RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

I- Effect of plant extracts on tested insects the black cutworm, *Agrotis ipsilon* (Hufnagel) and the cotton leafworm, *Spodoptera littoralis* (Boisd).

I.1. Effect of plant extracts as antifeedant:

This trial was run on 4th instar larvae of cotton leafworm and black cutworm to detect the presence or absence of antifeeding properties in these plant extracts.

I.1.1.a) Effect of squill extracts against the cotton leafworm

Results in **Table 2** illustrate the antifeeding activity of squill plant extracts with acetone, ethanol and petroleum/ether against the cotton leafworm These results show varying degrees of antifeedant activity. Acetone extracts was the most effective one as feeding deterrent causing 87.75% antifeeding activity while ethanol extracts come to the second category causing 78.99% at 10% concentration compared with control.

In the same table data indicate that the increase in concentration led to increase in the activity of antifeeding.

The comparison between the three different solvents in their efficiency to protect the target host denote to the priority of acetone followed by ethanol and finally petroleum/ether.

I.1.1.b) Effect of squill extracts against the black cutworm

Data presented in **Table 3** show the efficiency of the three solvents (ethanol, acetone and petroleum/ether) to extract feeding deterrents components from the leaves against the larvae

Table 2: Antifeeding activities of squill extracts on 4th instar larvae of the cotton leaf worm

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.19±0.03	11.16	88.84	87.75
	8	10	4.06±0.16	20.68	79.32	77.29
	5	10	6.38±0.13	32.5	67.49	64.32
	2.5	10	8.19±0.08	41.72	58.28	54.19
	1.25	10	9.31±0.17	47.43	52.58	47.93
Control			17.88	91.06		
Ethanol 70%	10	10	3.81±0.04	19.39	80.59	78.99
	8	10	4.00±0.05	20.36	79.62	77.94
	5	10	5.38±0.21	27.39	72.59	70.33
	2.5	10	6.00±0.25	30.55	69.43	66.91
	1.25	10	7.06±0.30	35.94	64.03	61.06
Control			18.13	92.33		
Petroleum ether	10	10	4.00±0.23	20.38	79.62	78.67
	8	10	5.56±0.29	28.32	71.68	70.34
	5	10	8.19±0.12	41.72	58.28	56.32
	2.5	10	8.94±0.19	45.54	54.46	52.32
	1.25	10	10.19±0.15	51.91	48.09	45.65
Control			18.75	95.49		

L.S.D at 0.05 (0.4493)

Table 3: Antifeeding activities of squill extracts on 4th instar larvae of the cut worm .

Extracts	% Conc.	No.of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.31±0.11	11.77	88.23	86.89
	8	10	3.75±0.10	19.1	80.89	78.73
	5	10	6.50±0.11	33.11	66.89	63.13
	2.5	10	8.25±0.13	42.03	57.97	53.2
	1.25	10	9.00±0.17	45.85	54.14	48.95
Control			17.63	89.79		
Ethanol 70%	10	10	2.13±0.12	10.85	89.15	88..29
	8	10	2.69±0.13	13.7	86.29	85.21
	5	10	4.63±0.11	23.58	76.42	74.55
	2.5	10	6.69±0.16	34.07	65.93	63.22
	1.25	10	9.13±0.23	46.5	53.49	49.81
Control			18.19	92.64		
Petroleum ether	10	10	4.25±0.09	21.65	78.35	76.71
	8	10	5.25±0.14	26.74	73.26	71.23
	5	10	7.31±0.20	37.24	62.76	59.95
	2.5	10	8.81±0.17	44.88	55.12	51.73
	1.25	10	9.38±0.09	47.78	52.22	48.6
Control			18.25	92.95		

L.S.D at 0.05 0.2554

of black cutworm. The three solvents led to extract efficient components consumption. This reduction in antifeeding activity was maximal in the case of ethanol extract reaching 88.29 % reduction with high concentration followed by acetone giving 86.89 % at the same concentration. On the other hand the lowest reduction recorded was 48.6 % at 1.25 % when the use of the petroleum/ether.

I.1.2.a) Effect of halfa bar extracts against the cotton leafworm.

Result in **Table 4** indicated that ethanol extracts possess antifeeding activity and this activity increases by increasing the concentration. The highest antifeedant activity 89.66 % obtained after the use of 10% concentration followed by petroleum/ether and acetone extracts at the same concentration, recording percentages of antifeeding activity 87.68% and 84.28 % respectively.

On the other hand, the lowest effect was recorded with 1.25% of petroleum/ether extract giving 48.64 % antifeeding activity .

Data in the same table showed that ethanol was the best solvent system in extracting the bioactive components of halfa bar *which* caused the highest protection to the plant 90.42 % .These results agree with **Swidan (1994)** who found antifeedant activity against 4th instar larvae of cotton leafworm in the extracts of this plant.

The study revealed that lower concentration of halfa bar had a significant activity at 1-0.25 % .

Table 4: Antifeeding activities of halfa bar extracts on 4th instar larvae of the cotton leaf worm.

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.81±0.13	14.31	85.69	84.28
	8	10	3.81±0.11	19.41	80.59	78.69
	5	10	5.00±0.21	25.47	74.53	72.04
	2.5	10	7.38±0.22	37.59	62.4	58.72
	1.25	10	9.00±0.21	45.85	54.15	49.66
Control			17.88	91.06		
Ethanol 70%	10	10	1.88±0.09	9.55	90.42	89.66
	8	10	2.19±0.14	11.15	88.84	87.92
	5	10	3.56±0.22	18.12	81.86	80.36
	2.5	10	5.00±0.11	25.45	74.53	72.42
	1.25	10	6.13±0.16	31.21	68.77	66.19
Control			18.13	92.33		
Petroleum ether	10	10	2.31±0.12	11.77	88.23	87.68
	8	10	3.13±0.17	15.94	84.06	83.31
	5	10	3.94±0.17	20.07	79.93	78.99
	2.5	10	7.50±0.25	38.21	61.79	60
	1.25	10	9.63±0.15	49.06	50.94	48.64
Control			18.75	95.49		

L.S.D. at 0.05 0.3039

I.1.2.b) Effect of halfa bar extracts against the black cutworm.

Data in **Table 5** indicate the important role of the studied factors in determining both protection and antifeeding activity by black cutworm larvae as being affected by halfa bar (leaves) extracts . It is evident to notice the positive correlation between extract concentration and food consumption by larvae. The higher concentration of the tested extract caused the lowest consumption of food. The least consumed area 2.25cm $\pm$ 0.03 recorded with petroleum/ether extract at 10% concentration compared with control 18.25 cm.

Data in the same table indicated that petroleum/ether extracts had the highest antifeedant activity 87.67 % at 10 % concentration than the same concentration with other solvents recording 86.26 % , 83.32 % in the case of ethanol and acetone respectively .On the other hand the lowest activity noticed after the treatment by 1.25% of acetone extract causing 50.37% antifeedant activity. Statistical analysis showed significant differences between the tested solvents .

I.1.3.a) Effect of belladonna (leaves) extracts against the cotton leafworm.

Results of feeding tests using different extracts of belladonna leaves are given in **Table 6**. All extracts reduced the consumed area compared to control. There was reverse relationship between concentration and food consumption. The higher the antifeeding activity the lower was the consumed area .

Table 5: Antifeeding activities of halfa bar extracts on 4th instar larvae of the black cutworm.

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.94±0.15	14.98	85.02	83.32
	8	10	3.38±0.19	17.22	82.78	80.81
	5	10	3.81±0.13	19.41	80.59	78.39
	2.5	10	6.75±0.23	34.39	65.61	61.71
	1.25	10	8.75±0.21	44.57	55.43	50.37
Control			17.63	89.79		
Ethanol 70%	10	10	2.50±0.15	12.73	87.27	86.26
	8	10	2.63±0.14	13.39	86.6	85.57
	5	10	3.81±0.10	19.41	80.59	79.05
	2.5	10	5.44±0.16	27.71	72.29	70.09
	1.25	10	7.63±0.12	38.86	61.14	58.05
Control			18.19	92.64		
Petroleum ether	10	10	2.25±0.09	11.46	88.54	87.67
	8	10	2.44±0.11	12.43	87.57	86.16
	5	10	2.63±0.15	13.39	86.6	85.59
	2.5	10	4.31±0.10	21.96	78.04	76.38
	1.25	10	7.00±0.06	35.66	64.34	61.64
Control			18.25	92.95		

L.S.D at 0.05 0.2223

Table 6: Antifeeding activities of belladonna extracts on the 4th instar larvae of the cotton leaf worm.

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	1.94±0.12	9.88	90.12	89.15
	8	10	3.06±0.26	15.59	84.41	82.89
	5	10	3.50±0.16	17.83	82.17	80.43
	2.5	10	5.81±0.09	29.59	70.4	67.51
	1.25	10	7.25±0.23	36.93	63.07	59.45
Control			17.88	91.06		
Ethanol 70%	10	10	1.31±0.03	6.67	93.33	92.77
	8	10	1.50±0.04	7.64	92.36	91.73
	5	10	1.75±0.16	8.91	91.09	90.35
	2.5	10	3.88±0.17	19.73	80.23	78.63
	1.25	10	5.56±0.13	28.32	71.66	69.33
Control			18.13	92.33		
Petroleum ether	10	10	4.75±0.12	24.19	75.8	74.67
	8	10	5.50±0.13	28.02	71.98	70.67
	5	10	6.88±0.24	35.05	64.95	63.31
	2.5	10	8.38±0.17	42.69	57.31	55.31
	1.25	10	9.38±0.23	47.78	52.22	49.97
Control			18.75	95.49		

L.S.D at 0.05 0.2382

Data demonstrated that all extracts of this plant have high antifeedant activity ranged between 49.97 % when treated with 1.25 % Petroleum/ether extract to 92.77 % after the treatment with 10 % ethanol extract which occupied the first category within the extracts of belladonna Statistical analysis showed significant differences between the used extracts in deterring food consumption

I.1.3.b)Effect of belladonna (leaves) extracts against the black cutworm

Results reported in **table 7** revealed a marked reduction in feeding by insect exposed to the extracts with different solvents. Extracts used possess antifeeding activity and this activity increase by increasing the concentration of extracts. Data in the same table also indicated that ethanol extract of belladonna gave the highest antifeeding activity 91.04 % at 10 % concentration followed by acetone extract and petroleum/ether at the same concentration which gave percentages of antifeeding activity varied from 85.82 % to 75.34 % respectively. On the other hand, the lowest effect was recorded with 1.25 % concentration of petroleum/ether extract (50.68 % antifeeding activity).

