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قسم علم الحيوان

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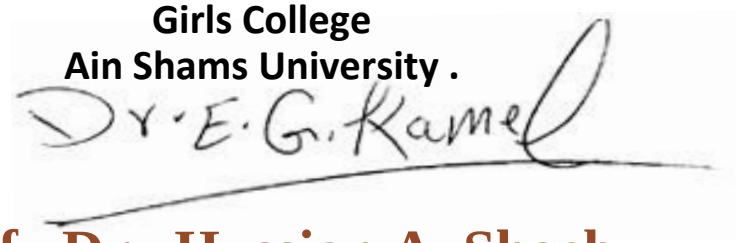

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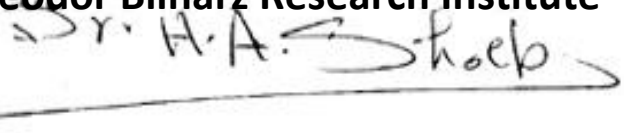

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Abstract

Thirty four plant species were screened for molluscicidal activity against *B. alexandrina* . Only two plant species *V. tinus* and *D. draco* were the most active ones (LC_{90} = 86 & 157 ppm , respectively). So , they were selected for more laboratory evaluations against *B. alexandrina* snails , *S. mansoni* larval stages and snail's infection . The effect of some environmental factors as sun light , river-bed mud , water pH and storage on the molluscicidal activity of both plant species was studied . The activity was affected negatively by storage . The miracidicidal and cercaricidal effect of *V. tinus* against *S. mansoni* was evaluated . Also the effect of the dry powder on the survival rate and fecundity rate of *B. alexandrina* by continuous exposure of adult snails to sublethal concentrations (LC_0 , LC_{10} , LC_{25}) of both plant species was determined . *S. mansoni* cercaria was more tolerant than miracidia . These plants , also , reduced the snail's fecundity and their cercarial production .

A chemical study was also carried out on both experimental plants to investigate their chemical constituents which might have a role in the biological activities of the dry

powder of both plants (about one Kg from each) was extracted with different organic solvents .

Methanol extract of *V. tinus* was subjected to silica gel column chromatography using different elution solvents . Five compounds were obtained from *V. tinus* methanol extract and identified by chemical and spectroscopic analysis [EMS , IR , UV] as oleanolic acid 23 – hydroxyl – 3 α [O – α L - $^{1}C_{4}$ – rhamnopyranosyl (1'' → 2') O α L $^{4}C_{1}$ arabinopyranosyl) oxy] olean – 12 – en – 28 – oic acid (1) , Quercetin 3 – O – α – L – (1 → 4) – rhamnopyranosyl (1 → 2) – $^{4}C_{1}$ glucopyranoside (2) , 5 , 7 , 4' trihydroxy – 3 , 6 , 3' trimethoxy flavones (jaceidin) (3) , 6 α – L (2 caffesyl , 3 dimethoxy cinnamoyl) rhamnopyranosyl catalpol (4) and caffeol iridoid derivative (5) .

One compound was obtained from the methanol extract of *D. draco* by preparative thin layer chromatography (PTLC) and was identified as 2 α , 3 β , 5 α , 25 δ - 2 , 3 , 27 trihydroxy spirostane 3 – O - β – D - apiofuranosyl (1 → 3) β – D – xylopyranosyl (1 → 3) β – D – glucopyranosyl (1 → 2) α – L - rhamnopyranosyl (1 → 3) α – L – rhamnopyranoside .

Conclusion

It is concluded from the present study that the dry powder & Methanol extract of the plants V.tinus & D.draco have toxic effects against B. alexandrina the snail vector of S. mansoni in Egypt as well the free living stages miracidia & cercariae of this parasite .

In addition the sublethal concentrations of these plants suppressed the reproductive capacity of this snails and the production of cercariae from infected ones.

So, the long exposure period of schistosomiasis vector snails to sublethal concentrations of these plants may be of great value for interupting schistosomiasis transmission.

Moreover methanol extract of these plants attenuated the infectivity of S.mansoni cercariae to albino mice and has a promising antischistosomal activity in mice infected with this parasite.

This may contribute to the validity of some Egyptian flora to be an important agent in the field of medicinal plants.

