6107448	7.88	2203784	6.98	OCTADEC-9-ENOIC ACID
36	12.879	2611229	3.37	1278470	4.05	Octadecanoic acid
37	12.917	1167482	1.51	717921	2.27	9,12-Octadecadienoic acid, methyl ester, (E,E)- (CAS)
38	12.962	7246674	9.35	4007735	12.70	6-Octadecenoic acid
39	13.016	976103	1.26	424800	1.35	Ethyl Oleate
40	13.106	110314	0.14	50334	0.16	Tetradecanamide
41	13.185	174871	0.23	105004	0.33	Octadecanoic acid, ethyl ester (CAS)
42	14.014	481050	0.62	201154	0.64	DI-(9-OCTADECENOYL)-GLYCEROL
43	14.787	301600	0.39	161827	0.51	9-OCTADECENAMIDE
44	14.981	104107	0.13	58480	0.19	
45	15.372	87182	0.11	50609	0.16	
46	15.658	157283	0.20	97049	0.31	1-Heptacosanol (CAS)
47	15.733	1272358	1.64	525992	1.67	Z-7-Hexadecenal
48	15.847	244334	0.32	70483	0.22	
49	16.009	272733	0.35	124071	0.39	Hexadecanoic acid, 2,3-dihydroxypropyl ester (CAS)
50	16.357	152329	0.20	70104	0.22	HEXATRIACONTANE
51	16.442	207860	0.27	80743	0.26	HEXATRIACONTANE
52	16.765	91913	0.12	44612	0.14	DIOCTADECYLOXY-1,1,2,2-TETRADEUTERIO ETHANE
53	17.262	128518	0.17	62208	0.20	1-Heptacosanol (CAS)
54	17.480	215673	0.28	103058	0.33	9-Octadecenoic acid (Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester
55	17.647	192719	0.25	79622	0.25	
56	17.887	4583215	5.92	2221272	7.04	Terephthalic acid, di(2-ethylhexyl) ester
57	20.916	1024111	1.32	412620	1.31	Cholest-5-en-3-ol (3.beta.)- (CAS)

4. Conclusion

The larvicidal properties of different concentrations of *E. lathyris* plant extracts against first, second, and third instar larvae of *C. aurata* were investigated in this study.All concentrations of extract were efficient for the *E. lathyris* different concentrations among extract-added meals examined, however 80-160mg/ml indicated the best insecticidal activity for third instar larvae. In order to investigate the insecticidal activity of plants, it is best to collect several parts of each plant, such as roots, stems, leaves, flowers, and fruits, as well as other plant particular sites, because some acaricidal plants may have either localized or spread insecticidal activity (Zhang et al., 2008). The acaricidal properties of several solvent extracts from different organs of *Euphorbia fischeriana* against *T. cinnabarinus* were screened by Liu et al. (2010).

Cao et al. (2007) found that chloroform extract from *Kochia scoparia* seeds had stronger acaricidal activity against *Tetranychusviennensis* than the roots, stems, and foliage. Aside from that, different plant species have been

found to have significantly different acquisition times and requirements (Wu et al., 1998). The chemical make-up of components differs greatly between species.The same botanical extract may vary depending on the harvest season, plant origin, drying procedures, and other variables (Damiani et al., 2011). *E. lathyris*, a well-known botanical plant in the Euphorbiaceae family, has been extensively grown for bioenergy or traditional Asian medicine. Europe, North and South America, Central Asia, East Asia, and North Africa are just a few of the places where *E. lathyris* can be found. Because of its high amount of hydrocarbons and fatty acids, it is used as a biofuel and biomass resource throughout Western Europe and the United States (Nemethy et al.,1979; Escrig et al.,2003). *E. lathyris* is a potent but dangerous traditional Chinese medicine from the euphorbiaceae family. Due to its radical laxative effects, which include dissolving static blood and eliminating lumps, it is widely used to treat hydropsy, ascites, anuresis and constipation, amenorrhea, and scabies. This species currently has a wide range as a ruderal plant and weed on cultivated soils. This latex contains a lot of isoprenoids, mostly triterpenes with a lot of structural variety, and a little bit of diterpenoids, the most of which are irritating toxics.

Polycyclic triterpenes are another significant group of chemical constituents found in significant amounts in the latex of *E. lathyris*. These substances are not only high in energy, but they also have a variety of biological and medicinal properties. In latexes, multiple isoforms of chitinases exist, and they have strong insecticidal activity. However, these chitinases appear to be selective for phytopathogens (Freitas et al., 2016).