Statistical analysis showed significant differences between all used extracts from the side of consumed area

I.1.4.a) Effect of thorn apple (leaves) extracts against the cotton leafworm:

Data tabulated in **Table 8** show the effect of different solvent extracts of thorn apple on the antifeeding of the cotton leafworm (4^{th} instar larvae). These data indicated that 10 % concentration of thorn apple ethanol extract possess the highest

Table 7: Antifeeding activities of belladonna extracts on the 4th instar larvae of the black cut worm

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.50±0.12	12.74	87.26	85.82
	8	10	3.25±0.16	16.56	83.44	81.57
	5	10	3.50±0.12	17.83	82.17	80.15
	2.5	10	5.56±0.17	28.32	71.68	68.46
	1.25	10	7.56±0.10	38.51	61.49	57.12
Control			17.63	89.79		
Ethanol 70%	10	10	1.63±0.16	8.3	91.69	91.04
	8	10	1.88±0.14	9.58	90.42	89.69
	5	10	2.56±0.12	13.04	86.96	85.93
	2.5	10	4.56±0.17	23.22	76.77	74.93
	1.25	10	6.94±0.20	35.34	64.65	61.85
Control			18.19	92.64		
Petroleum ether	10	10	4.50±0.10	22.92	77.08	75.34
	8	10	5.25±0.10	26.74	73.26	71.23
	5	10	5.75±0.05	29.29	70.71	68.49
	2.5	10	7.50±0.16	38.21	61.79	58.9
	1.25	10	9.00±0.13	45.85	54.15	50.68
Control			18.25	92.95		

L.S.D at 0.05 0.1949

Table 8: Antifeeding activities of thorn apple extracts on the 4th instar larvae of the cotton leaf worm

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.13±0.11	10.85	89.15	88.09
	8	10	3.19±0.08	16.25	83.75	82.16
	5	10	3.88±0.19	19.77	80.23	78.3
	2.5	10	6.00±0.14	30.57	69.43	66.44
	1.25	10	7.50±0.12	38.21	61.79	58.05
Control			17.88	91.06		
Ethanol 70%	10	10	1.25±0.06	6.36	93.63	93.11
	8	10	1.38±0.04	7.03	92.97	92.39
	5	10	1.63±0.09	8.3	91.69	91.01
	2.5	10	1.88±0.07	9.55	90.42	89.66
	1.25	10	4.00±0.11	20.36	79.62	77.94
Control			18.13	92.33		
Petroleum ether	10	10	4.13±0.04	21.04	78.96	77.97
	8	10	5.13±0.08	26.13	73.87	72.64
	5	10	6.19±0.07	31.53	68.47	66.99
	2.5	10	8.06±0.05	41.06	58.94	57.01
	1.25	10	9.19±0.07	46.82	53.18	50.99
Control			17.88	95.49		

L.S.D at 0.05 0.2553

reduction in feeding of larvae and show 93.11 % antifeeding activity. On the contrary, petroleum/ether extract of thorn apple at 1.25% gave the lowest reduction 50.99%. Results also showed that all solvent extracts possess antifeeding activity comparing with the control. The increase in concentration increases the activity of antifeeding. By the comparison between different extracts ethanol occupied the first class in deterring feeding because of possessing the better properties in this side than other solvents. These results agree with **Singh *et al* (2001)** who found that the plant extract from the leaves of *Datura alba* exhibited antifeedant activity against *Heliothis armigera* under laboratory condition.

I.1.4.b) Effect of thorn apple (leaves) extracts against the black cutworm .

Results in **Table 9** show that 10% ethanol extract of thon apple against 4th instar larvae of black cutworm gave the higher antifeedant activity 90.05%, followed by acetone and petroleum/ether, recording 84.06% and 77.37% respectively. While the lowest antifeedant activity (51.34) was recorded at 1.25 % of petroleum ether extract. The percentages of antifeeding activity increase by increasing concentration. With regard to the statistical analysis there were significant differences between all used extracts.

I.1.5.a) Effect of Egyptian henbane (herb) extracts against the cotton leafworm

Data in **Table 10** show that the ethanol extract of Egyptian henbane recorded the highest antifeeding activity 93.45% at 10% concentration against 4th instar larvae of cotton

Table 9: Antifeeding activities of thon apple extracts on 4th instar larvae of the black cut worm

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.81±0.06	14.31	85.69	84.06
	8	10	3.31±0.11	16.86	83.14	81.23
	5	10	3.75±0.10	19.1	80.89	78.73
	2.5	10	5.63±0.09	28.68	71.32	68.07
	1.25	10	7.75±0.05	39.48	60.52	56.04
Control			17.63	89.79		
Ethanol 70%	10	10	1.81±0.10	9.22	90.78	90.05
	8	10	2.06±0.13	10.49	89.51	88.67
	5	10	2.94±0.21	14.97	85.03	83.84
	2.5	10	4.88±0.19	24.85	75.15	73.17
	1.25	10	7.25±0.17	36.93	63.07	60.14
Control			18.19	92.64		
Petroleum ether	10	10	4.13±0.06	21.04	78.96	77.37
	8	10	4.69±0.15	23.89	76.11	74.3
	5	10	5.50±0.06	28.02	71.98	69.86
	2.5	10	7.38±0.06	37.6	62.4	59.56
	1.25	10	8.88±0.04	45.24	54.76	51.34
Control			18.25	92.95		

L.S.D at 0.05 0.1668

Table 10: Antifeeding activities of Egyptian henbane extracts on the 4th instar larvae of the cotton leaf worm

Extracts	% Conc.	No.of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	1.63±0.05	8.29	91.7	90.88
	8	10	2.00±0.08	10.18	89.82	88.81
	5	10	2.63±0.06	13.39	86.6	85.29
	2.5	10	5.69±0.09	28.99	71.01	68.18
	1.25	10	7.13±0.06	36.32	63.68	60.12
Control			17.88	91.06		
Ethanol 70%	10	10	1.19±0.04	6.06	93.94	93.45
	8	10	1.44±0.03	7.33	92.66	92.06
	5	10	1.56±0.04	7.94	92.05	91.4
	2.5	10	2.06±0.05	10.49	89.51	88.64
	1.25	10	3.75±0.07	19.09	80.89	79.32
Control			18.13	92.33		
Petroleum ether	10	10	3.88±0.13	19.77	80.23	79.31
	8	10	4.88±0.09	24.86	75.14	73.97
	5	10	6.00±0.09	30.57	69.43	68
	2.5	10	7.69±0.07	39.17	60.83	58.99
	1.25	10	9.06±0.07	46.15	53.85	51.68
Control			18.75	95.49		

L.S.D at 0.05 0.2674

leafworm, when compared with the other two solvents acetone and petroleum/ether. They showed 90.88 % and 79.31% antifeedant activity, respectively. Statistical analysis showed significant differences between different solvents comparing with control .

I.1.5.b) Effect of Egyptian henbane (herb) extracts against the black cutworm

Antifeedant activity of different Egyptian henbane extracts against 4th larvae instar of black cutworm shown in **Table 11**. These data indicated that the acetone extract recorded the highest antifeeding activity 87.24 %, followed by ethanol extract 84.88 % and petroleum/ether extract 80.49 % at 10% conc.

Statistical analysis showed significant differences between extracts and control.

I.2. Insecticidal effects of various plant extracts on 4th larval instar of *Spodoptera littoralis* and *Agrotis ipsilon.*

I.2.1.a Effect of squill extracts against the cotton leafworm

Data in **Table 12** show the effect of different solvents extracts on the mortality of cotton leafworm. Results show that all solvent extract have effect on fourth instar larvae of cotton leafworm than untreated which show only 3.33% mortality.

The highest mortalities caused by the treatment with 10 % concentration of ethanol extract were 16.67 % , 30.00 % , 63.33 % , and 76.67 % after 24,48,72 hours and one week respectively followed by the same concentration of acetone and petroleum

Table 11: Antifeeding activities of Egyptian henbane extracts on 4th instar larvae of the black cut worm

Extracts	% Conc.	No. of larvae used	Consumed area in $(mm)^2$ after 24hr from treatment	eaten area (%)	% Protection	Antifeedant activity
Acetone	10	10	2.25±0.05	11.46	88.54	87.24
	8	10	2.63±0.06	13.39	86.6	85.08
	5	10	2.88±0.06	14.67	85.33	83.66
	2.5	10	5.25±0.05	26.74	73.26	70.22
	1.25	10	7.38±0.04	37.59	62.4	58.14
Control			17.63	89.79		
Ethanol 70%	10	10	2.75±0.23	13.99	86	84.88
	8	10	3.88±0.08	19.75	80.25	78.67
	5	10	4.13±0.09	21.03	78.97	77.29
	2.5	10	7.13±0.17	36.29	63.7	60.94
	1.25	10	7.63±0.08	38.82	61.16	58.05
Control			18.19	92.64		
Petroleum-ether	10	10	3.63±0.04	18.14	81.86	80.49
	8	10	4.38±0.39	22.31	77.69	76
	5	10	5.00±0.27	25.47	74.53	72.6
	2.5	10	7.25±0.06	36.93	63.07	60.27
	1.25	10	8.88±0.04	44.88	55.12	51.73
Control			18.25	92.95		

L.S.D at 0.05 0.2202

Table 12: Toxic effect of squill extracts against cotton leaf worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	13.33	30	60	73.33	72.41±0.00
	8	30	10	26.67	56.67	70	68.97±0.27
	5	30	10	26.67	53.33	66.67	65.52±0.54
	2.5	30	6.67	20	50	60	58.62±0.47
	1.25	30	3.33	10	26.67	33.33	31.03±0.27
Control			00	00	00	3.33	
Ethanol 70%	10	30	16.67	30	63.33	76.67	75.86±0.41
	8	30	13.33	30	63.33	73.33	72.41±0.35
	5	30	10	26.67	56.67	70	68.97±0.43
	2.5	30	6.67	23.33	53.33	56.67	55.17±0.22
	1.25	30	6.67	13.33	23.33	36.67	34.48±0.41
Control			00	00	00	3.33	
Petroleum ether	10	30	10	26.66	56.67	63.33	62.06±0.72
	8	30	10	23.33	50	63.33	62.06±0.27
	5	30	6.67	23.33	46.67	60	58.62±0.27
	2.5	30	3.33	16.67	33.33	56.67	55.18±0.00
	1.25	30	3.33	10	16.67	30	27.59±0.47
control			00	00	00	3.33	

ether extracts showing 73.33 % and 63.33 % after one week from the treatment.

Data in the same table indicate that decreasing the concentration of plant extracts lead to lowering in the mortality percentage.

The use of solvents only above results lead to percentage of mortality, so that the corrected mortalities were calculated by using Abbot's formula These results agree with **Hassid *et al.* (1976)** who found that *Urginea maritima* was found to be highly toxic to larvae of *Spodoptera littoralis* (Boisd.), In Urginea L-azetidine-2-carboxylic acid (AZA). is present at a concentration of 1.7% of the fresh weight AZA is responsible for the lethal effect on the larvae .

I.2.1.b. Effect of squill extracts against the black cutworm

The effect of squill extracts on 4th instar larvae of black cutworm is given in **Table 13.**

The results in this table showed that petroleum/ether, as a solvent is less active than the other solvents in extracting the toxic contents of the plant and this appear in the mortality percentage . The extract of ethanol at 10% concentration also caused the highest mortality percent 76.67% after one week from exposure. The lowest effect was after 1.25% concentration of petroleum/ether which gave 26.67% mortality.

The above results in Tables 12 and 13 indicate that toxic compounds in this plant was extracted by acetone, ethanol and petroleum/ether, but ethanol is the most active than the other

Table 13: Toxic effect of squill extracts against black cut worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	16.67	40	66.67	73.33	72.41±0.72
	8	30	16.66	36.67	63.33	73.33	72.41±0.00
	5	30	13.33	30	63.33	66.67	65.52±0.47
	2.5	30	6.67	13.33	26.67	40	37.93±0.27
	1.25	30	3.33	10	20	33.33	31.03±0.27
Control			00	00	00	3.33	
Ethanol 70%	10	30	36.67	53.33	70	76.67	75.86±0.72
	8	30	33.33	53.33	70	70	68.97±0.00
	5	30	26.67	46.67	66.67	70	68.97±0.47
	2.5	30	26.67	40	50	53.33	51.72±0.27
	1.25	30	13.33	36.67	43.33	46.67	44.82±0.54
Control			00	00	00	3.33	
Petroleum ether	10	30	16.67	40	53.33	66.67	65.52±0.54
	8	30	16.67	36.67	53.33	63.33	62.06±0.27
	5	30	13.33	20	40	56.67	55.18±0.27
	2.5	30	10	16.67	33.33	40	37.93±0.00
	1.25	30	3.33	10	16.67	26.67	24.14±0.00
Control			00	00	00	3.33	

solvents against the two insect used. These results agree with **Pascual (2002)** who found insecticidal activity of bufadienolides (proscillaridin A, scillaren A, scilliroside, gammabufotalin and scillirosidin) from *Urginea maritima* bulbs against *Tribolium castaneum*. Proscillaridin A, scilliroside and scillirosidin showed significant insecticidal activity as topical applications. Scillirosidin was the most lethal, resulting in more than 50% mortality at 10 micro g per insect. Scillaren A and gammabufotalin were the least toxic.

