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WATER EXTRACTS OF SOME WILD PLANTS AS A MEAN OF NONE CHEMICAL CONTROL AGAINST THE TWO LAND SNAILS *Monacha cartusiana* (Müller) and *Theba pisana* (Müller) UNDER LABORATORY CONDITION.

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ABSTRACT

Water extracts from four wild plant species namely: *Azadirachta indica, Neriu oleander, Calotropis procena, Urginea maritime* (different parts: leaves, stems and flowers) were tested against two widely land snails species, i.e. *Monacha cartusiana* and *Theba pisana* under laboratory conditions. The concentrations used were crude extract 1:1 and the diluted 1:3 and 1:10. All the treatments were sprayed directly to the snails or sprayed to the lettuce leaves which used as poisonous food. Moreover, the grinded parts of these plants (leaves, stems and flowers) were used separately for testing their active ingredients.

The obtained results indicate that using some plant water extracts as spraying technique was more efficient against land snails than in its addition to lettuce leaves as poisonous foods or using the grinded plant parts itself.

INTRODUCTION

Emad and Magdy (1990) studied the molluscicidal efficacy of *Canna omdoca* against *Bulinus trucncatus*. The LC_{50} of the boiled, filtered, aqueous extract was 850 ppm, while the unfiltered one was 550 ppm.

Shoeb *et al.* (1990) studied the effect of dry powder of some plants against the Egyptian snails *Biomphalaria alexandrina, Bulinus truncates* and *Lymnaea caillaudi*. The results cleard that only *Solanum nigrum* (Solanaceae) and *Euphorbia peploides* (Euphorbaceae) have molluscicidal activity, *Bulinus truncates* was the most susceptible to the action of both plants.

In Alexandria, Kassem *et al.* (1993) studied the effect of eleven indigenous plant species included seed of oleander, white mustard, black mustard, nigella, jimpson weed and leaves of oleander, milk bush morning glory, wild beets, garlic and onion against the brown garden snail *Eobania vrmiculata,* water extracts of wild beets and oleander showed the highest percent mortality 90 – 100 % after one day of treatments, while Jimpson weed caused 70 % mortality after one day. Phytochemical examination indicated the presence of alkaloids in both oleander and wild beets tested parts.

Hamdy and El-Wakil (1993) studied the molluscicidal and antifeeding effect of the cardenolide extract isolated from the latex of *Calortopis procera* against *Theba pisana* in ccomparison with that of lannate. They showed that the plant extract was 28 times more toxic to *Theba pisana* than lannate whereas LD_{50} of the extract was 4.06 mg/kg, while it was 114.23 mg/kg for

lannate. In addition to its molluscicidal activity, the extract was also found to have strong antifeedant activity, where the concentrations of 0.52 Ug/cm^2 and 1.3 Ug/cm^2 gave 100% protection to lettuce leaves against the mentioned species, respectively, while lannate up to 19.5 Ug/cm2 did not protect the plant.

Dawy (1994) studied the molluscicidal effect of some wild plant extracts against *Helix aspersa,* under laboratory conditions. He noticed that the damsisa extract was the most toxic against the snails, followed by Hanzal and Halfa-bar extracts while Gobberia extract showed the lowest toxicity. A positive relationship was noticed between mortality and post-treatment period. A gradual increase in mortality occurred by the prolongation of time until the end of the experiment. The time required to achieve 50% kill, being 34.42, 73.68, 406.08 and 819.36 hrs, respectively.

Ghamry (1994) tested five cruciferous seeds powder from cabbage, cauliflower, garden rocket, radish and turnip against land snails *Eobania vermiculata, Monacha contiana* and *Cepaea nemoralis* in the laboratory. Results showed that cabbage and cauliflower seed powder only gave pronounced effect, when extracted by either ethanol or acetone, cold or boiled water. Also, powders and crude extracts of cabbage and cauliflower seeds were the most effective for killing the snails after 3 – 10 days. Ethanol or acetone extracts of cabbage and cauliflower seeds incorporated into baits were effective only against the snails *M. contana* and *C. nemoralis.* Topical application test of ethanolic and acetone extracts of cabbage seeds gave high percent reached 100%. The same trend observed by water pool test. All boiled seeds extracts in water were not effective.