Botanically active antifeedants are found in all compound groups of secondary plant metabolism. Herbal insecticides' antifeedant behavior has been studied in a number of countries. In the field of insect pest management, quantifying the antifeedant impact of herbal insecticides is important. Antifeedants are important from an ecological standpoint because they never kill the destination insects and larvae directly, allowing them to coexist with their natural enemies and assisting in the maintenance of natural balance. Antifeedant signs typically show a lower ratio of nourishment. Higher antifeedant is a chemical that prevents insect pests from being fed without killing them directly, yet maintaining nearly cured foliage and causing them to starve to death (Pavunraj et.al., 2012; Yasui et.al., 1998). Non-host plants' unsuitability as food for insects is largely due to antifeedant compounds. Other chemical indicators can be used to detect inappropriate plants; these chemical substances may be unappealing or poisonous to insects (Jeyasankar et al., 2010).

Terpenoids, alkaloids, saponins, and polyphenols, on the other hand, are the most effective insect feeding inhibitors. (Koul, 2005). A few plant secondary metabolites are known antifeedants, and they contain a wide range of chemicals, including triterpenes, sesquiterpene lactones and alkaloids, cucurbitacines, quinines, and phenols. Several plant families contain numerous species as well as bioactive substances, among which volatile oils, particularly terpenes, have been shown to have antifeedant properties against various lepidopteran pests.

These compounds may be present in the Caper spurge extracts used in this study. If an activity extract is chosen, it can be saved, purified, and used against *C. aurata* larvae in the first, second, and third instars. The findings suggest that more research should be conducted. Polycyclic triterpenes are another important group of chemical constituents found in significant amounts in the latex of *E. lathyris* (Warnaar, 1981; Das and Mahato, 1983). In latexes, multiple isoforms of chitinases exist, and they have strong insecticidal activity. However, these chitinases appear to be selective for phytopathogens (Freitas et al., 2016) At the same time, the larvae were found to be defecating excessively. Concentrations of *E. lathyris* (20, 40, 80, and 160 mg/ml.) have antifeedant insecticidal effects on the first, second, and third instar larvae of *C. aurata*, but only 20 mg/ml. on the larvae (instar 1 a) of *C. aurata*. *E. lathyris* contains a large amount of latex and therefore effective for all larvae. On the other hand, insecticide activity in the Euphorbia lathyritic latex may not be caused simply by their chitinolytic properties in two chitinase-analog proteins (called LA-a and LA-b). (Kitajima et al.,2010).The latex of *E. lathyris* caused a large body scan in some larvae exposed to the plant paste. *L. euphorbain*: Euphorbain L is a proteinase derived from the latex of this multi-chain enzyme, which has a similar composition to that of *E. lathyris* but is larger in size and has more restricted activity. Similarly, extracts of this plant in water, ethanol, acetone, and other organic solvents have insecticidal, larvicidal, antibacterial, and antiparasitic properties. (Dubey and Jagannadham, 2003) These extracts of *E. lathyris* in various concentrations also discourage or possibly repel an insect from feeding.

An extract of *E. lathyris* mixed nutrient exhibited significant insecticidal activity at concentrations ranging from 20 to 160 percent. It is possible that the insecticidal property present in the selected extract mixed nutrient compound may inhibit metabolic activities of the larvae throughout the improving process, resulting in the larvae failing to moult and eventually died. As a result, nontoxic compounds isolated from *E. lathyris* should be isolated for human and animal consumption. It is especially important to improve nontoxic herbal insecticidal extracts. Our findings show that *E. lathyris* has insecticidal activity against *C. aurata* larvae in the first, second, and third instars. In vitro toxicity tests, *E. lathyris* against *C. aurata* larvae was performed. This study shows the *E. lathyris* extracts is as nontoxic, pollution-free pesticides that can be released into the environment. (Nong et.al.., 2012) . The extracts of *E. lathyris* composite were rarefied at four empirical concentrations of 20%, 40%, 40%, and 60% (m/v). The insecticidal activity of each concentration of *E. lathyris* component was tested and insects deaths were observed at 3, 6, and 8 days. Treatment with *E. lathyris* extracts at less than 20% concentration could result in 45.45 percent mortality in 3 days and 83.21 percent mortality in 8 days. Insecticidal activity was lower at concentrations less

than 20%. This study proposed that *E. lathyris* and E. lathyris-derived extract paste materials can be used as *C. aurata* larvae control agents. Using active components of *E. lathyris* latex (isoprenoids, triterpenes, diterpenoids,) in insecticidal research and development can increase the efficiency of a larvae and reduce the potential for strength development in larvae and insect populations. Polycyclic triterpenes are another important group of chemical constituents found in the latex of *E. lathyris*. In latexes, multiple isoforms of chitinases are formed, and they have strong insecticidal activity. However, these chitinases appear to be selective for phytopathogens (Freitas et al., 2016).