I.2.2.a. Toxic effect of halfa bar extracts against the cotton leafworm

The effect of various solvent extracts as stomach poisons to fourth larval instar of cotton leafworm is given in **Table 14.** Data showed that three solvent extracts showed lethal effect on 4^{th} instar larvae of cotton leafworm

The highest mortality percentage 76.67% was caused by ethanol and petroleum/ether extract after one week of treatment at 10% concentration.

Data demonstrated in the same table revealed that increasing the concentration of halfa bar extracts lead to increase in the mortality percentages of 4^{th} instar larvae of cotton leafworm The lowest percentage of mortality 36.67% was recorded after the treatment with 1.25% concentration of acetone and ethanol extracts .These results go in line with the finding of **Bassole *et al.* (2003)**.

Cymbopogon proximus contains a bitter oleo resin, toxic volatile oils and a saponin used extensively in indigenous

Table 14: Toxic effect of halfa bar extracts against cotton leaf worm.

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	13.33	36.67	63.33	73.33	72.41±0.27
	8	30	13.33	33.33	60	70	68.97±0.54
	5	30	10	26.67	56.67	63.33	62.07±0.47
	2.5	30	6.67	23.33	43.33	56.67	55.18±0.00
	1.25	30	6.67	13.33	30	36.67	34.49±0.27
Control			00	00	00	3.33	
Ethanol 70%	10	30	16.67	33.33	66.67	76.67	75.86±0.56
	8	30	10	33.33	63.33	73.33	72.41±0.41
	5	30	6.67	26.67	60	66.67	65.52±0.54
	2.5	30	6.67	23.33	50	53.33	51.72±0.35
	1.25	30	3.33	10	26.67	36.67	34.49±0.41
Control			00	00	00	3.33	
Petroleum ether	10	30	20	43.33	70	76.67	75.86±0.72
	8	30	16.67	40	70	76.67	75.86±0.27
	5	30	13.33	30	63.33	70	68.97±0.00
	2.5	30	10	26.67	53.33	66.67	65.52±0.47
	1.25	30	3.33	16.66	30	43.33	41.38±0.27
Control			00	00	00	3.33	

medicine as a diuretic, colic painkiller and antipyretic infever **El–Askary *et al.* (2003).**

I.2.2.b. Toxic effect of halfa bar on larval of the black cutworm

The effect of halfa bar extracts with three solvents acetone, petroleum/ether and ethanol against 4th larval instar of black cutworm is presented in **Table 15**. These data showed clearly the high mortality values were recorded with all solvents.

The maximum mortality afore mentioned extracts was 36.67% after one day of treatment. Petroleum/ether and ethanol extracts had the highest initial effect, giving 80.00 % and 73.33 % mortality at 10% concentration while acetone extract killed 70.00 % after seven days.

By comparing percentage of mortality of different concentration for each solvents extracts, it appears that petroleum/ether extracts took.

The first category in killing black cutworm larval achieving a mortality 80.00 %, followed by ethanol 73.33 % followed by acetone 70.00 at 10 % concentration .In this scale **Benedicto *et al.* (1998)** recorded higher larval mortality rates of *Opogona sacchari* after the treatment with aqueous and acetone extracts of *Cymbopogon citrates*.

I.2.3.a. Toxic effect of belladonna extracts against the cotton leafworm

The effect of belladonna extracts on the 4th instar larvae mortality of cotton leafworm given in **Table 16**. Data in this table revealed very high mortalities in the treatment of all solvent

Table 15:Toxic effect of halfa bar extracts against black cut worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	16.67	40	63.33	70	68.97±0.47
	8	30	16.67	40	60	66.67	65.52±0.72
	5	30	10	23.33	53.33	56.66	55.17±0.27
	2.5	30	00	00	00	46.66	44.83±0.00
	1.25	30	00	00	00	40	37.93±0.47
Control			00	00	00	3.33	
Ethanol 70%	10	30	36.67	56.67	70	73.33	72.41±0.54
	8	30	36.67	53.33	66.67	73.33	72.41±0.27
	5	30	30	46.67	56.67	60	58.62±0.47
	2.5	30	23.33	33.33	40	46.67	44.83±0.27
	1.25	30	16.67	23.33	30	36.67	34.49±0.27
Control			00	00	00	3.33	
Petroleum ether	10	30	26.67	50	76.67	80	79.31±0.00
	8	30	23.33	46.67	73.33	76.67	75.86±0.47
	5	30	20	36.67	66.67	73.33	72.41±0.27
	2.5	30	13.33	30	56.67	66.67	65.52±0.00
	1.25	30	10	20	33.33	40	37.93±0.47
Control			00	00	00	3.33	

Table 16: Toxic effect of belladonna extracts against cotton leaf worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	23.33	46.67	80	86.67	86.21±0.00
	8	30	20	43.33	76.67	83.33	82.76+0.27
	5	30	20	36.67	73.33	80	79.31±0.27
	2.5	30	16.67	30	66.67	73.33	72.41±0.47
	1.25	30	10	23.33	40	50	48.28±0.27
Control			00	00	00	3.33	
Ethanol 70%	10	30	20	43.33	76.67	83.33	82.76±0.22
	8	30	20	40	76.67	80	79.31±0.22
	5	30	16.67	33.33	70	80	79.31±0.27
	2.5	30	13.33	33.33	63.33	70	68.97±0.54
	1.25	30	10	20	36.67	50	48.28±0.56
Control			00	00	00	3.33	
Petroleum ether	10	30	16.67	40	76.67	80	79.31±0.54
	8	30	16.67	40	73.33	76.67	75.87±0.27
	5	30	13.33	33.33	66.67	73.33	72.41±0.47
	2.5	30	10	30	60	70	68.97±0.27
	1.25	30	6.67	16.67	36.67	46.67	44.83±0.47
Control			00	00	00	3.33	

extracts . The values were recorded 86.68 % , 83.33 % and 80.00 % after the treatment by acetone , ethanol and petroleum ether extracts at 10 % concentration respectively. On the other hand the less value of mortality 46.67 % was recorded after seven days from the treatment with petroleum/ether extracts at 1.25% concentration.

Data in the same table showed that the decreasing in the concentration, led to decreasing in the mortalities percentages.

I.2.3.b. Toxic effect of belladonna extracts against the black cutworm

The toxic effect of the different solvent extracts of belladonna against black cutworm are presented in **Table 17**.

The results indicated that mortality percentages were generally increased with increasing time of exposure and concentration. Ethanol extract was highly toxic to black cutworm which recorded 86.67% mortality after 7 days at 10% concentration, while petroleum/ether extract have the lowest effect giving 76.67% mortality at the same concentration. *Atropa belladonna* extracts has highly toxic effect against *Operculella zell*.**Sabbour and Ismail (2002)**.

I.2.4.a. Toxic effect of thorn apple extracts against the cotton leafworm

The effect of thorn apple extracts of all solvent used to fourth instar larvae of cotton leafworm given in **Table 18.**

Data in the above table indicate that ethanol extract had rapid effect against larvae of cotton leafworm than acetone and

Table 17: Toxic effect of belladonna extracts against black cut worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	23.33	43.33	76.67	83.33	82.76±0.27
	8	30	23.33	40	76.67	80	79.31±0.27
	5	30	20	33.33	73.33	76.67	75.87±0.47
	2.5	30	13.33	26.67	63.33	70	68.97±0.27
	1.25	30	6.67	23.33	36.67	50	48.28±0.27
Control			00	00	00	3.33	
Ethanol 70%	10	30	36.67	66.67	83.33	86.67	86.20±0.27
	8	30	30	66.67	76.67	80	79.31±0.00
	5	30	30	53.33	76.67	76.67	75.87±0.72
	2.5	30	23.33	50	60	63.33	62.07±0.72
	1.25	30	13.33	30	53.33	53.33	51.72±0.47
Control			00	00	00	3.33	
Petroleum ether	10	30	20	36.67	73.33	76.67	75.87±0.00
	8	30	16.67	36.67	70	73.33	72.41±0.27
	5	30	16.67	30	70	73.33	72.41±0.47
	2.5	30	10	20	53.33	66.67	65.52±0.27
	1.25	30	6.67	16.67	30	40	37.93±0.54
Control			00	00	00	3.33	

Table 18: Toxic effect of thorn apple extracts against cotton leaf worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	23.33	46.67	76.67	83.33	82.76±0.27
	8	30	20	43.33	73.33	80	79.31±0.54
	5	30	16.67	33.33	70	80	79.31±0.47
	2.5	30	13.33	30	66.67	70	68.97±0.27
	1.25	30	6.67	20	36.67	46.67	44.83±0.27
Control			00	00	00	3.33	
Ethanol 70%	10	30	30	53.33	80	86.67	86.20±0.22
	8	30	23.33	46.67	76.67	83.33	82.76±0.65
	5	30	20	40	73.33	80	79.31±0.54
	2.5	30	13.33	30	66.67	73.33	72.41±0.61
	1.25	30	10	23.33	43.33	53.33	51.72±0.41
Control			00	00	00	3.33	
Petroleum ether	10	30	20	43.33	73.33	80	79.31±0.54
	8	30	16.67	40	70	76.67	75.87±0.27
	5	30	16.67	36.67	66.67	76.67	75.87±0.47
	2.5	30	10	26.67	56.67	66.67	65.52±0.72
	1.25	30	3.33	16.67	33.33	43.33	41.38±0.00
Control			00	00	00	3.33	

petroleum/ether after 24 hour from treatment at 10% concentration and 23.00 % mortality at the second concentration.

As for , the total percentages of mortality after 7 days it is clear that ethanol extracts at 10 % concentration had the most effect in killing the larvae of cotton leafworm it gave 86.67 % of mortality followed by 83.33 % and 80.00 % mortality in the case of acetone and petroleum/ether at the same concentration respectively .

The lowest record of mortality was 43.33 % after treatment with petroleum/ether extract at 1.25 % concentration. These results agree with **Moreira *et al.* (2004)** who found insecticidal activity in hexane and alcohol extracts of *Datura stramonium* against larvae of *Diaphania hyalinata*.

I.2.4.b. Toxic effect of thorn apple extract against the black cutworm

Data in **Table 19** explain the mortality in larval of black cutworm after the exposure to thorn apple extracts. Mortality among the exposed larval varied from extract to another and from concentration to another. The highest number of dead larvae 86.67 % was recorded at 10% concentration of ethanol extract. The other concn. of the same extract gave percentages of mortality reaching 86.67, 80.00,66.67, and 53.33 % after the treatment with 8 %, 5 %, 2.5 % and 1.25 % concentration respectively In this field of study **Wang *et al.* (1999)** found insecticidal properties for *Datura stramonium* extract against *Pieris rapae*. This extract caused 92% mortality in larvae on cabbage leaves treated with 5% concentration.

Table 19: Toxic effect of thorn apple extracts against black cut worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	30	43.33	76.67	80	79.31±0.27
	8	30	26.67	40	73.33	80	79.31±0.47
	5	30	16.67	30	70	76.67	75.87±0.54
	2.5	30	10	26.67	60	66.67	65.52±0.27
	1.25	30	6.67	20	33.33	46.67	44.83±0.47
Control			00	00	00	3.33	
Ethanol 70%	10	30	43.33	70	83.33	86.67	86.20±0.27
	8	30	36.67	66.67	80	86.67	86.20±0.54
	5	30	33.33	60	76.67	80	79.31±0.47
	2.5	30	26.67	53.33	66.67	66.67	65.52±0.27
	1.25	30	20	36.67	50	53.33	51.72±0.72
Control			00	00	00	3.33	
Petroleum ether	10	30	23.33	40	70	76.67	75.87±0.27
	8	30	20	36.67	70	73.33	72.41±0.00
	5	30	13.33	30	66.67	73.33	72.41±0.27
	2.5	30	10	23.33	56.67	66.67	65.52±0.47
	1.25	30	3.33	13.33	30	43.33	41.38±0.47
Control			00	00	00	3.33	

These results not agree with **Oudhia (2000)** who found that aqueous leaf extacts of *Datura stramonium* did not cause *Mylabris pustulata* mortality.

