

## **The Study of the effect of some medical plant extracts on snail *Lymnaea auricularia***

**دراسة تأثير بعض مستخلصات النباتات الطبية على قواقع اللامنيا اريكيولارس**

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### **Abstract**

The aim of study to evaluate molluscicidal activity of some medicinal plant extracts (*Achillea millefolium L.*, *Artemisia vulgaris L.*, *Salvia officinalis L.*) against *Lymnaea auricularia* snails . the toxicity of different conditions after 24hrs,48hrs for mulluscs was time and dose dependent. The 24hrs Lc50=12mg/L of the ethanolic extract of *Salvia officinalis L.* were higher in comparison to *Achillea millefolium L.* Lc50=30mg/L and *Artemisia vulgaris L.* Lc50=20mg/L In chlorinated water extract, tap water extract and distilled water extract of *A.vulgaris L.* shown highest activity in comparison to *S.officinalis L.* and *A.millefolium L.* According to these results it may conclude that, the ethanolic extract of *Salvia officinalis L.* may be used for the snail control.

### **الخلاصة**

الهدف من الدراسة لتقييم فاعلية مبيدات القواقع لبعض النباتات الطبية (القيصوم, الشيح, المريمية) ضد قواقع اللامنيا اريكيولارس. لوحظت السمية للقواقع معتمدة الجرعة والوقت بعد 24 ساعة, 48 ساعة لمختلف الحالات. التركيز القاتل لنصف الإعداد المعاملة = 12 ملغم لتر لمستخلص ايثانول نبات المريمية كان اعلى بالمقارنة مع نبات القيصوم = 30 ملغم لتر والشيح = 20 ملغم لتر. أما الماء الحاوي الكلور والماء غير الحاوي الكلور والماء المقطر لنبات الشيح كان اعلى بالمقارنة مع نبات المريمية والقيصوم. استنادا للنتائج يستنتج إن مستخلص الايثانول لنبات المريمية قد يستخدم للسيطرة على القواقع.

### **Introduction**

Many aquatic snails acts as intermediate hosts for the larvae of trematodes, *Fasciola hepatica* and *Fasciola gigantica* and *schistosoma* wich cause the diseases of fascioliasis and schistosomiasis(1). Control of the intermediate host disrupts the life cycle of the parasite, stopping the transmission of infection, while in poor countries where schistosoma is common, biological control of the snails that serves as intermediate host for schistosoma and fasciola, appears feasible and cost effective(2).

Snail control through the use of synthetic molluscicides also forms an important part in the integrated control programme for schistosomiasis (3). The high cost of synthetic molluscicides used in the control of the intermediate snail hosts, has resulted in renewed interest in plant molluscicides(4). Uses of plant product as molluscicide are more acceptable than synthetic one. The major uses of the medicinal plants ranged from pain killer to malaria and cancer treatment(5).

However, the toxicity of these molluscicides to non-target organisms and ecosystem destruction render them less efficient (3) and did not cause any mortality among fish in a mix population of snails and fish(6).

The hydroalcohol extracts of *Achillea millefolium L.* and *Artemisia vulgaris L.* both belonging to the Asteraceae family were use as analgesic, antiinflammatory and antispasmodic agent(7) and other used crud plant extract of *Artemisia cina* for biological control monieziasis of sheep(8).

The leaves infusion of sage (*Salvia officinalis L.*) its used as gargle for treatment tonsillitis, mouth abscess(9) and the volatile oil of sage have antimicrobial activity and used for different skin diseases such as eczema(10).

In Iraq the endemic diseases fascioliasis and schistosomiasis are important and the study in this field is limited and the important of these diseases on human and animal lead to conducted this study to

-evaluate molluscicidal activity of some medicinal plants extracts *Achillea millefolium L.*, *Artemisia vulgaris L.*, *Salvia officinalis L.* against *Lymnaea auricularia* .

## **Material and Methods**

Fresh snails were collected from Al-hussynia river and its branch then put in sterile glass and transported to the laboratory of parasitology in the College of Veterinary Medicine after that made washing for snail from mud then classified (11). Ten experimental animals were kept in glass aquarium. The ratio of dead snails to total tested snails was expressed as mortality (%) (12).

Leaves of (*Achillea millefolium L.*, *Artemisia vulgaris L.* and *Salvia officinalis L.*) were collected from Kerbala desert and classified by national herbarium of agriculture ministry.

A total weight of 100g of dry powdered plant were infused in 70% ethanol until complete exhaustion (usually 1:5 w/v ratio) for 72hr at room temperature with periodic shaking. The extract was filtered twice using Whatman filter paper no (1). The filtrate was then dried using rotary evaporator sterile bottles and kept frozen at (-20°C).

