THE POSSIBLE USAGE OF THE SAPONIN ACTIVE INGREDEINTS IN SOME LOCAL PLANTS FOR SNAIL CONTROL AS SUBSTITUENTS FOR ENVIRONMENTAL HARMFULL SYNTHETIC MOLLUSCICIDES

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The possible usage of the saponin active ingredeints in some local plants for snail control as substituents for environmental harmfull synthetic molluscicides.

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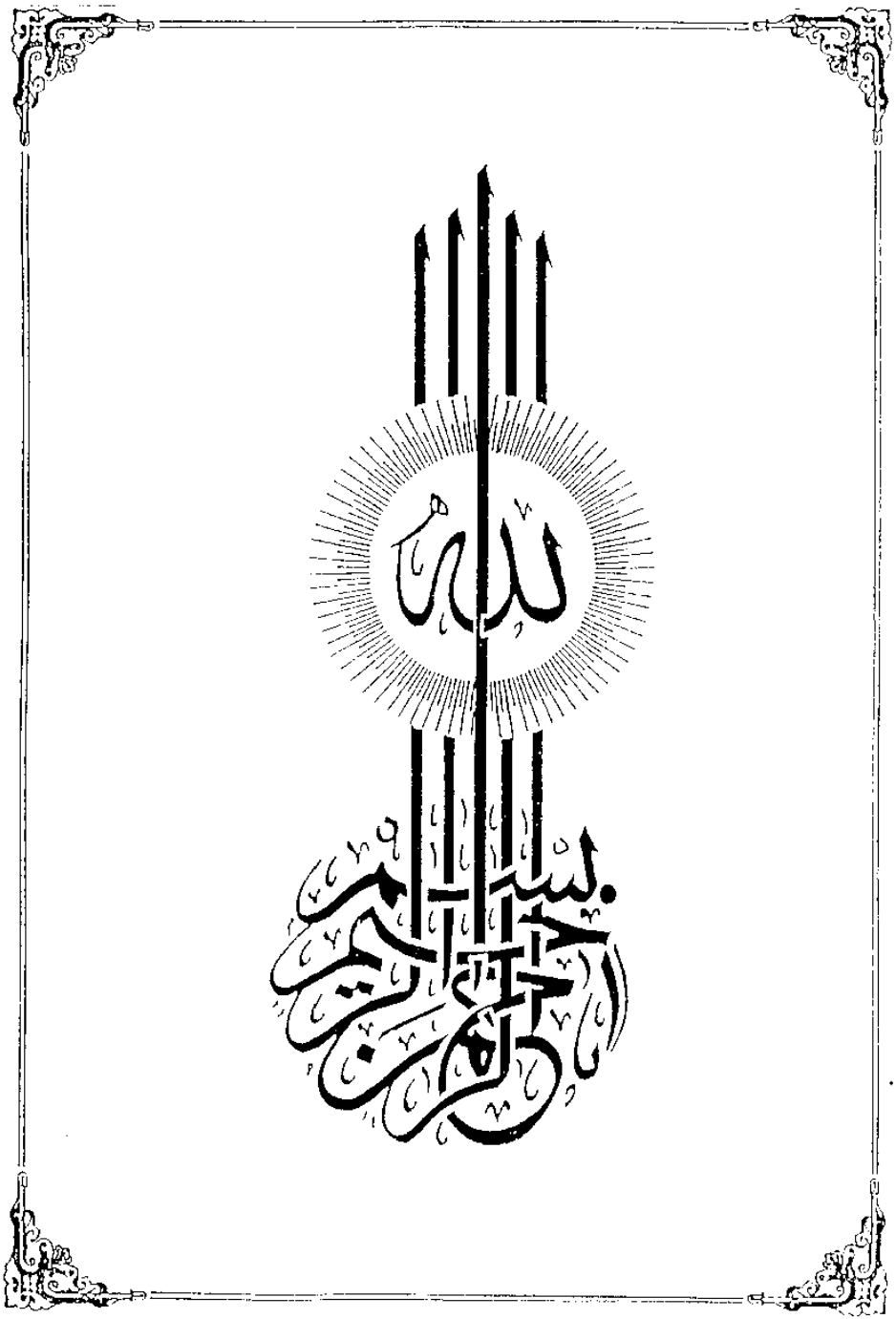

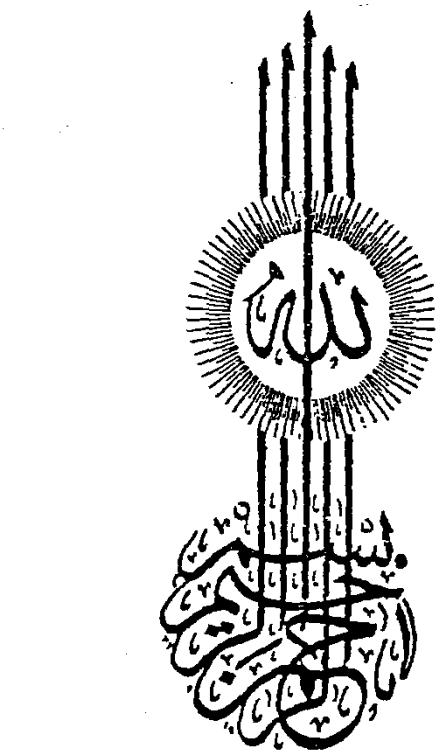

علم الإنسان ما لم يعلم

صدق الله العظيم

(سورة العلق، آية ٥)

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SUMMARY

SUMMARY

A) From the ethanol extract of Agave attenuata four glycosides were chromatographically isolated and purified. They were characterised by IR, ^{1}H NMR and mass spectroscopy as :

1- 3-O-(glycosyl)-26-O-(glycosyl)-(25 S)-5 β-furostan-3 β,22 α,26 triol.