I.2.5.a. Toxic effect of Egyptian henbane extracts against the cotton leafworm

Table 20 summarized the effect of leaves extracts of Egyptian henbane on the 4th instar larvae of cotton leafworm. Data showed that these extracts were effective with all solvent used in this study. The initial mortality was 33.33 % after 24 h. of treatment and reached 86.67 % with ethanol extracts at 10 % concentration. Decreasing the concn. to 8% reduce the mortality to 30.00% after 24h. and 83.33% after 7 days .

While that mortality increased with increasing the concentration and exposure period. Petroleum/ether extract gave only 40.00 % at 1.25 % concentration after 7 days from the treatment. These results agree with **Salem (1995)** who found that methylene chloride extract of *Hyoscyamus muticus* was effective against the nymphs of *Bemisia tabaci* causing 100% mortality after 48 hour from the treatment with 0.1% concentration.

I.2.5.b. Toxic effect of Egyptian henbane extracts against the black cutworm

Data in **Table 21** show the effect of *Egyptian henbane* extracts on 4th larval instar of black cutworm. The treatment with ethanol extract caused the highest mortality after 7 days (83.33%). On the contrary, the application of petroleum/ether at 1.25% concentration gave the lowest mortality percent (40%). The percentage of mortality in the case of untreated larvae 3.33 % after 7 days. Also, from data in the same table , it is clear that

Table 20: Toxic effect of Egyptian henbane extracts against cotton leaf worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	26.67	46.67	73.33	83.33	82.76±0.47
	8	30	23.33	43.33	73.33	80	79.31±0.54
	5	30	20	36.67	70	76.67	75.87±0.00
	2.5	30	16.67	30	60	70	68.97±0.27
	1.25	30	10	23.33	33.33	43.33	41.38±0.47
Control			00	00	00	3.33	
Ethanol 70%	10	30	33.33	50	80	86.67	86.20±0.56
	8	30	30	43.33	80	83.33	82.76±0.41
	5	30	26.67	40	73.33	83.33	82.76±0.22
	2.5	30	16.67	30	66.67	73.33	72.41±0.41
	1.25	30	13.33	23.33	40	50	48.28±0.35
Control			00	00	00	3.33	
Petroleum ether	10	30	23.33	40	70	80	79.31±0.00
	8	30	20	40	70	76.67	75.87±0.47
	5	30	16.67	33.33	63.33	73.33	72.41±0.27
	2.5	30	10	26.67	56.67	66.67	65.52±0.27
	1.25	30	6.67	20	30	40	37.93±0.47
Control			00	00	00	3.33	

Table 21: Toxic effect of Egyptian henbane extracts against black cut worm

Extracts	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Acetone	10	30	20	50	76.66	80	79.31±0.47
	8	30	20	46.67	73.33	76.67	75.87±0.27
	5	30	13.33	33.33	63.33	70	68.97±0.47
	2.5	30	10	23.33	46.67	66.67	65.52±0.72
	1.25	30	6.67	20	33.33	50	48.28±0.27
Control			00	00	00	3.33	
Ethanol 70%	10	30	40	66.67	80	83.33	82.75±0.27
	8	30	36.67	56.67	80	80	79.31±0.00
	5	30	36.67	53.33	70	73.33	72.41±0.27
	2.5	30	26.67	43.33	56.67	56.67	55.18±0.72
	1.25	30	20	36.67	43.33	46.67	44.82±0.72
Control			00	00	00	3.33	
Petroleum ether	10	30	23.33	43.33	70	76.67	75.86±0.27
	8	30	23.33	40	70	73.33	72.41±0.27
	5	30	16.67	33.33	63.33	66.67	65.52±0.54
	2.5	30	10	26.67	53.33	63.33	62.07±0.47
	1.25	30	6.67	16.67	30	40	37.93±0.27
Control			00	00	00	3.33	

all extracts of the plant by different solvents caused high mortality than control and also clear that any increase in concentration of plant extract increased mortality. Hexane, diethyl ether and ethyl acetate extract of *Hyoscyamus muticus* gave high toxicity against *Aphis gossypii*. The LC_{50} values were 0.727,0.883,1.013 mg/cm^2 respectively **Soliman *et al.* (2005)** .

II.1.The effect of alkaloid as antifeedant on 4th larval instar of the cotton leaf worm and the black cutworm:

Data in **Table 22 & 23** show the antifeeding activity of alkaloids isolated from belladonna and thorn apple against 4th instar larvae of the cotton leafworm and the black cutworm .

Data in the above mentioned tables revealed the presence of antifeeding activity in the solanaceous alkaloids of the tropane group (hyoscine) of the two plants against the two used insect larvae. The activity increased by increasing the concentration. The effect of belladonna alkaloids was higher against black cutworm larvae than alkaloids of thorn apple. The concentration of 1000 ppm of belladonna and thorn apple caused 82.78 and 81.21% antifeeding activity against black cutworm larvae. As for, antifeeding activity of the alkaloids of the same aforementioned plants against cotton leafworm it is clear that the antifeeding activity in the case of larvae of the cotton leafworm was lower than that in black cutworm larvae .The high concentration 1000ppm gave 79.32 and 81.51% for belladonna and thorn apple respectively. But generally, all concentrations of the alkaloids extracted from the two plants till the lowest ones

Table 22: Antifeeding activities of Alkaloid on the 4th instar larvae of the cotton leaf worm.

Plants	% Conc.	No. of larvae used	Consumed area in (mm) treated 24hr	% of eaten area	% Protection	Antifeedant activity
Atropa-belladonna	1000	10	4.06±0.19	20.68	77.61	79.32
	750	10	4.75±0.36	24.2	73.8	75.8
	500	10	6.00±0.17	30.56	66.91	69.44
	250	10	7.81±0.12	39.78	56.92	60.22
	125	10	9.38±0.16	47.77	48.26	52.23
Datura-stramonium	1000	10	3.63±0.10	18.49	79.98	81.51
	750	10	4.38±0.12	22.31	75.89	77.69
	500	10	5.75±0.21	29.29	68.28	70.71
	250	10	7.31±0.09	37.23	59.68	62.76
	125	10	9.06±0.17	46.14	50.03	53.86
Control			18.13	92.33		

L.S.D at 0.05 0.3571

Table 23: Antifeeding activities of Alkaloid on the 4th instar larvae of the black cut worm.

Plants	% Conc.	No. of larvae used	Consumed area in (mm) treated 24hr	% of eaten area	% Protection	Antifeedant activity
Atropa-belladonna	1000	10	3.38±0.27	17.22	81.42	82.78
	750	10	4.31±0.21	21.95	76.31	78.04
	500	10	5.88±0.19	29.95	67.67	70.05
	250	10	8.25±0.20	42.02	54.65	57.98
	125	10	9.88±0.36	50.32	45.68	49.68
Datura-stramonium	1000	10	3.69±0.20	18.79	79.73	81.21
	750	10	4.50±0.23	22.92	75.26	77.08
	500	10	6.25±0.20	31.83	65.64	68.17
	250	10	8.75±0.18	44.57	51.89	55.43
	125	10	9.81±0.28	49.96	46.07	50.04
Control			18.19	92.64		

L.S.D at 0.05 0.3134

has antifeeding activity higher than that in control which recorded 18.13 mm consumed eaten area compared with the lowest effective treatment giving only 9.88 mm eaten area in the case of 1.25 concentration of belladonna with black cutworm larvae.

II.2. The toxic effect of alkaloid on 4th larval instar of the cotton leafworm and the black cutworm .

The effect of alkaloids as stomach poisons to fourth larval instar of the cotton leafworm and the black cutworm are given in **Table 24 and 25.**

Generally, all plant extracts showed moderate mortality after 24 hour and increased after 7 days .

The highest mortality 79.31 has caused by the treatment with 1000 p.p.m of thorn apple alkaloid against black cutworm, while the effect of the same alkaloid against cotton leafworm recorded the same value 68.97 % after 7 days at Atropa and Datura.

III.1.LC_{50} of investigated plants extracts on the cotton leafworm

Table 26 and **Fig 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10** show the results of probit analysis obtained by the exposure of the larvae of 4th instar of the cotton leafworm to different concentration of five plant extracts at two time of exposure.

When the LC_{50} values for the different extracts were compared the most effective extracts were having the smallest values for LC_{50}. thorn apple extract with ethanol was the most

Table 24: Toxic effect of Alkaloid against cotton leaf worm .

Plants as sources of alkaloid	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Atropa belladonna	1000	60	26.67	43.33	63.33	70	68.97±0.82
	750	60	23.33	38.33	56.67	66.67	65.52±0.72
	500	60	18.33	35	41.67	50	48.28±0.47
	250	60	16.67	26	33.33	40	37.93±00.47
	125	60	6.67	20	26.67	33.33	31.03±0.54
Datura stramonium	1000	60	26.67	41.67	65	70	68.97±0.82
	750	60	25	38.33	58.33	68.33	67.24±0.54
	500	60	20	31.67	40	50	48.28±0.47
	250	60	16.67	23.33	31.67	38.33	36.21±0.72
		60	5	16.67	23.33	36.67	34.49±0.00
Control			00	00	00	3.33	

Table 25: Toxic effect of Alkaloid against black cut worm

Plants as sources of alkaloid	% conc.	No. of larvae used	% of Mortality				
			24 hr.	48 hr.	72hr.	week	Week± S.E
Atropa belladonna	1000	60	21.67	50	68.33	76.67	75.87±0.54
	750	60	20	50	65	71.67	70.69±0.27
	500	60	15	38.33	46.67	53.33	51.72±0.72
	250	60	8.33	26.67	38.33	45	43.11±0.00
	125	60	5	18.33	25	30	27.59±0.47
Datura stramonium	1000	60	20	51.67	73.33	80	79.31±0.47
	750	60	16.67	48.33	65	75	74.14±0.27
	500	60	15	36.67	46.67	60	58.62±0.27
	250	60	11.67	28.33	35	41.67	39.66±0.54
	125	60	6.67	15	23.33	31.67	29.32±0.47
Control			00	00	00	3.33	

Table 26: LC_{50} of investigated plants extracts on 4th larval instar of *Spodoptera littoralis* after 3 days and 7 days of exposure

	ACETON				ETHANOL 70%				PETROLEUM ETHER			
	3 DAYS		7 DAYS		3 DAYS		7 DAYS		3 DAYS		7 DAYS	
	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50
Atropa belladonna	1.125±0.179	1.57	1.18±0.186	1.099	1.144±0.178	1.866	1.051±0.182	1.101	1.104±0.176	2.045	0.947±0.178	1.246
Cymbopogon proximus	0.947±0.174	4.014	1.03±0.174	2.504	1.083±0.175	3.476	1.205±0.177	2.489	1.136±0.175	2.814	0.919±0.176	1.424
Datura stramonium	1.057±0.177	1.758	1.103±0.164	1.242	1.072±0.187	0.876	1.092±0.186	0.954	1.1±0.175	2.385	1.087±0.179	1.499
Hyoscyamus muticus	1.133±0.176	2.164	1.2±0.182	1.447	1.184±0.180	1.577	1.208±0.187	1.081	1.101±0.175	2.679	1.152±0.179	1.713
Urginea maritima	0.843±0.173	4.39	1.097±0.175	2.482	1.059±0.175	3.747	1.187±0.177	2.296	1.164±0.182	6.938	0.893±0.173	3.403