CONTENTS

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INTRODUCTION

Schistosomiasis is a public health problem of special social and economic importance in many developing countries . Its incidence is increasing by dams construction and introducing new irrigation schemes that provide ideal breeding sites for snail borne diseases . Also , the prevalence of this parasite in a human population depends on the number of infected snails in an area .

In Egypt , it is a serious endemic disease , affecting a wide majority of population (Abd El – Wahab et al , 1990) .

Schistosomiasis control can be achieved through sanitation , snail control and chemotherapy (WHO,1993) . Since there is no vaccine available , snail control should remain among the methods of choice for the fight against this parasite even though chemotherapy is playing a leading role in integrated control stratigies in many endemic areas (McCullough et al , 1980) .

Application of molluscicides (synthetic or of plant origin) can confer a rapid and efficient mean of reducing snail populations and transmission of Schistosomiasis (Adewunmi and Furu , 1989) . Moreover , molluscicides may be of economic importance as they destroy the snail vectors of

other trematodes , e.g. fascioliasis whose chemotherapeutic agents are not quite effective (Hostettman , 1984) .

The low concentrations of molluscicides were , also , excepected to curtail the survivorship of schistosomiasis miracidia and cercariae , therefore , reducing the costs of schistosomiasis control , in addition to decreasing the risk of toxicity to non-target organisms present in the aquatic environment (Gawish , 1997; Abd El-Kader and Tantawy , 2000; Gawish and El-Bardicy , 2002 and Mahmoud and Gawish , 2005) . The present available molluscicides showed some physical disadvantages and tend to be , generally , biocides affecting most of the non-target organisms in the water environment (WHO, 1965) . The possible development of resistance in schistosomiasis – transmitting snails to these chemicals is another important factor (Kloos & McCullough, 1982) .

Therefore , there is a great interest in the use of molluscicides of plant origin by local communities in self-supporting system of schistosomiasis control program (Taylor, 1986) . In fact , molluscicides of plant origin seem to be less expensive , readily available , rapidly biodegradable , have low toxicity to non-target organisms and probably easily applicable with simple techniques appropriate to developing

countries (Adewunmi et al , 1990 ; Wang and Song , 1995 ; Mengesha et al , 1997 , Schall et al , 1998 ; Vogg et al , 1999 ; Atlam , 2000 and El-khodary , 2001 and Ibrahim et al , 2004) .

The molluscicidal potency of several plant species were evaluated , allover the world , against the snail borne diseases (Whitfield , 1996) . In Egypt , some plant species showed mollucicidal properties against different snail species , e.g. *Dyzygotheca elegantissima* and *D. Kerchovana* (Refahy, 1994) , *Ammi majus* (Rizk , 1995 and Al-Sharkawy,1996) , *Anagallis arvensis* (El- Emam et al , 1996) *Solanum dobium* (Tantawy et al ,2000) and *S. nigrum* and *Panicum repens* (Ibrahim et al , 2004) .

Some plants that having molluscicidal activity could , also , suppress and / or attenuate the infectivity *S. mansoni* cercariae to the experimental animals (Gawish and El-Bardicy,2004 and Mahmoud and Gawish , 2005). These plant species may exhibit antischistosomal properties (El-Nahas et al , 2006) .

The aim of the work :

This study was designed to evaluate the toxic effect of some plant species to *B. alexandrina* snails through laboratory screening tests for determination of LC_{50} and LC_{90} values .

The promising plant species *Vibornum tinus* and *Dracaena draco* were subjected , as dry powder water suspension , for comprehensive laboratory tests as follow :

1- Effect of certain environmental factors , e. g. water pH , sun light , river-bed mud and storage , on the milluscicidal potency of these plants .
2- Effect of the plant's dry powder on egg-laying capacity of *B. alexandrina* snails .
3- Effect of the dry powder on the free living larval stages of *S. mansoni* (miracidia and cercariae) .
4- Effect of the dry powder on the infectivity of *S. mansoni* miracidia to *B. alexandrina* snails and on cercarial production .
5- The infectivity of *S. mansoni* cercariae to albino mice was dertmined after cercarial exposure to methanol extract from *V. tinus* plant .
6- The antischistosomal properties of methanol and petroleum ether extracts from *V. tinus* and methanol and acetone extracts from *D. draco* were evaluated through oral administration to albino mice infected with *S. mansoni* cercariae .
7- Fractionation , isolation and identification of some active constituents from *V. tinus* and *D. draco* plants were performed .