Ghamry *et al.* (1994a) tested five plant extracted from *Hyoscyamus muticus, Digitania sanguinalis,* Bitter apple, Safir and Canna indica against two land snail species, *i.e. Eobania vermiculata* and *Monacha contiana* in laboratory. The results indicated that *H. nuticus* extracts gave only pronounced effect. When ethanoloic crude extracts of *H. muticus* incorporated into baits, gave latent effect for killing the two snail species after nine days with 75 & 88 % of mortality for *E. vermiculata* and *M. contiana.* While topical application test gave 100% to *Monacha* sp. and 90 % to *Eobania* sp., *Canna indica* extracts had no effect.

Hamdy *et al.* (1994) tested usharin (*Calotropis procera*) which grows wild in the Egyptian desert against the white snail *Theba pisana.* The results revealed that it had highly toxic against the snails. The active ingredient responsible for the molluscicidal activity was found to be usharin.

Sharshir *et al.* (1996) tested ground seeds of some plants; black pepper (*Piper nigrum*), caraway (*Carum carv*), Coriander (*Coriandrum sativum*), anise (*Pinpnella anisum*), cumin (*Cuminum cyminum*), capsicum (*Capsicum frutescens*) and damsissa (*Ambrosia mafima*) to evaluate their toxicity against *Monacha contiana* under laboratory conditions. They found that pure ethanolic extracts of caraway and caraway and coriander gave high mortality to the snails, while cumin was the lest effective.

Ghamry (1997) tested leaves of pripernel plants (*Anagallis arevensis*) and cortexes of fruits pomegranate (*Punica granatum*) as baits against the two land snails i.e. *Eobania vermiculata* and *Monacha cartusiana.* He found

that these powders and crude extracts as baits of pimpernel leaves and pomegranate fruits cortexes, mostly effective for killing the land snail species after 1-19 day from treatments. Topical application test methanol, ethanol and water extracts of pimpernel leaves and ethanolic extracts of pomegranate fruits eortexes gave highly precent mortality reached 100%. On the other hand, boiled water extracts either from pimpernel leaves or fruits extracts came next after methanol and ethanol extracts.

A laboratory experiment had been conducted by Zidan *et al.* (1997) to throw light on the molluscicidal activity of certain weeds extracts, *i.e.* damsissa, hanzal, halfa barr and Gobberia against the land snail *Helix aspersa*. The obtained results showed thast damsissa extract proved the most toxic preparation followed by hanzal and halfa-barr while gobberia was the least effective extract. The mortality percentage increased gradually by the lapse of post-treatment period. LT_{50} being 34.22, 73.68, 406.08 and 819.36 hours with damsissa, hanzal, gobberia and halfa-barr, respectively.

Okka (1998) tested the extracts of fifteen plants against the land snail *Theba pisana* in the laboratory. Results indicated that olives, *Olea europeae* and Rosberry, *Solanum nigrum* were the most effective natural products for killing snails after one day from application, when extracted by commercial alcohol 75%.

Shahawy, Wafaa (1998) studied the toxicity effect of fourteen plant extracts belong to six families; caraway, parsley, dill, anise and coriander (Umbellifereae) damsissa wormseed & yarrows (Compositae), tobacco & capsicum (Solanaceae), majoram & basil (Labiatae), black pepper (Piper ceae) and *O. kuntze* (Theaceae), against the land snail *Monacha contiana*. The results showed thast the caraway ectracts was the most effective against the snail, followed by parsley, damisissa and yarrows. The LC_{50} values were 707.05, 847.59 921.04and 1000.7 ppm, respectively, after 24 hours treatment. However, capsicum extracts was the lowest toxic among tested plants.