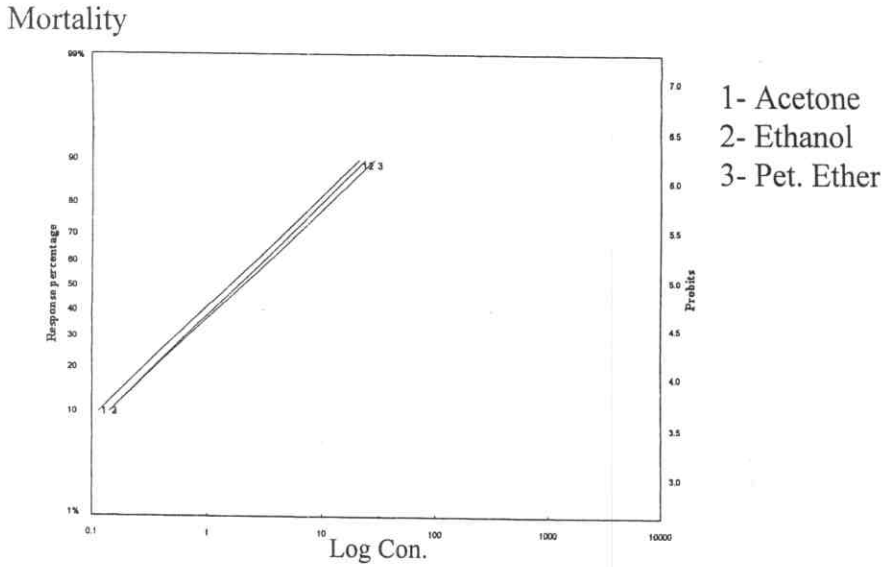

Figure (1): Lethal response after treatment 4th instar larvae of cotton leafworm to Bands of belladonna leaves extracts after 72 hours

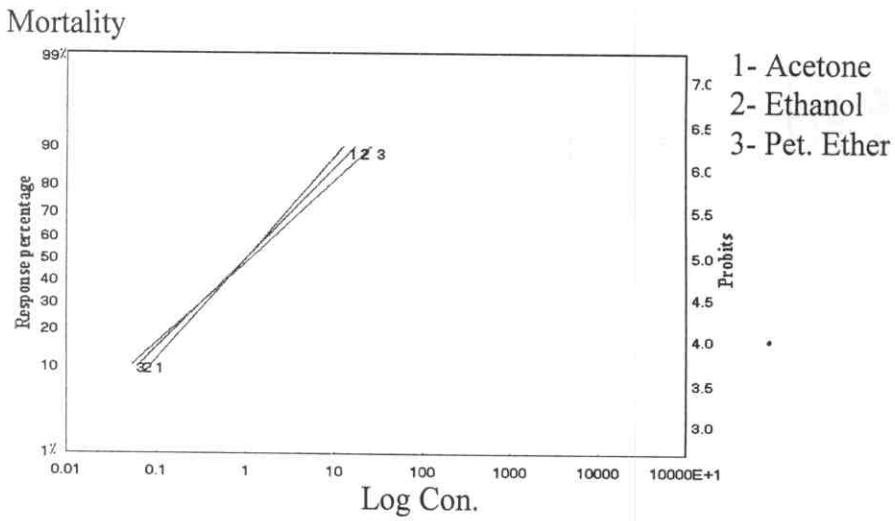

Figure (2): Lethal response after treatment 4th instar larvae of cotton leafworm to Bands of belladonna leaves extracts after one week

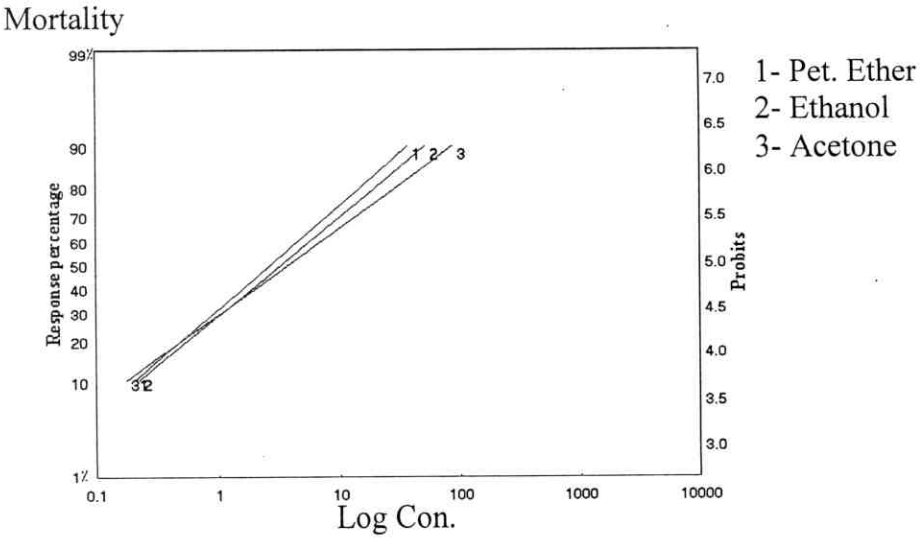

Figure (3): Lethal response after treatment 4th instar larvae of cotton leafworm to Bands of *halfa bar* leaves extracts after 72 hours

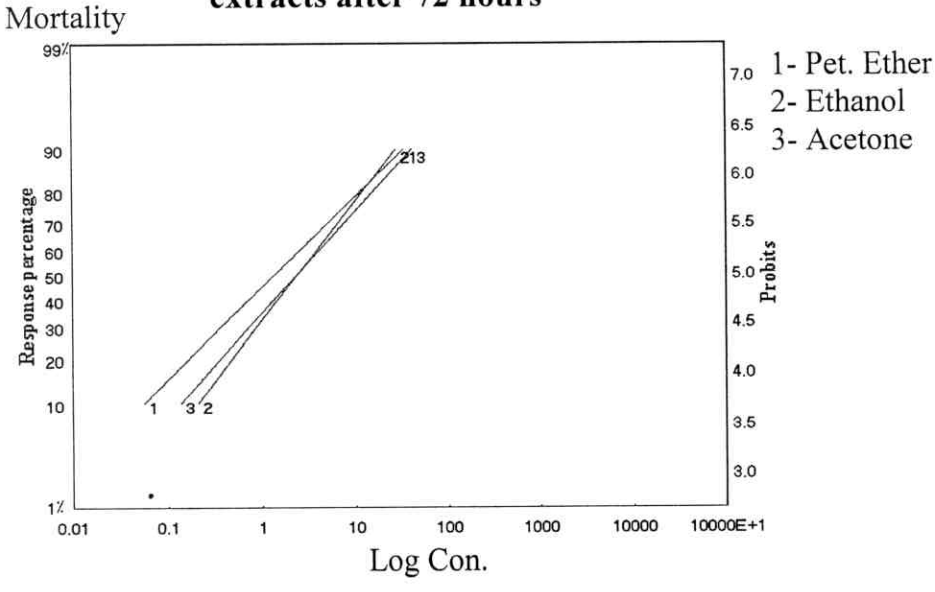

Figure (4): Lethal response after treatment 4th instar larvae of cotton leafworm to Bands of *halfa bar* leaves extracts after one week

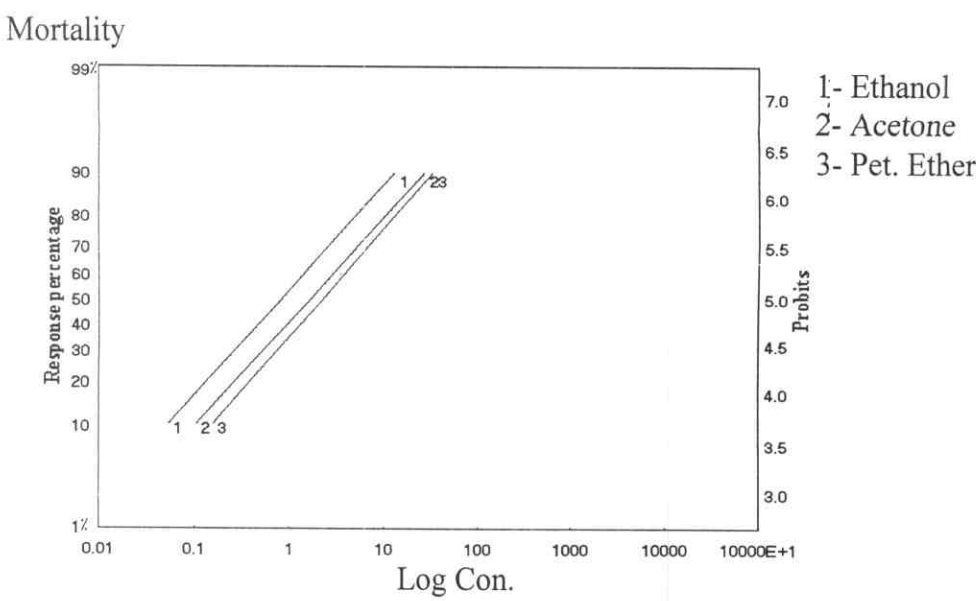

Figure (5): Lethal response after treatment 4th instar larvae of cotton leafworm to Bands of thorn apple leaves extracts after 72 hours

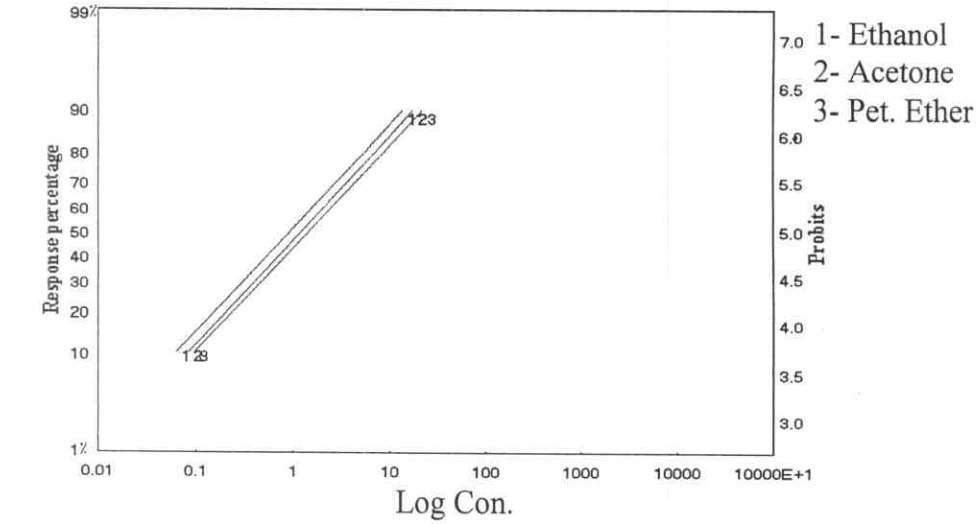

Figure (6): Response after treatment 4th instar larvae of cotton leafworm to Bands of thorn apple leaves extracts after one week

effective one recording the lowest value of LC_{50} (0.876) after 3 days and (0.954) after one week . On the other hand the least effective extract against cotton leafworm based on with LC_{50} values was squill extract (6.938) after 3 days.

The values of slopes varied between (0.843 to 1.208). There was a considerable difference between the highest slope and the lowest one . This may indicate that the response of the insect on the different time exposure with high slope was more uniform than that of other extracts of low slope.

III.2. LC_{50} values of investigated plant extracts to the 4th instar larvae of the black cutworm .

Table 27 and **Fig 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20** demonstrate the results obtained by the exposure of black cut worm larval to treated food with different concentration of the tested plant extracts .

The maximum toxicity, was noticed with ethanol extract of belladonna LC_{50} (1.111) after 7 days and acetone extract LC_{50} (1.124) after one week from the same plant . One the other hand the many mum toxicity, was noticed with petroleum ether of squill recorded 7.571 after 3 days and 4.43 after week .

The same table we can consists the toxic effect of three parts .

Parts no. 1 contains the plant extracts which gave the less LC_{50} between 1.124 to 1.756 of belladonna and ethanol of Egyptian henbane extracts respectively .

Parts no. 2 contains the value between 2.051 to 3.652 with squill ethanol extracts respect were demonstrated to this plant caused moderately toxic effect .