The large economic costs, as far as we know, are the main constraint to the improvement of natural pesticides. In contrast, it is a natural product that can be grown locally and achieved at a low cost for the *E. lathyris* extract over insects. Generally, an extract from plants has only few concentrations and many hopeful features of effective composites. The antioxidant and antimicrobial feature came mainly from Tetradecanic acid and Hexadecanoic acid that has larvicidal action (Falodun et al., 2009) recorded that Cyclooctane TTCs from *Caragana sulkyness* may have great potential to control the infestation of *S. litura* in many crops (Divya et al., 2017). According to Eto et al. (1981), the isobutyl or isopropyl group demonstrated the most appropriate insecticidal activityand 9,12-Octadecadienoic Acid (Z,Z)- (26.846 percent) is a significant chemical constituent that may be involved in larvicidal activity. 5-Aminolevulinic acid (ALA), a byproduct of biological tetrapyrrole synthesis, has the potential to be used as a photodynamic herbicide/insecticide.

Pyruvate inhibited the C5 pathway enzyme, resulting in decreased ALA efficiency in *P. riboflavina*. To overcome pyruvate inhibition, a combined reaction with lactate dehydrogenase was used, which resulted in the formation of ALA (Rhee et al., 1987).

In Australia, ethyl format (EF) is used to manage dried fruit pests since it has quick insecticidal effects and doesn't create any residue on stored grains (Muthu et al., 1984).

The results revealed a strong response of the female *A. dispersal* antennas to ±-2-hexanol from the essentials oil of *P. indus* feeds. In addition, insecticidal activity is also present (Ullah et al., 2015). Although larvae fed with tetrahydrofuran showed lower growth while the larval death rate was checked, it was not significantly increased (Cesar et.al., 2000). Furan and thiophene rings are also linked to a variety of useful pesticidal activities. Pefurazoate and Trifensulfuron are heterocyclic fungicides and herbicides that contain a furan and thiophene ring, respectively (Liu et al., 2010). For their insecticidal and acaricidal properties, certain benzoates are well known. For instance the treatment of scabies, a contagious skin invasion due to the *Sarcoptesscabiei* mite, is using benzyl benzoate (Dressler et al., 2016: Yang et al., 2013, Feng and Zhang, 2017).

Sucrose octanoate and caproate were synthesized by Li et al (2005) and sucrose octanoate, which has the greatest activity against a variety of arthropod species. The death rate achieved 79.2% after being cured for 5 days with 12% of the reaction products, which shows that sucrose octanoate are potent pesticides against *Lymantria dispar* grubs (Shujun et al., 2008). Nonetheless, additional research into the refining and identification of the active components of E. lathyris extracts as a possible novel pesticide should be conducted. The insecticidal area of activity and formulations to create, as well as the insecticidal power and stability of this chemical, require more investigation. Confirmation requires field testing as well.

Animals and insects are poisoned by some chemical components, such as alkaloids and cardenolides. Furthermore, chitinase-related enzymes can hydrolyze fungal pathogens (Dussourd and Eisner,1987). Chitinases, lectins, lipases, oxidative and other hydrolytic enzymes have also been identified as occurring in latex fluids (Stirpe et al., 1993; Azarkan et al., 1997). These data on the biochemical composition of laticifer fluids support the hypothesis that they play a defensive role (Taira et al. 2005). These findings depict some of the structural changes that occurred in the larvae fed the plant extract-containing food that we studied. The plant's latex content has caused significant damage to the larvae (Figure 2 B, Figure 3 B1, C1).

The current study found that *E. lathyris* extracts were the most toxic during a repelletic bioassay. *C. aurata* larvae skin inside and outside has also altered in body weight by employing varied doses of the extract. Extracts of *E. lathyris* exhibit potent insecticidal properties. Based on in vitro and in vivo experiments, *E. lathyris* extracts may be suggested for the treatment of *C. aurata* larvae as a low-cost, readily available, and ecologically friendly botanical pesticide, effectively protecting various fruit blossoms, including rose and fig fruit, and other agriculturally important plants.

Competing interests: The authors declare that they have no competing interest

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