Fifteen commercial essential oils and fourteen of their chemical constituents has been laboratory screened for their molluscicidal and antifeedant activity against the white graden snail, *Theba pisana* by El-Zemaity and Radwan (2001). They found that, the essential oils of peppermint, caraway, thyme, chenopodium and the chemical constituent's carvacrol, thymol, eugenol, and cinnamic aldehyde exhibited high molluscicidal activity against the snails. The most marked reduction in feeding was caused by rosemary, fennel, cinnamon and dill oils. In addition, carvacrol, borneol, carveol, thymol and r-carvone manifested a strong antifeedant effect.

Ebenso (2004) determined the effect of 350, 500, and 700 mg/kg of crude extracts of neem, *Azadirachta marginata* and *Limicoloria aurora* (Jay) and compared with control using pawpaw, *Carica papaya* L. as baiti. Results showed no effects on the controls or snails exposed to neem seed oil extract, crude extracts of bark, root and leaf of neem at 500 and 700 mg/kg produced mortality after exposure for 48 h for *L. aurora* and 72h for *A. marginata*.

MATERIALS AND METHODS

Laboratory experiments were planned to study the moluscicidal effect of certain plant-water extracts against the common abundant land snails, (*Monaca cartusiana* and *Thepa pisana*). Four water-plant extracts, from different places were used (the plant parts, namely: leaf, stem and roots were used. They used as spraying, poisonous foods or grinded parts. These plants are *Azadirachta indica*, *Nerium oleander, Calotropis procera* and *Urginea maritima*. These plants were selected due to its poisonous effect after a preliminary experiment.

Plants extract preparation:

The plants were collected from different places and transferred to the laboratory, washed and separated to different parts (leaves, stems and flowers), and after grinding by electric Mixer, a separate mixture of each part was prepared by adding a volume of water in a ratio of 1:1 (weight : volume) and kept in refrigerator for 24 hors. Then, the mixture was filtered using muslin bag and it was ready for application as a crude extract (1:1) or diluted as 1:3 and 1:10.

Concerning poisonous food, the lettuce leaves were cut to small pieces and were mixed with crude extract (1:2 vol/weigt) and kept for the lettuce leaves be saturated with the extract.

Plant Materials Used:

Table (1) illustrate the four experimental plants selected for this study which included; Arabic, English, Latin name, family name and plant parts tested, in addition to region of plant collection are considered. The plants were identified at the Herbarium of Desert Research Center, Mataria, Cairo.

Table (1): The experimental plants selected for the study

Arabic name	English name	Latin Name	Family name	Part tested	Source	Method of usage
النيم	Neem	*Azadirachta indica*	Meleaceae	Leaves & Stems	Mataria	Grind, extract, poisoned
الدفله	Nerium	*Neriu oleander*	Apocynaceae	Leaves, Stems & flowers	Mataria	Grind, extract, poisoned
العشار	Oshar	*Calotropis procena*	Asclepiadaceae	Leaves, Stems & flowers	Ismalia Cairo road	Grind, extract, poisoned
بصل العنصل الابيض	Onion	*Urginea maritima*	Liliacea	Leaves	weastern coastal region	Grind, extract, poisoned

Tested snails:

The tested snails, *Theba pisana* (Müller) and *Monacha cartusiana* (Müller) were collected from untreated fields and gardens at Burg El-Arab and Marriut, Alexandria Governorate during spring. They were transferred into white cloth bag to the laboratory of Harmful Animal Unit, Plant protection Department, Desert Research Center, Matria. One hundred healthy animals

were kept in separate glass terrarium (60 x 35 x 40 cm) contained 8 – 10 cm optimal clay soil, supplied with fresh washed lettuce leaves as source of food for two weeks before testing and covered with muslin with rubber band to prevent snails from escaping and kept under 20±4 °C (El-Okda, 1981). The snails were selected for each treatment and starved for 24 hours before starting the experiments (Miller *et al.,* 1988).

RESULTS AND DISCUSSION

1. Molluscicidal cativity of some wild plant extracts:

1.1 Spraying the snails with plant extracts :

The present work was planned to study toxicity and antifeedant effects of certain wild plant extracts on two land snails under laboratory conditions.

The toxic effect of four plant extracts was studied under laboratory conditions against *M. cartusiana* and *T. pisana*

The obtained data revealed that the toxic effects of tested plant extracts markedly differed according to plant species, snail species, plant parts, concentration of the extract and application method.

