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ANTIFEEDING EFFECTS OF PLANT EXTRACTS AGAINST WHITE GARDEN SNAIL *THEBA PISANA* (MÜLLER) UNDER LABORATORY CONDTIONS

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ABSTRACT: *The efficacy of the plant extracts namely,* Euphorbia, Aloe, Peganumus, Cymbopagon *and* Stramonium *of five-tested wild and ornamental plants versus against Theba pisana (Müller) was studied under laboratory condition. All cactus plant extracts by Ethanol, exhibited highly repellency against T. pisana (Müller). Colatrapis Hexane and Ethanol extracts were selected from the highest repellency potential extracts, The mortality and repellent percentages increased gradually with increasing applied cocentrations 100, 200, 400, 800 and 1000 ppm. when lettuce leaves treated with colatrapis Hexane and Ethanol extracts. The consumption of treated leaves in grame/day by T. pisana (Müller) decreased with increasing cosentrations.*

***Key words**: Land snail – Plant extracts – Solvent – Repellency – laboratory.*

INTRODUCTION

Plant extracts have more attention in controlling many of serious pests especially in tropical and subtropic countries, also they are biodegradable, very low mammalian toxicity and potentially compatible with natural enemies. Antifeeding effect of the cardenolide extract isolated from the latex of *Calotropis procera* was studied against *Theba pisana* (Müller) in comparison with that of lannate. The plant extract was 28 times more toxic to *Theba pisana* than lannate whereas LD50 of the extract was 4.06 mg/kg, while it was 114.23 mg/kg for lannate (Hamdy and El-Wakil 1993). Uscharin, Calotropis procera, was discovered to be highly toxic to *Theba pisana,* Hamdy *et al.* (1994). *Solanum nigrum* was the most effective natural product in killing *Theba pisana* offer one day from application in the laboratory, when extracted by commercial ethyl alcohol 75%, El- Okda *et al.,*(1998). The repellency potential of some crude plant extracts; neem, spotted gum, oshar, cauliflower, santonica, radish, peppermint, khilla, alocasia and cabbage, when extracted with hexane and ethanol on *Theba pisana*, was studied by Zedan *et al.* (2001).

MATERIALS AND METHODS

An experiment was carried out in the laboratory of the Department of Agriculture Zoology and Nematology, Faculty of Agriculture, Al-Azhar University, Nasr City, Cairo.

1-Tested snails:

Adult individuals *Theba pisana* , were collected form field crops at Alexandria Governorate and transported in white cloth bags to the laboratory. Healthy individuals were kept in round plastic boxes (15 cm diameter) contained moistened sandy clay soil and provided with fresh discs of green lettuce leaves for two weeks for acclimatization.

2- Tested plants

The efficacy of extracts of five wild and ornamental plants against *T. pisana* was studied under laboratory conditions (22 ± 2°C and 75 ± 5% soil moisture). Those plants were illustrated in Table (1) which included English, Latine and Family names.

Table (1): Some information on used plants.

English name	Latin name	Family name	Source
Euphorbia	Euphorbiasplendesi	Euphorbiaceae	Naser city
Aloe	Aloe vera	Aloeaceae	
Peganumus	Aptenia cordifolia	Alzoaceae	
Cymbopagon	Cymbopagon citaratus	Graminea	
Stramonium	Datura stramonium	Solanceae	

3- Preparation of plant extracts

Plant extracts were prepared according to the method adopted by El-Baroty (1984) with some modification. Plant materials (leaves) were dried under laboratory temperature grounded in electric mill and sieved through 0.5 mm sieve. Sample of 250 gm of each plant were weighed 25 a powder matrial. Each powder was soaked in 700 ml of each of Hexane and Ethanol solvents for 8 hours. Brown colored bottles (5 liters) provided with tight stoppers were used as containers and intermittently agitated by an electric shaker for 4 hours. The solvent was separated from the insoluble plant material and the later was extracted with another 500 ml solvent for 4 hours . The final solvent was separated as combined extracts (1200 ml), then filtered over anhydrous sodium sulfate and evaporated under reduced pressure using a rotary evaporator. The crude extract was weighed and adjusted to 25 ml with the solvent used and kept in a refrigerator till testing. The marc was then extracted subsequently with 95% ethanol and subjected to the above steps.

4- Procedure used:

Five plant extracts which were obtained using Hexane and Ethanol solvents. The effectiveness of these extracts as snail repellents were

determined against *T. pisana* by leaf dipping technique under one choice feeding method. Green lettuce leaves were dipped for 3 seconds in the tested concentrations (100, 200, 400, 800 and 1000 ppm.) and left until stopping of solution drops Saleh *et al.,* (1984). Healthy individuals of *T.pisana* were offered daily the treated and untreated leaves, replenished daily for four successive days. Three replicates for each treatment were carried out in addition to the control. The observed percent of mortality were corrected according to Abbott's Formula (1925).