2- 3-O-(glycosyl)-(25 S)-5β -spirostan-3 β-ol.

3- 6 Methoxy apigenin 7-O-glycoside.

4- Quercetin glycoside.

B) From the ethanol extract of Agave lophantha four glycosides were chromatographically isolated and purified. They were characterized by IR, ^{1}H NMR and mass spectrascopy as:

5- 3-O-(glycosyl)-5 α-spirostan-3 β ol.

6- 3-O-(glycosyl)-(25 R)-5β-spirostan-3 β ol.

7- 3-O-(glycosyl)-(25 R)-5 α-spirostan-3 β ol.

8- 3-O-(glycosyl)-(25 S)-5β -spirostan-2 β,3 β-diol.

C) Screening of 50 plants for molluscicidal activity was carried out to select the most active plants for detailed investigations.

D) Investigations on the molluscicidal properties of the dry powder of Agave attenuata and Agave lophantha under the effect of some simulated field conditions were carried out towords Bulinus truncatus, Biomphalaria alexandrina the intermediate host of schistosomiasis and Lymneae cailliaudi the intermediate host of fascioliasis.

E) The molluscicidally active ingredients of Agave attenuata were proved to be the steriodal glycoside (2) and the flavonoid glycosides (3,4).
In the case of Agave lophantha, the steriodal glycosides(5-8) were found to be the molluscicidally active constituents.

F) Correlation between the structure of compounds 1-8 and their molluscicidal activity towords Biomphalaria alexandrina indicated that whereas the monodesmosidic steriodal saponins (2, 5-8) showed highest activity, the bidesmosidic glycosides (1) was inactive and the flavoniod glycosides (3,4) were moderately active.

G) Liver function tests measured by serum albumn changes or increased hepatic enzymes did not show any significant changes from normal value in animals treated with sarsapogenin and smilagenin glycosides (2 and 6).

INTRODUCTION AND AIM OF THE WORK

Human schistosomiasis, bilharziasis disease, is one of the major problems of increasing importance in different parts of the world. The disease infects more than 200 millions people in more than 73 countries in tropical and subtropical regions. It headed the list of communicable diseases in Egypt, both as regards its prevalence and its repression on the national economy.

Childern acequire the disease early in the life in rural endemic areas and hence the disease is now considered a pediatric health problem. Besides the occupational and environmental hazard it has been reported that schistosomiasis increased as a result of the construction of new irrigation systemes.

Numerous schistosomiasis projects in Egypt, Brazil, Ghana, phillippines, Venzueal and elsewhere have shown that schistosomiasis control by molluscicides e.g. chemotherapy, environmental measures, health education, etc can be a rapid and efficient means of reducing or eliminating transmission. Up tell now, snail control procedures including mollusciciding remains among the methods of choice for the control of schistosomiasis even though selective population chemotherapy may, in future, play a leading role in integrated control stratigies in many endemic areas (McCullough, F.S. 1980).

It is known that the cost effectiveness of molluscicide is greater where the volume of water to be treated per person at risk is small. However, molluscicide can be also effective in large, flowing or static water-bodies as schistosomiasis transmission tends to be focal rather than wide-spread. The cost of molluscicide operation may differ markedly from one endemic area to anthor in terms of persons protected. Figures of 1-4 US dollares per capita annually have been reported (McCullough,F.A. 1980).

Beside the slow relase technique, the most marked change during the last few years have been the switch in strategy from area wide to focal and seasonal control of the snail hosts (WHO 1983).

The disadvantage of synthetic molluscicides namely their high costs, bought with scarce hard currency, and their pollution effect on the environment led many developing countries to avoid the dependence on chemical snail control programmes (Doffala,A.A 1952),(Msagi,A.S. 1965).

Whereas synthetic chemicals biodegrade slowly preliminary evidence suggests population of snail hosts may have developed resistance to them. In view of these considerations, national and international institutions are both currently giving increasing attention to the study of plant molluscicides in the hope that they may prove cheaper, more easly

available and simply applicable using techniques apporpriate to devolping country.

A relatively high proportion of the plants tested for molluscicidal activity since 1930s were selected on the basis of medicinal properties or general knowledge of toxicity. Though more than 2000 plant species have been tested for molluscicidal activity, only few plants have reached field trials but found unsufficient for large scale application e.g. Phytolacca dodecandra known as endod (WHO 1981), (Lemma,A. 1970).

Aim of the work:-

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applicable plants.

It is aimed in the
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Aim of the work:-

Owing to :-

a- The disadvantages of synthetic molluscicides, mainly their high costs and being imported with scarce hard currency.

b- The hope that plant molluscicides may be cheaper, easily available, simply applicable and more safe than synthetic molluscicides.

c- The difficultes arisign with the present field applicable plants.

It is aimed in the present thesis to investigate some local plants that may be of importance in snail control at the field level.

The plane of work :-

1- Screening of 50 local plants for molluscicidal activity.

2- Investigating the molluscicidal properties of the two plants Agave attenuata and Agave lophantha under the effect of some simulation field conditions (sun, mud, time of exposure, temperature, pH and storage).

3- Trials at the isolation of some of the molluscicidally active chemical constituents via chromatographic techniques.

4- Trials at the structure elucidation of the isolated chemical constituents via IR, NMR and Mass spectroscopy.

5- Toxicological studies on the liver functions of mice.