Data in tables (2 & 3) showed that after 15, 30 and 45 minutes post treatment the tested plant extract, Nerium leaf at 1:1, 1:3 and 1:10 spray the tested snails exhibited 100% death of *M. cartusiana* and *T. pisana,* respectively.

Stem Nerium extract at concentrations, 1:1, 1:3 and 1:10 exhibited 100% death of *M. cartusiana* after 30, 75 and 60 minutes respectively, while 100% death of *T. pisana* was observed at 45, 75 and 75 minutes respectively using Stem Nerium extract at concentrations, 1:1, 1:3 and 1:10 respectively.

From tables (2 & 3) it was revealed that onion extract 1:1 exhibited 100% death of *M. cartusiana* and *T. pisana* after 45 minutes respectively. On the other hand, the Onion extract at 1:3 caused 100% death of *M. cartusiana* and *T. pisana* after 75 and 105 minutes, respectively, while 100% death of M. *cartusiana* and *T. pisana* was observed after 90 and 120 minutes respectively using Onion extract at 1:10.

Neem plant leaf extract at 1:1exhibited 100% death of *M. cartusiana* and *T. pisana* after 7.30 hr and 24 hr. respectively, while at 1:3 Neem plant leaf extract 84% and 50% death of *M. cartusiana* and *T. pisana* was observed respectively after 24 hrs. Tables (4, 6 & 7).

Stem extract of Neem plant at 1:1 causes 55% death of *M. cartusiana* after 24hrs. while no effect was observed on *T. pisana* using the same extract. On the other hand, neither *M. cartusiana* nor *T. pisana* was affected at 1:3 Stem extract of Neem plant.

Oshar plant leaf extract at 1:1 and 1:3 exhibited 100% death of *M. cartusiana* and *T. pisana* after 6 hr and 9 hr respectively.

Stem extract of Oshar plant at 1:1 exhibited 100% death of *M. cartusiana* and *T. pisana* after 4.30 hrs and 6 hrs, respectively. On the other hand, 1:3 stem extract of oshar plant causes 100% death of *M. cartusiana* and *T. pisana* after 7.30 hrs (Tables 4 & 5).

`Table (2): Effect ofdifferent plant extracts on *Monacha cartusiana*

Time	15 min.			30 min.			45 min.			60 min.			75 min.			90 min.		
Treatment	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%
N.L.Ex 1:1	100	10	100															
N.L.Ex 1:3	0	0	0	100	10	100												
N.L.Ex 1:10	0	0	0	100	4.0	40	100	10	100									
N.S.Ex 1:1	0	0	0	100	10	100												
N.S.Ex 1:3	0	0	0	0	0	0	0	0	0	100	7.5	75	100	10	100			
N.S.Ex 1:10	0	0	0	100	4.7	47	100	8.5	85	100	10	100						
O.Ex. 1:1	0	0	0	100	9.0	90	100	10	100									
O.Ex. 1:3	0	0	0	0	0	0	0	0	0	100	9.1	91	100	10	100			
O.Ex. 1:10	0	0	0	0	0	0	0	0	0	100	7.8	78	100	7.8	78	100	10	100
Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fo% = Frequency M = Mortality mean MR% = Mortality percentage N.L.Ex = Nerium leaf extract,
N.S.Ex = Nerium stem extract, O.Ex = Onion Extract

Table (3) : Effect of different plant extracts on *Theba pisana*

Time	15 min.			30 min.			45 min.			60 min.			75 min.			90 min.			105 min.			120 min.		
Treatment	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%
N.L.Ex 1:1	100	10	100																					
N.L.Ex 1:3	0	0	0	100	10	100																		
N.L.Ex 1:10	0	0	0	100	8.0	80	100	10	100															
N.S.Ex 1:1	0	0	0	100	9.2	92	100	10	100															
N.S.Ex 1:3	0	0	0	0	0	0	0	0	0	100	9	90	100	10	100									
N.S.Ex 1:10	0	0	0	100	6.3	63	100	6.3	63	100	9	90	100	10	100									
O.Ex. 1:1	0	0	0	100	8.8	88	100	10	100															
O.Ex. 1:3	0	0	0	0	0	0	0	0	0	100	5.4	54	100	8.8	88	100	8.8	88	100	10	100			
O.Ex. 1:10	0	0	0	0	0	0	0	0	0	0	0	0	100	4.4	44	100	4.4	44	100	4.4	44	100	10	100
Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N.L.Ex = Nerium leaf extract, N.S.Ex = Nerium stem extract, O.Ex. = Onion Extract