Two grams from each dry extract were dissolved in 10% dimethyl sulfoxide (DMSO) to give a final concentration of 200mg/ml. Sterilization was then carried out by using Millipore filtration (0.45µm Millipore filters) using an autoclaved sterile glass filter holder. Sterile filtrates were stored in screw capped sterile tubes in the refrigerator at (5°C) until use. The water extracts were carried out by weight and dissolved 2gram of extract of each plant in (100ml) of distilled water to prepare 200mg/ml for each plant. (dechlorinated tap water extract, chlorinated water extract, distilled water extract, ethanolic extract) containing 2litre each and 5mg fresh aerial plant extract. Required amount of synthetic molluscicides were used as control groups. (13).

## **Results**

Table (1) shows the toxicity of different preparations of some medicinal plants extracts against snail *L.auricularia* and shows that the toxicity was both time and dose dependent, activity decreased with decrease dose and increase time. The 24hrs Lc50=12mg/L of the ethanolic extract of *Salvia officinalis L.* were higher in comparison to *Achillea millefolium L.* Lc50=30mg/L and *Artemisia vulgaris L.* Lc50=20mg/L. In chlorinated water extract, tap water extract and distilled water extract of *A.vulgaris L.* shown highest activity in comparison to *S.officinalis L.* and *A.millefolium L.*

The results of present study clearly indicate that the leaves of selected medicinal plants are an important source of botanical molluscicides. Molluscicidal activity *S. officinalis L.*, *A.millefolium L.*, *A.vulgaris L.* varies greatly from species to species and even between different parts of the same plant. The toxicity study revealed that the toxic component *S. officinalis L.*, *A.millefolium L.* and *A.vulgaris L.* leaves are soluble in both water and ethanol.

A comparison of the molluscicidal activity of the ethanolic extract of *S. officinalis L.*, *A.millefolium L.* and *A.vulgaris L.* were more potent.

Table(1)lethal toxicity of *A.millefolium L.*, *A.vulgaris L.*and *S. officinalis L.* when exposed to conditions under 24 and 48HRS.

<i>Achillea millefolium L.</i>	Extract	Lc50mg/L	
		24hrs	48hrs
	dechlorinated tap water extract	80	70
	Chlorinated water extract	80	70
	distilled water extract	50	45
	ethanolic extract	30	26
<i>Artemisia vulgaris L.</i>	Extract	Lc50mg/L	
		24hrs	48hrs
	dechlorinated tap water extract	70	60
	Chlorinated water extract	60	55
	distilled water extract	40	35
	ethanolic extract	20	17
<i>Salvia officinalis L.</i>	Extract	Lc50mg/L	
		24hrs	48hrs
	dechlorinated tap water extract	90	85
	Chlorinated water extract	80	70
	distilled water extract	60	50
	ethanolic extract	12	10

## Discussion

Mortality rate of *Lymnaea auricularia* was recorded after every 24hrs,48hrs.and dead *L.auricularia* were removed from aquaria due to risk of contamination with other animals. Snail mortality was established by the concentration of body within the shell; no response to needle probe was taken as evidence of death(14,4).Lethal concentration was observed between exposure time and different concentration of extracted leaf material of plants. The Lc50 values are tabulated in the table(1).

The ethanolic extracts of. *A.millefolium L.*,*A.vulgaris L.*and *S. officinalis L.*Leaves were found to be most potent molluscicidal activity than rest of the medium. Lethal concentration of ethanolic extract of *A.millefolium L.* at 24hrs:30mg/L,48hrs:26mg/L, *A.vulgaris L.* at 24hrs:20mg/L,48hrs:17mg/L and *S. officinalis L.* at 24hrs :12mg/L ,48hrs :10mg/L,respectively.

(Vermiben®2.5%(abendazol)has been used standard molluscicide,Lc50 at 24hrs.is 13mg/L)against *L.auricularia* .

Mortality rate of *S. officinalis L.* is best than rest of the plants it due to the presence of terpenes(15)or monoterpenes(16)while in *A.millefolium L.*and *A.vulgaris L.*have flavonoid,glycoside as aprincipal constituent and high content of caffeic acid derivatives and difference between them *A.millefolium L.*had ahiger content of rutin while *A.vulgaris L.*the hydroxy benzoic acid derivatives was the major component *A.millefolium L.*and *A.vulgaris L.* both hydroalcohol extracts showed the same flavonoid,glycoside as aprincipal constituent which was identified as rutin and high content of caffeic acid derivatives(7)

In light of above facts, that the selected plant species(*A.millefolium L.*, *A.vulgaris L.*and *S. officinalis L.*)shows enhanced molluscicidal activity as compared to an expensive synthetic molluscicides.The mechanism by which these leaf extract killed snail is not exactly known and will require further biochemical studies for elucidation.