Table 27: LC_{50} of investigated plants extracts on 4th larval of *Agrotis ipsilon* after 3 days and 7 days of exposure

	ACETON				ETHANOL 70%				PETROLEUM ETHER			
	3 DAYS		7 DAYS		3 DAYS		7 DAYS		3 DAYS		7 DAYS	
	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50	Slope ± S.E	LC50
Atropa belladonna	1.163±0.178	1.817	1.027±0.181	1.124	0.957±0.179	1.111	1.094±0.182	1.204	1.235±0.176	2.613	1.017±0.178	1.688
Cymbopogon proximus	1.364±0.182	5.393	0.904±0.173	3.095	1.203±0.176	3.652	1.172±0.176	2.957	1.222±0.177	2.336	1.152±0.179	1.713
Datura stramonium	1.207±0.178	2.161	1.062±0.182	1.341	1.039±0.182	1.115	1.229±0.187	1.149	1.115±0.175	2.595	0.932±0.176	1.491
Hyoscyamus muticus	1.308±0.178	2.754	0.876±0.177	1.199	1.176±0.179	1.756	1.221±0.18	1.716	1.136±0.175	2.814	1.015±0.175	1.922
Urginea maritima	1.568±0.185	4.598	1.368±0.179	3.197	0.852±0.173	2.051	0.911±0.174	1.855	1.13±0.182	7.571	1.233±0.178	4.43

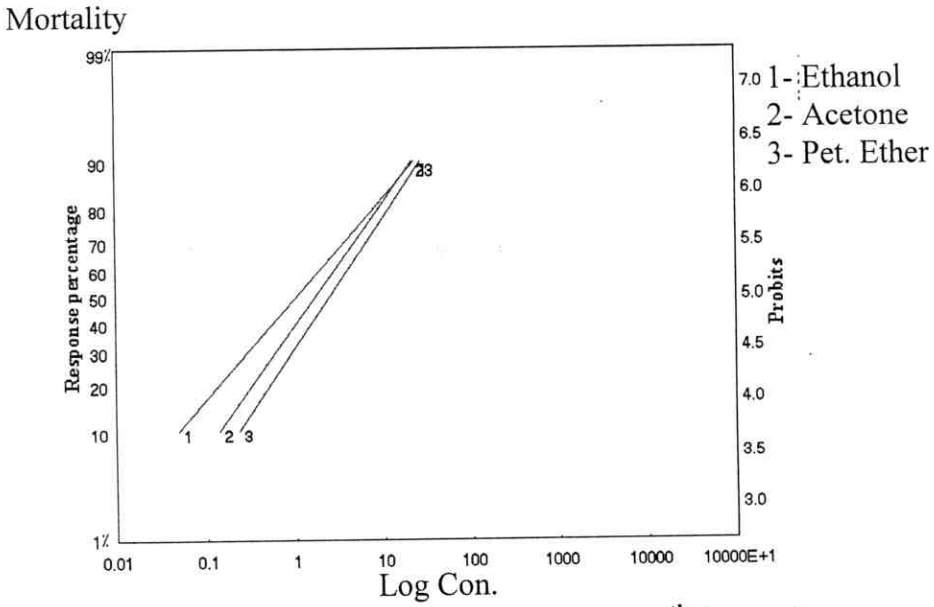

Figure (11): Lethal response after treatment 4th instar larvae of black cut worm to Bands of belladonna leaves extracts after 72 hours

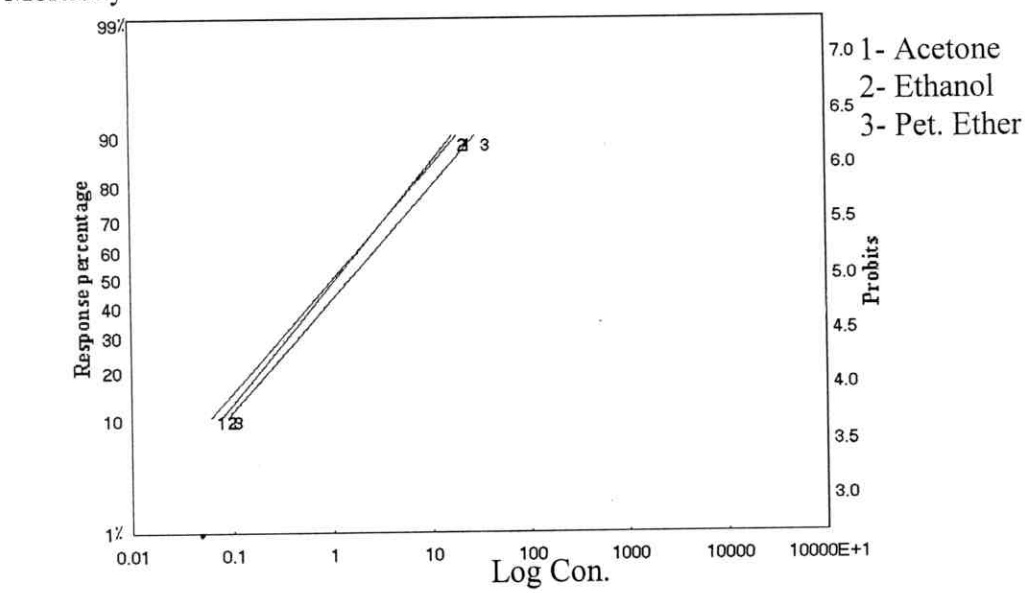

Figure (12): Lethal response after treatment 4th instar larvae of black cut worm to Bands of belladonna leaves extracts after one week

Mortality

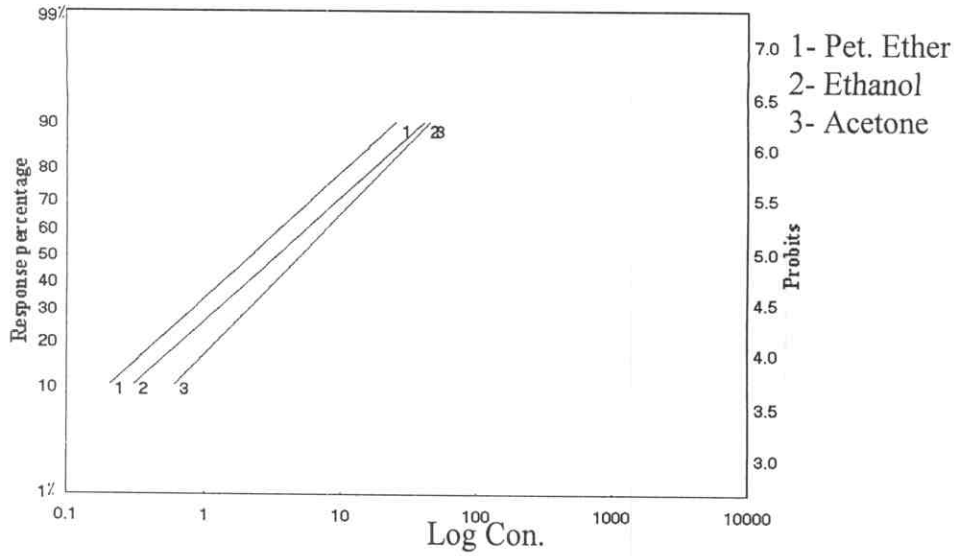

Figure (13): Lethal response after treatment 4th instar larvae of black cutworm to Bands of Halfa bar leaves extracts after 72 hours

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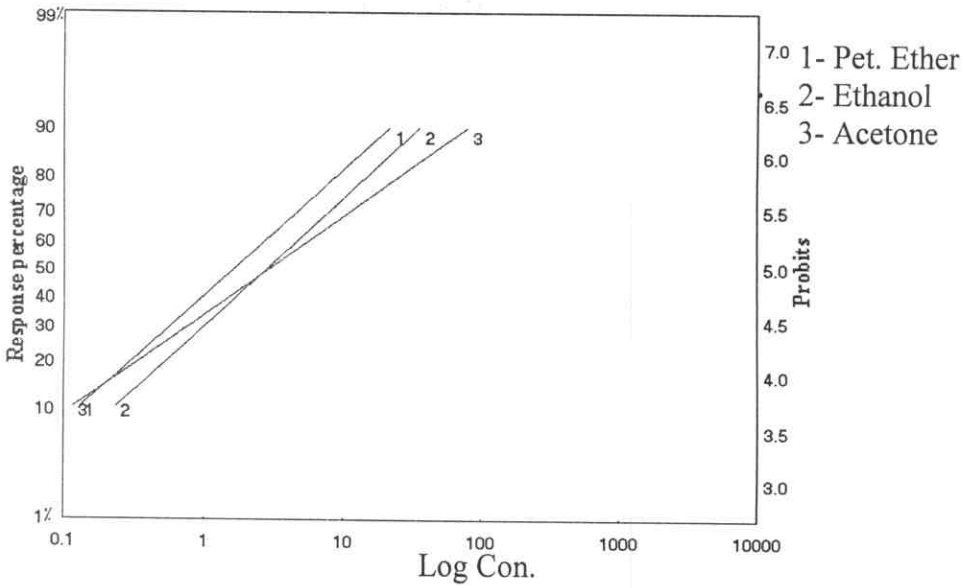

Figure (14): Lethal response after treatment 4th instar larvae of black cutworm to Bands of Halfa bar leaves extracts after one week

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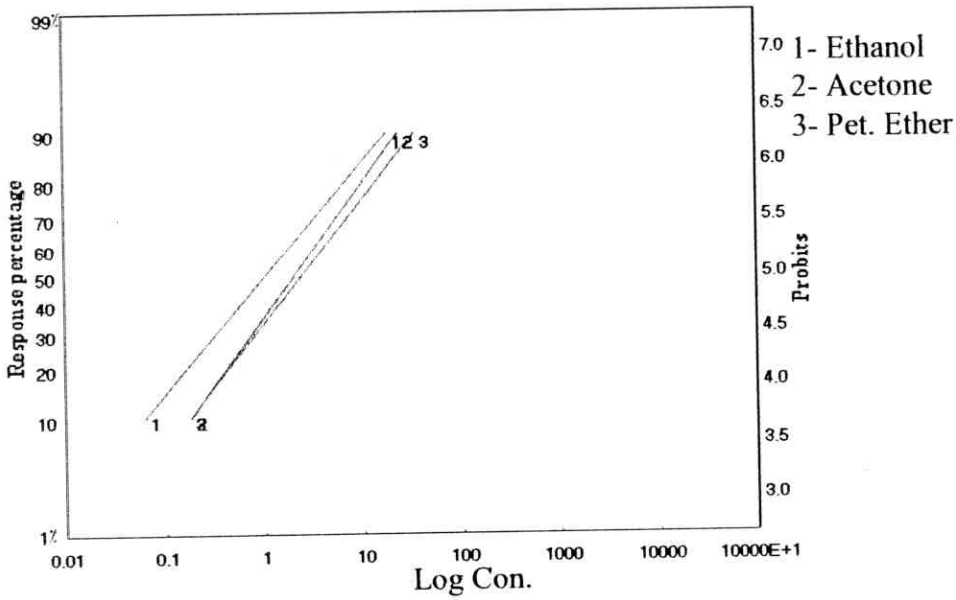

Figure (15): Lethal response after treatment 4th instar larvae of black cutworm to Bands of thorn apple leaves extracts after 72 hours

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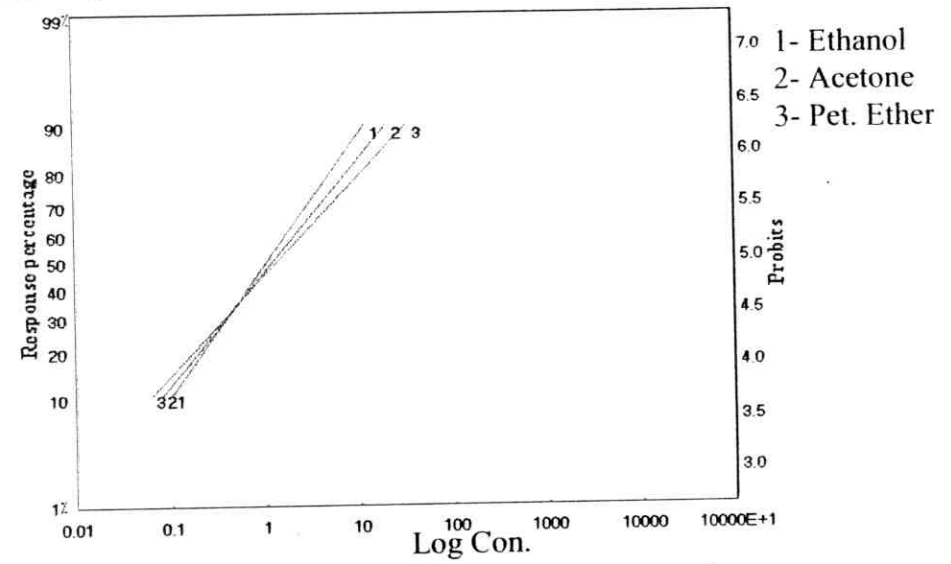