Table (6): Effect of poisonous lettuce treated with different plant extracts on *Monacha cartusiana*

Time	4.5 hr.			6 hr.			7.5 hr.			9 hr.			24			48		
Treatment	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%
Ne.L.G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ne.S.G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ne.L.Ex 1:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NeS.Ex 1:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ne.L.Ex 1:3 (S)	0	0	0	0	0	0	0	0	0	100	8.1	81	100	8.4	84	100	8.4	84
Ne.S.Ex 1:1 (S)	0	0	0	70	1.8	18	90	2.8	28	100	4.5	45	100	5.5	55	100	5.5	55
NeS.Ex 1:3 (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N.L.G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N.S.G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N.F.G	0	0	0	0	0	0	0	0	0	10	0.1	1	20	0.3	3	20	0.3	3
N.L.Ex 1:1	0	0	0	0	0	0	0	0	0	70	1.2	12	80	1.3	13	80	1.3	13
N.S.Ex 1:1	0	0	0	0	0	0	0	0	0	40	0.8	8	70	1.5	15	90	2.0	20
N.F.Ex 1:1	0	0	0	0	0	0	0	0	0	100	2.7	27	100	2.9	29	100	3.5	35
Osh.L.G	0	0	0	0	0	0	70	1.5	15	100	3.7	37	100	5.0	50	100	5.0	50
Osh.S.G	0	0	0	0	0	0	90	1.9	19	90	3.3	33	90	3.5	35	90	3.5	35
Osh.F.G	0	0	0	0	0	0	90	3.3	33	100	4.4	44	100	5.5	55	100	5.5	55
Osh.L.Ex 1:1	0	0	0	0	0	0	80	1.7	17	90	2.0	20	100	3.6	36	100	3.6	36
OshS.Ex 1:1	0	0	0	0	0	0	100	3.5	35	100	4.9	49	100	7.0	70	100	7.0	70
Osh.F.Ex 1:1	0	0	0	0	0	0	70	1.1	11	100	1.9	19	100	2.2	22	100	2.2	22
P.O.G	0	0	0	0	0	0	30	0.4	4	70	1.1	11	90	1.5	15	90	1.5	15
P.O.Ex. 1:1	0	0	0	0	0	0	100	4.2	42	100	7.6	76	100	9.5	95	100	9.5	95
Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N.L.G = neem grinded leaf Ne.S.G = Nerium grinded stem Ne.L.Ex (S) = Nerium leaf extract, spray P.O.G = poisonous onion grinded P.O.Ex = poisonous onion extract

Table (7): Effect of poisonous lettuce treated with different plant extracts on *Theba pisana*