RESULTS AND DISCUSSION

Obtained results in Table (2) revealed that all ethanolic plant extracts, exhibited highly repellency against *T. pisana.* Hexanic and Ethanolic extracts of aloe plants were rcorded the highest repellency potential in comparison with other extracts, where Hexanic and Ethanolic aloe extracts were found to be the strongest anifeedant activety.

Table (2): Repellency potential of crude extracts for some plants extracts against Theba pisana using leaf dipping technique under laboratory conditions (22 ± 2°C and 75 ± 5% soil moisture).

Plant extracts	Hexanic solvent			Ethanolic solvent		
	Mean Consumption g./day		Repellency %	Mean Consumption g./day		Repellency %
	Untreated	Terated		Untreated	Terated	
Euphorbia	5.67	0.00	100	8.2	0.81	90
Aloe	7.30	0.00	100	5.2	0.00	100
Paganumus	7.06	0.17	98	11	0.13	99
Cymbopagon	7.9	4.7	41	9.1	1.4	85
Stramonium	8.2	5.33	35	8.9	0.77	91

Data in Table (3) revealed that, the mortality and repellent percentages increased gradually with increasing applied cocentrations (100, 200, 400, 800 and 1000 ppm.), when lettuce leaves treated with colatrapis Hexanic and Ethanolic aloe extracts. The consumption of treated leaves in gram/day by *T. pisana* decreased with increasing cosentrations. The obtained results revealed that LD50 values of aloe Hexanic and Ethanolic extracts were 611.81 and 331.05 respectively. These results are inagreement with those obtained by Ghamry *et al.,* (1994) and Al-Akra(2005). The repelant effect is considered safe for the environment and living creatures. Its function is sully based on the physical or chemical senses of target pest. Accordingly, these method are classified into the folowing given groups: visual, acoustical, tactile, gustatory and olfactory repelant. A good repellent method or material is one that affects two or more of these senses. Therefore, it could be leaves at 1000ppm gave satisfactory control of the aimed land snail, *T. pisana.*

Table (3): Repellency effects of five concentrations of aloe plant extracts against Theba pisana under laboratory conditions (22 ± 2°C and 75 ± 5% soil moisture) .

Concentrations ppm.	Types of solvents							
	Hexane				Ethanol			
	Mean Consumptions g./day		Repellencey %	Mortality %	Mean Consumptions g./day		Repellencey %	Mortality %
	Untreated	Terated			Untreated	Terated		
100	6.2	3.2	48	16	9	9	0	7
200	5.6	1.2	79	25	10	7.4	26	16
400	3.9	0.8	80	38	5.2	3.2	36	62
800	4.3	0.82	81	55	6.3	2.4	62	82
1000	5.5	0.52	91	67	4.4	1.4	68	93

LC50 for Hexanic extract 611.81 ppm. and Ethanol extract 331.05 ppm.

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التأثير المانع للتغذية للمستخلصات النباتية على قوقع الحدائق الأبيض تحت الظروف المعملية

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الملخص العربي

كان الهدف من البحث هو تقييم التأثير المانع للتغذية لخمسة أنواع من نباتات الزينة وهى أم اللبن ، الصبار ، بيجونيا ، حشيشة الليمون ، الداتوره حيث تم استخلاص المواد الفعالة بها بواسطة المذيبات العضوية (الإيثانول والهكسان) على قوقع الحدائق الأبيض تحت الظروف المعملية.

أظهرت النتائج ان العجينة الخام من جميع النباتات المختبرة ذات قدرة عالية فى منع القوقع من التغذية وسجل نبات الصبار **aloe** أعلى قدرة فى منع التغذية بالمقارنة بباقى المستخلصات.

كما أظهرت النتائج زيادة نسبة الموت والتأثير الطارد لنبات الصبار **aloe** زيادة التركيزات المستخدمة بكلا من المذيبين المستخدمين.

كما قل متوسط الإستهلاك اليومى بالجرام لأوراق الخس المعاملة يقل بزيادة التركيزات المستخدمة لجميع المستخلصات المستخدمة.

وأعطت النتائج أفضلية لإستخدام مستخلص الصبار الكحولى حيث أعطت المعملة بتركيز ١٠٠٠جزء فى المليون من مستخلص نبات الصبار الكحولى نسبة موت وصلت إلى ٩٣% ونسبة ٦٨% كمانع للتغذية أو طارد لقوقع الحدائق الأبيض.