Figure (16): Lethal response after treatment 4th instar larvae of black cutworm to Bands of thorn apple leaves extracts after one week

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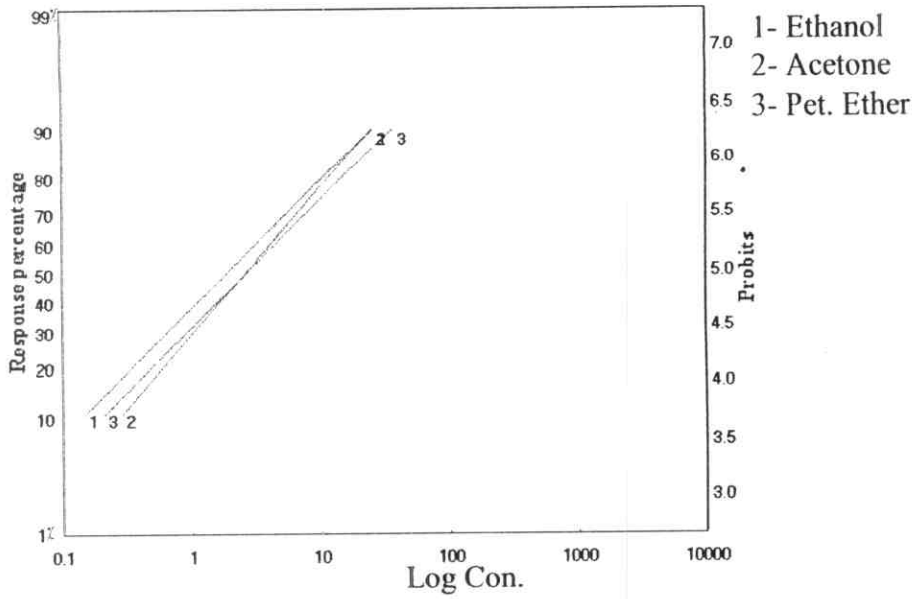

Figure (17): Lethal response after treatment 4th instar larvae of black cutworm to Bands of Egyptian henbane leaves extracts after 72 hours

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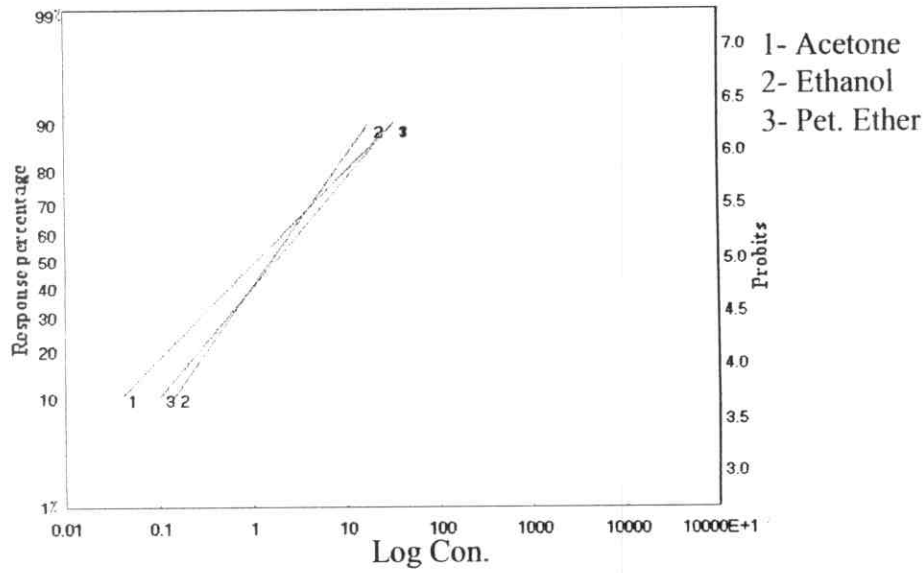

Figure (18): Lethal response after treatment 4th instar larvae of black cutworm to Bands of Egyptian henbane leaves extracts after one week

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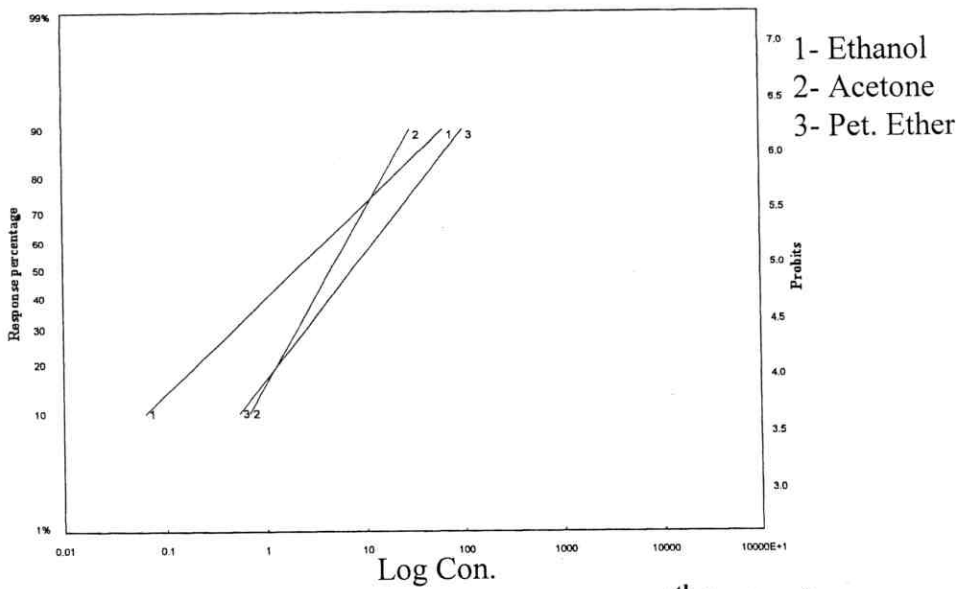

Figure (19): Lethal response after treatment 4th instar larvae of black cutworm to Bands of squill leaves extracts after 72 hours

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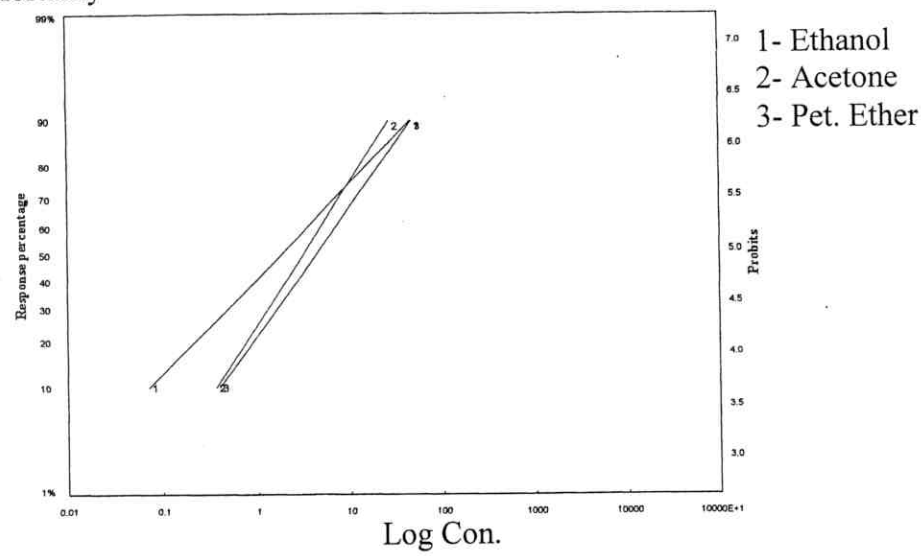

Figure (20): Lethal response after treatment 4th instar larvae of black cutworm to Bands of squill leaves extracts after one week

Parts no. 3 contains the extracts which give high LC_{50} values between 4.43 for squill pet. ether extract and 7.571 at the same plant. This means these extracts were low effective at the insect .

The slope values of the established LCP lines the tested extracts was ranged between 0.852 to 1.568. The obvious difference between the highest slope and the lowest one may indicate that the response of the 4th instar larvae of two insects used to the extracts with high slope was uniform.

Table 28 and 29 Fig. 21, 22, 23 and 24 show the results of probity analysis obtained by the exposure of the larvae of 4th instar of cotton leafworm and black cutworm to the Alkaloid of two plants at two time of exposure.

The LC_{50} of the Alkaloid obtained from belladonna were (571.33). it is similar value LC_{50} of the Alkaloid of thorn apple (569.91). that is after three days, on the other hand of the value LC_{50} of the Alkaloid, of belladonna were 479.932 and also the same value LC_{50} of the Alkaloid of thorn apple (473.117) that is after 3 days.

V. Percentage of solid percolate (gum) of different plant extracts .

One hundred grams of air dried powder of each plant was extracted by organic solvents of different polarity (petroleum/ether, acetone and ethanol). The residue of each extract was concentrated under reduced pressure till dryness and kept over calcium sulphate in desiccators . The percentage of each crude residue was reported in **Table 30.**

Table 28 LC_{50} of investigated Alkaloids on 4th larval of cotton leafworm after 3 days and 7 days of exposure

Plants as sources of alkaloid	3 DAYS		7 DAYS	
	Slope ± S.E	LC50	Slope ± S.E	LC50
Atropa belladonna	1.071 ±0.18	571.33	1.142±0.179	405.302
Datura stramonium	1.24±0.183	569.41	1.089±0.178	388.936

Table 29 LC_{50} of investigated Alkaloids on 4th larval of black cutworm after 3 days and 7 days of exposure.

Plants as sources of alkaloid	3 DAYS		7 DAYS	
	Slope ± S.E	LC50	Slope ± S.E	LC50
Atropa belladonna	1.342±0.183	479.932	1.359±0.181	322.609
Datura stramonium	1.549±0.182	473.117	1.508±0.183	297.565

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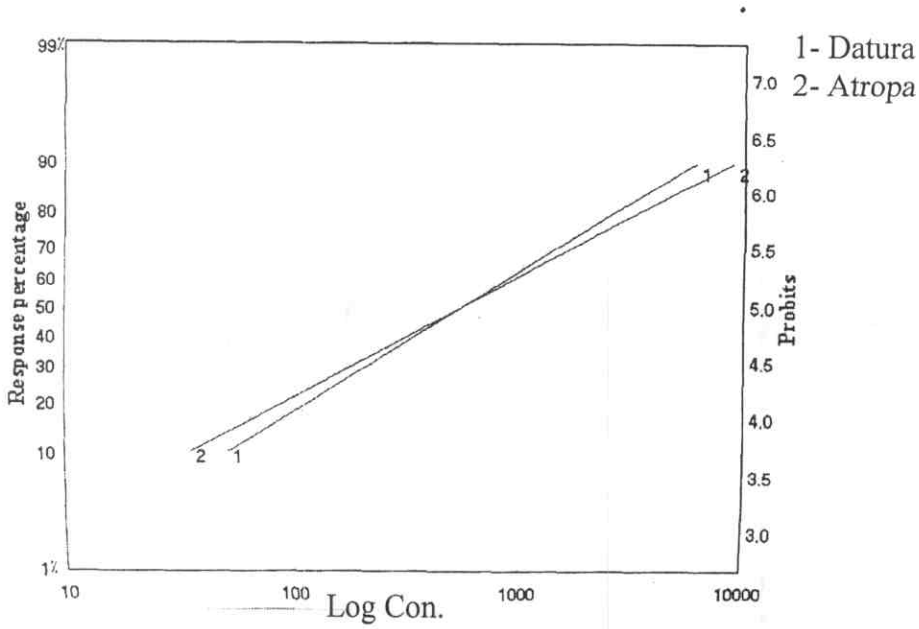

Figure (21): Lethal response after treatment 4th instar larvae of cotton leafworm to Bands of alkaloid after 72 hours.