Time	4.5 hr.			6 hr.			7.5 hr.			9 hr.			24			48		
Treatment	**Fo%**	**M**	**MR%**	**Fo%**	**M**	**MR%**	**Fo%**	**M**	**MR%**	**Fo%**	**M**	**MR%**	**Fo%**	**M**	**MR%**	**Fo%**	**M**	**MR%**
Ne.L.G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ne.S.G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ne.L.Ex 1:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NeS.Ex 1:1	0	0	0	0	0	0	0	0	0	0	0	0	10	1.0	10	10	1.0	10
Ne.L.Ex 1:1 (S)	100	2.1	21	100	3.5	35	100	4.3	43	100	7.3	73	100	10	100			
Ne.L.Ex 1:3 (S)	0	0	0	0	0	0	0	0	0	0	0	0	100	5	50	100	5	50
Ne.S.Ex 1:1 (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NeS.Ex 1:3 (S)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N.L.G	0	0	0	0	0	0	0	0	0	20	0.2	2	50	0.8	8	50	0.9	9
N.S.G	0	0	0	0	0	0	0	0	0	90	2.1	21	100	3.5	35	100	6.3	63
N.F.G	0	0	0	0	0	0	0	0	0	30	0.4	4	50	0.7	7	50	0.8	8
N.L.Ex 1:1	0	0	0	0	0	0	0	0	0	50	0.8	8	50	1.3	13	50	1.6	16
N.S.Ex 1:1	0	0	0	0	0	0	0	0	0	0	0	0	30	0.4	4	30	0.5	5
N.F.Ex 1:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Osh.L.G	0	0	0	0	0	0	90	2.8	28	100	4.3	43	100	4.5	45	100	4.5	45
Osh.S.G	0	0	0	0	0	0	80	1.8	18	100	7.2	72	100	8.2	82	100	8.2	82
Osh.F.G	0	0	0	0	0	0	70	1.0	10	100	3.7	37	100	5.4	54	100	5.4	54
Osh.L.Ex 1:1	0	0	0	0	0	0	70	1.5	15	80	1.9	19	100	4.5	45	100	4.5	45
Osh.Ex 1:1	0	0	0	0	0	0	90	2.3	23	100	7.0	70	100	8.7	87	100	8.7	87
Osh.F.Ex 1:1	0	0	0	0	0	0	60	1.3	13	60	2.4	24	70	3.1	31	70	3.1	31
P.O.G	0	0	0	0	0	0	30	0.3	3	50	0.5	5	60	0.7	7	60	0.7	7
P.O.Ex. 1:1	0	0	0	0	0	0	100	3.4	34	100	6.5	65	100	9.9	99	100	9.9	99
Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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إستخدام المستخلصات المائية لإجزاء بعض النباتات البرية كوسيلة غير كميائية لمكافحة نوعين من القواقع الأرضية موناكا كارتزيانا وسيبا بيسانا تحت ظروف المعمل

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فى هذا البحث تم إستخدام المستخلصات المائية لبعض النباتات (الأوراق – السوق – الأزهار) وذلك لأربع نباتات من النباتات النامية بريا ، وذلك لمكافحة نوعين من القواقع الأرضية وهما موناكا كارتزيانا وسيبا بيسانا. وكانت التركيزات المستخدمة هى التركيز الخام ١:١ والمخفف ٣:١ ، ١٠:١.

كل المعاملات تم تطبيقها رشا مباشرا على القواقع أو خلطها بأوراق الخس التى تم إستخدامها كطعوم سامة. كما تم إستخدام مفرى هذه الأعضاء النباتية منفصلة (الأوراق – السوق – الأزهار) لدراسة تأثير سمية المادة الفعالة بها.

أظهرت النتائج المتحصل عليها أن إستخدام المستخلصات المائية رشا مباشرا على القواقع كان ذو تأثير فعال فى موت القواقع مقارنة بخلطه بأوراق الخس وإستخدامه كطعوم سامة أو إستخدام مفرى الأعضاء النباتية ذاتها.

Table (4) : Effect of different plant extracts on *Monacha cartusiana*

Time	1.5 hr.			3 hr.			4.5 hr.			6 hr.			7.5 hr.			9 hr.		
Treatment	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%
Ne.L.Ex 1:1	50	1.1	11	100	4.0	40	100	5.4	54	100	6.6	66	100	10	100			
Osh.L.Ex 1:1	0	0	0	100	7.7	77	100	9.4	94	100	10	100						
Osh.L.Ex 1:3	0	0	0	0	0	0	0	0	0	80	3.1	31	100	6.2	62	100	10	100
Osh.S.Ex 1:1	0	0	0	100	6.9	69	100	10	100									
Osh.S.Ex 1:3	0	0	0	100	6.0	60	100	8.7	87	100	9.6	96	100	10	100			
Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N.L.Ex = Nerium leaf extract, Osh.L.Ex = Oshar leaf extract,Osh.S.Ex = Oshar stem extract