## References

- 1-Singh,S.K.;Yadav,R.P.;Singh,A.(2010):Molluscicides from some common medicinal plants of eastern uttar.J.App.toxicol.30,1:1-7.
- 2-EL-sherbini,G.T.;Zayed,R.M.;EL-sherbini,E.T.(2010):Molluscicidal activity of some solanum species extracts against the snail *Biomphalaria alexandrina*. Epic Antiques.1-2.
- 3-Adetunji,V-O.and Salawu,O.T.(2010):Efficacy of ethanolic leaf extracts of *Carica papaya* and *Terminalia catappa* as molluscicides against the snail intermediate hosts of Schistosomiasis .J.Med.plant.Res.4(22):2348-2352.
- 4-Vijay,P.(2010):Evaluation of molluscicidal activity of some Indian medicinal plants against *lymnaea acuminata*.Int.App.Bio.pharma.Tech. 1(2):308-311.
- 5-Abera,B.(2003):Medicinal plants used in traditional medicine in jimma zone,oromia,south west Ethiopia.Ethiop.J.Health.Sci.13(2):85-96.
- 6-Singh,S.K.and Singh, A.(2003):Molluscicidal and Anticholinesterase activity of *Alstonia scholaris* plant against fresh water snail *lymnaea acuminata* .Pakistan .J.Bio.Sci .6:16:1442-1446.
- 7-Pires,J.M.;Mendes,F.R.;Negri,G.;Duarte-Almeida,J.M.;Carlini,E.A.(2009) .Antinociceptive peripheral effect of *Achillea millefolium L.* and *Artemisia vulgaris L.*:both plants known popularly by brand names of analgesic drugs .Phytother.Res.23:2:212-9.
- 8-Bashtar,A.-R.;Hassanein,M.;Abdel-Ghaffar,F.;Al-Rasheid,K.;Hassan,S.; Mehlhorn,H.;Al-Mahdi,M.;Morsy,K.;Al-Ghamdi,A.(2011):studies on monieziasis of sheepI.prevalence and antihelminthic effects of some plant extracts, a light and electron microscopic study.parasitol.Res. 108:177-186.
- 9-Alippi, A.M.; Ja Ringuet, E.L.;Cerimele, MS. Re; and CP Henning, (2003).Antimicrobial activity of some essential oils against paenibacillus larvae the cansal agent of American Foulbrood disease. Journal of herbal, Spies and Medicinal plants; 4- 9- 16.
- 10-Das, A.K.(2005).studies on anti diarrhoeal activity of *Punica granatum* seed extract in rat. J-ethno pharmacology 15: 205 – 208.
- 11- الطائي,صباح فاضل عبدالحسين(2011). دراسة بيئية لأنواع القواقع المائية في جدول الحسينية/محافظة كربلاء المقدسة كمضائف وسطية لديدان ثنائية المنشأ.ماجستير علوم حياة,كلية التربية,جامعة كربلاء.
- 12-Li,y-y.;Chen,J.;Han,B-x.;Pan,G-b.;Guo,D-z.(2010):Molluscicidal activities of *Ginkgo biloba* leaf against the snail *Oncomelania hupensis*.J.Med.plants.Res.4(23):2466-2472.
- 13-Smadi,D.I.(2011):Studies toward isolation and identification of bioactive substances from medicinal plants.M.Sc.Thesis.An-Najah national university, Palestine.
- 14-Sharma,S.;Singh,T.;Vijayvergia,R.(2009):Molluscicidal activity of some medicinal plants.J.Herbal.Med.toxicol.3(2):155-157.
- 15-Knezevic-Vukcevic,J.;Vukovic-Gasic,B.;Stevic,T.;Stanojevic,J.;Nikolic, B.;Simic,D.(2005)Antimutagenic effect of essential oil of sage(*Salvia officinalis L.* )and its fractions against UV-induced mutations in bacterial and yeast cells.Arch.Biol Sci.Belgrade.57(3):163-172.
- 16-Mitic-Culafic,D.;Vukovic-Gasic,B.;Knezevic-Vukcevic,J.;Stankovic,S.; Simic,D.(2005):Comparative study on the Antibacterial activity of volatiles from sage(*Salvia officinalis L.* ). Arch.Biol Sci. Belgrade. 57(3):173-178.