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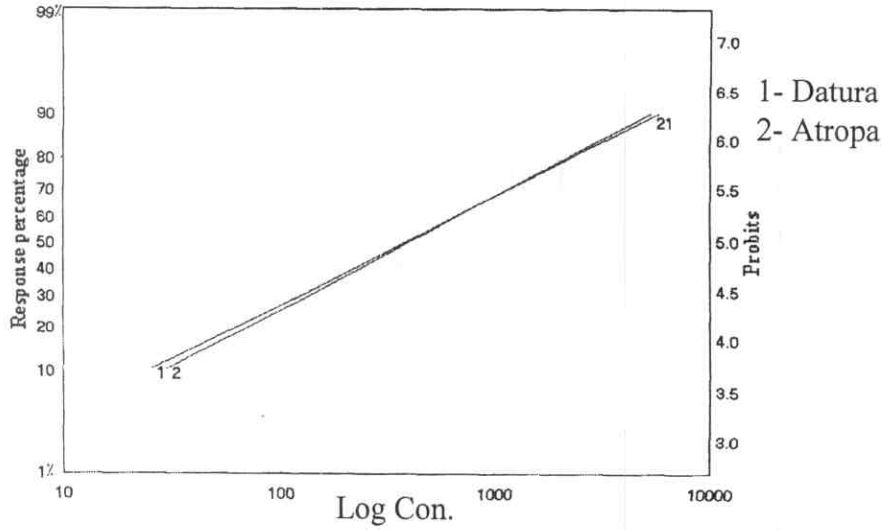

Figure (22): Lethal response after treatment 4th instar larvae of cotton leafworm to Bands of alkaloid after one week.

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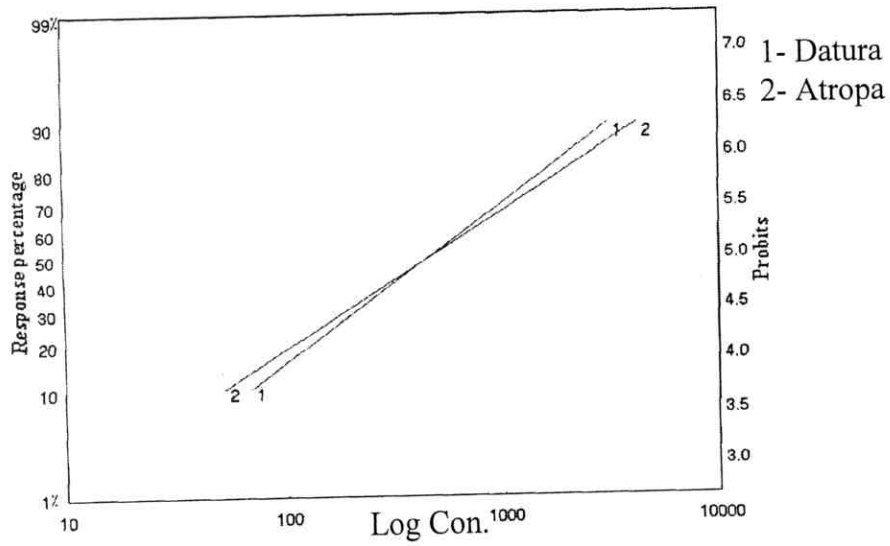

Figure (23): Lethal response after treatment 4th instar larvae of black cutworm to Bands of alkaloid after 72 hours.

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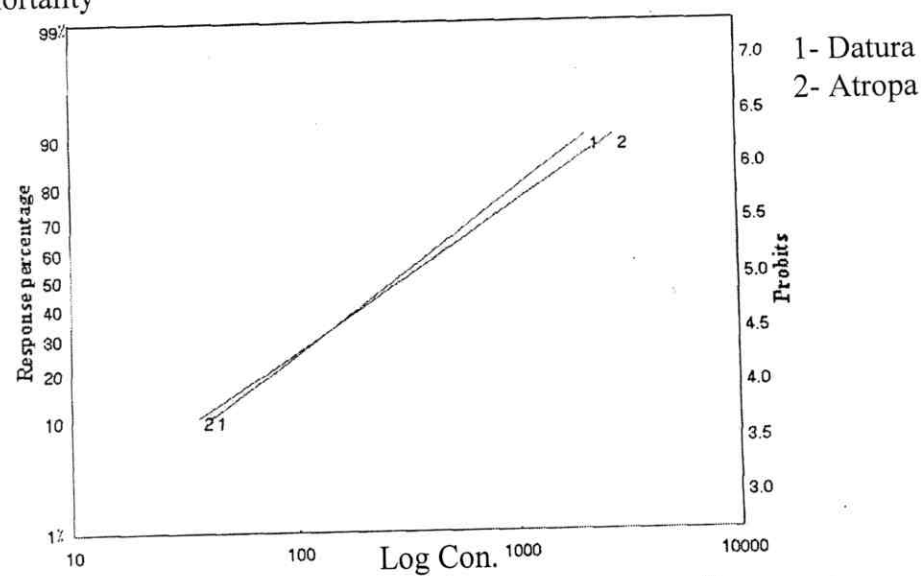


Figure (24): Lethal response after treatment 4th instar larvae of black cutworm to Bands of alkaloid after one week.

Table 30 Percentage of each extracts of different plants based on 100 gm dry powder.

Plants	Acetone	Ethanol 70%	Petroleum ether
Atropa belladonna	3.82	6.37	1.76
Cymbopogon proximus	3.39	6.5	1.94
Datura stramonium	2.75	4.45	1.62
Hyoscyamus muticus	2.71	3.14	1.44
Urginea maritima	4	11.25	3.78

VI. Thin layer chromatography (TLC):

Test solution belladonna pure extract (a),datura pure extract (b) and refernce solution, hyoscyine (c) [as standard] Were spotted as mentioned in the equipments and apparatus. After spraying with sulphuric acid a dark brown spots were appeared having an identical RF value (0.94) for the sample and the standard spots. **Fig 25**

From TLC application the solution obtained from thorn apple and belladonna. Indicates that it is hyoscine alkaloid.

VII. High pressure liquid chromatography (HPLC)

Inject 20 u1 of :

1) belladonna pure extract (a)

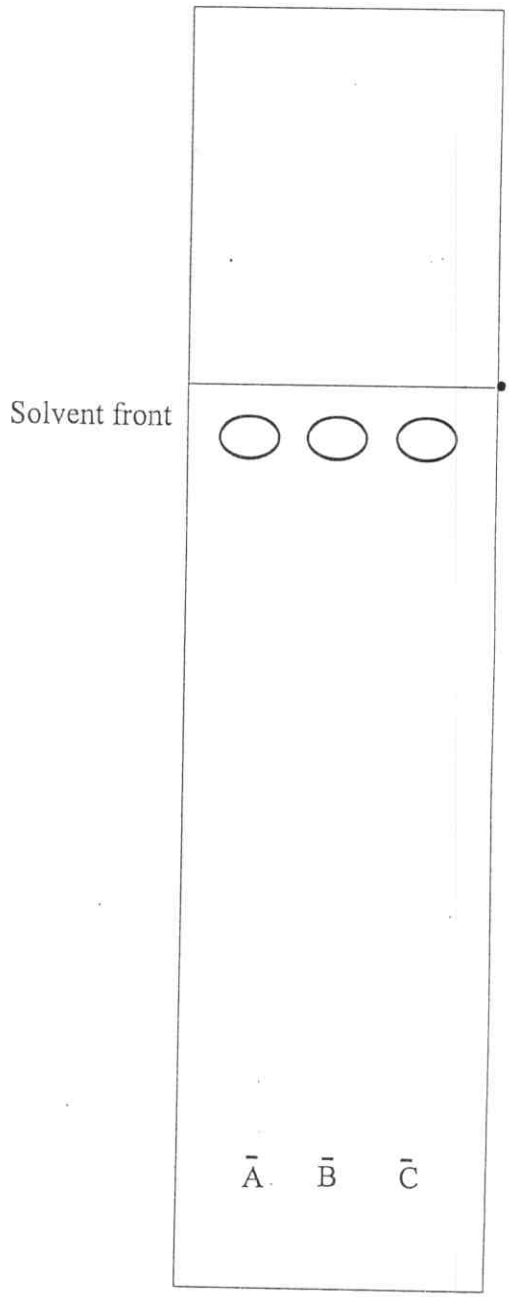
2) Datura pure extract (b)

3) Reference solution, hyoscine (c)

The chromatogram obtained from test solution (a, b) were compared with the chromatogram obtained from reference solution .

The retention time in the chromatogram for belladonna extract (a) was 7.81 minutes for thorn apple extract (b) was 7.88 minutes and hyoscine was (7.85) minutes. This indicated that the alkaloids in belladonna and thorn apple were identical with hyoscine standard. Figure 26, 27 and 28

Figure (25): TLC digrame for belladonna and datura extracts



a) bellandonna pure extract **b) datura pure extract**
c) refernce solution (hyoscyine)

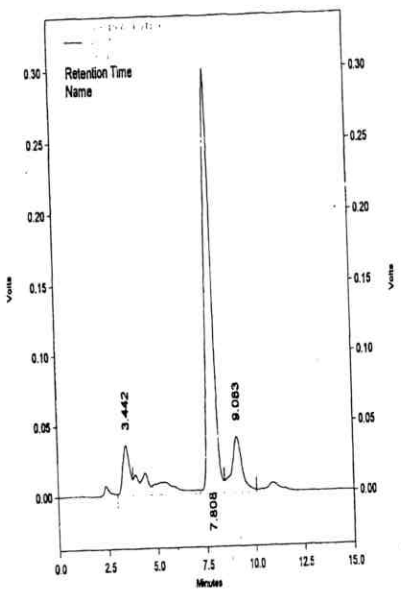


Figure (26): Alkaloid of belladonna (a)

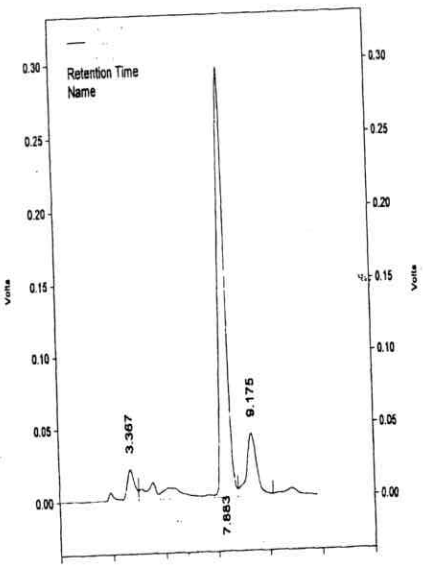


Figure (27): Alkaloid of thorn apple (b)

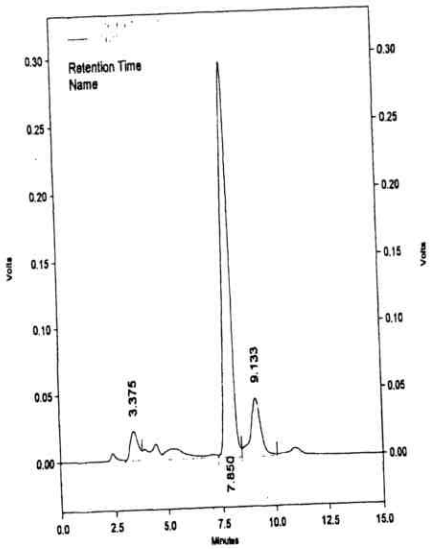


Figure (28): Control of alkaloid : Hyoscine