Table (5) : Effect of different plant extracts on *Theba pisana*

Time	1.5 hr.			3 hr.			4.5 hr.			6 hr.			7.5 hr.			9 hr.		
Treatment	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%	Fo%	M	MR%
Osh.L.Ex 1:1	0	0	0	100	6.6	66	100	8.3	83	100	10	100						
Osh.L.Ex 1:3	0	0	0	0	0	0	20	0.4	4	90	3.2	32	100	6.4	64	100	10	100
Osh.S.Ex 1:1	0	0	0	100	4.7	47	100	8.2	82	100	10	100						
Osh.S.Ex 1:3	0	0	0	70	2.0	20	100	5.7	57	100	6.8	68	100	10	100			
Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Osh.L.Ex = Oshar leaf extract, Osh.S.Ex = Oshar stem extract

1.2 Effect of Grinded plant parts on the snails:

After 24 hrs. the Grinded leaf and stem of neem plant have not any effect neither *M. cartusiana* nor *T. pisana*.

Grinded leaf and stem of Nerium plant, exhibited no effect on *M. cartusiana* after 48 hrs while 9% and 63% death of *T. pisana* was observed after 48 hrs. respectively. On the other hand, grinded flower of Nerium plant causes 3% and 8% death of *M. cartusiana* and *T. pisana* after 24 hrs and 48 hrs, respectively.

Concerning the grinded leaf of oshar plant, data in tables (6 & 7) show that, 50% and 45% death of *M. cartusiana* and *T. pisana* was established after 24 hrs, respectively. On the other hand, grinded stem of Oshar plant exhibited 35% and 82% death of *M. cartusiana* and *T. pisana* after 24 hrs, respectively. Moreover, the grinded flower of Oshar plant exhibited 55% and 54% death of *M. cartusiana* and *T. pisana* after 24 hrs, respectively.

Also the grinded Onion plant exhibited 15% and 7% death of *M. cartusiana* and *T. pisana* after 24 hrs treated, respectively. Tables (6 & 7).

1.3 Effect of poisnous lettuce leaves treated with mixed plant extracts on the snails:

Data in tables (6 & 7) showed that, the grinded lettuce leaf mixed with Neem leaf extract 1:1, there is no effect was detected on neither *M. Cartusiana* nor *T. pisana* after 48 hrs. On the other hand, the grinded letus leaf mixed with Neem stem extract 1:1 causes only 10% death of *T. pisana* after 24 hrs.

Tables (6 & 7) illustrated that, the grinded letus leaf mixed with Nerium leaf extract 1:1 and Nerium stem extraxct 1:1 exhibited 13% death after 24 hrs, 16% death after 48hrs and 20% death after 48 hrs and 5% death after 48 hrs. on *M. Cartusiana* and *T. pisana*, respectively.

Concerning the grinded Nerium flower, the death percentage was 35 after 48 hrs on *M. cartusiana* while *T. pisana* was not affected.

Oshar leaf extract 1:1 mixed with grinded letus leaf cusses 36% and 45% death of *M. cartusiana* and *T. pisana* after 24 hrs. respectively while Oshar stem extract 1:1 mixed with grinded letus leaf cusses 70% and 87% death of *M. cartusiana* and *T. pisana* after 24 hrs. respectively. Also, Oshar flower extract 1:1 mixed with grinded letus leaf cusses 22% and 31% death of *M. cartusiana* and *T. pisana* after 24 hrs. respectively

Onion extract 1:1 mixed with grinded letus leaf cusses 95% and 99% death of M. *cartusiana* and *T. pisana* after 24 hrs. respectively

These results are in harmony with those reported by many authors. Rothschild (1972) reported that the extracts of leaves and fruits of plants of family Solanaciea were very effective in controlling the snails. Our findings are in agreement with those obtained by Ghamry (1994), Hamdy, *et al.* (1994), El-Hawashy, Nadia (1996), Sharshir, *et al.* (1996) and Lotfy (1997).In conclusion: the water plant extracts were recommended for controlling of land snails instead of pesticides to avoid the environmental pollution.