SOME PHARMACOLOGICAL STUDIES ON A FLAVONE GLYCOSIDE OF NYCTANTHES ARBORTRISTIS (HARSINGHAR)

A. K. SRIVASTAVA**, R. L. KHARE*, R. K. UDADHYAY*, A. K. JHA**, J. S. DANGI** and NARESH TALWAR**

Department of Pharmaceutical Science, Dr. H. S. Gour Vishwavidyalaya, Sagar, Madhya Pradesh India*
And
Department of Pharmacy, B. N. College, Udaipur, Rajasthan**, India

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ABSTRACT: A flavones glycoside isolated from the bark of ayurvedic plant, Nyctanthes arbortristis was subjected to various pharmacological studies. The glycoside was found to be effective on, cardiovascular system and smooth muscles of intestine but no significant effect was found on CNS. The glycoside exhibited promising anti-inflammatory activity.

INTRODUCTION

Nyctanthes arbortristis (Oleaceae) is a small genus of shrubs and small trees occurring in Indo-Himalayan region. Only one species of this genera, namely Nyctanthes arbortristis is native to India.1 In ayurveda the leaves are used in chronic fever, obstinate sciatica2, coughs3, malaria, constipation, intestinal worms and excessive diuresis, flowers are used as stomachic, carminative, astringent to bowel, anti-inflammatory and hair tonic4 and the bark is used in coughs to promote expectoration of thick phlegm5. Flowers contain nyctanthin6, D-mannitol, astragalin and nicotiflorin7. Leaves contain tannic acid, methyl salicylate8, carotenes, ascorbic acid9, hentriacentane, B-amyrin10, friedelin, lupeol, oleanolic acid11 and an tridoid glycoside – nyctanthoside12 . Heartwood is reported to contain a flacanone glycoside13.

In the present study an attempt was made to investigate the pharmacological activities of the flavanone glycoside isolated from the bark of the plant.

MATERIALS AND METHODS

Collection of crude drug and isolation of glycoside

The plants growing in the university campus were identified by Dr. Pramod Khare, Department of Botany, Dr. Hari Singh Gour Vishwavidyalaya, Sagar (M.P.). The bark was collected and dried in shade.

The coarsely powdered bark was extracted with alcohol (95%) and the extract was concentrated and filtered. Filtrate was fractionated with benzene and n-butanol. When the n-butanol extract was concentrated to give a viscous mass which was dissolved in minimum quantity of methanol and diluted with benzene, a pasty precipitate appeared. The benzene layer was poured off and the pasty material was extracted with solvent ether and ethereal layer was discarded. The residue was dissolved in water and filtered. The filtrate was concentrated and kept in a refrigerator overnight. A crystalline solid appeared, which was separated and dried under vacuum. The solid obtained was subjected to qualitative chemical analysis and was
found to be a flavanone glycoside (Mg/HCl test). The crude glycoside was further purified by column chromatography using benzene: methanol mixtures in various proportions. The spectral analysis of the glycoside is in progress.

Pharmacological Screening

i) Effect on blood pressure of cat

The glycoside was administered intramuscularly in a dose of 5mg/kg body weight. The blood pressure was recorded after every two minutes.

ii) Effect on perfused heart of frog

The effect of the glycoside was investigated on perfused heart of frog as described by Burn.14

iii) Effect on isolated intestine of rabbit

The effect of glycoside was investigated on isolated intestine of rabbit in doses of 6.25, 50 and 125µg/ml of both. The effect on atropinized (3.25 µg/ml) intestine was investigated in dose of 125µg/ml. Further, glycoside in dose of 50µg/ml was utilized to study the effect on spasm induced by acetylcholine (0.5µg/ml).

iv) Effect on pentobarbitone sleep time

The glycoside was given to overnight fasted groups of albino rats (80-120g) in a single dose 20 mg/kg body weight and after 30 minutes they were given pentobarbitone 25 mg/kg body weight (i.p.). Control group was given distilled water instead of the glycoside. The time between the loss and the gain of righting reflex was noted as sleeping time and compared with that of control group.15

v) Effect on carrageenin – induced odema

Anti-inflammatory activity of the glycoside was investigated by carrageenin induced oedema method16,17. Glycoside in doses of 10, 30, 50 and 80 mg/kg body weight (i.p) was administered. The activity was compared with phenylbutazone (100 gm/kg body weight, i.p) Groups of 6 albino rats were used for each study.

RESULT AND DISCUSSION

i) Effect on blood pressure of Cat

The glycoside decreased the blood pressure of cat by 6mm of Hg and the effect lasted for 15 minutes.

ii) Effect on perfused heart of frog

The glycoside induced a depressant effect on frog’s perfused heart. At a dose of 100 µg the percent decrease in heart rate was found to be 35.64% and the heart was arrested for 90 seconds, while acetylcholine (0.2 µg) produced 46.6% decrease in heart rate. In the atropinized (130 µg) heart the glycoside produced 6.67% decrease in heart rate. These observations suggest that the glycoside possessed muscarinic action which was antagonized by atropine.

iii) Effect on isolated intestine of rabbit

The glycoside exhibited dose dependant increase in contraction of the smooth muscles. Unlike acetylcholine, the stimulant action of the drug was transient and the muscle approached its original tone without washing. However this stimulant action was antagonized by atropine. Further, the glycoside modified the acetylcholine-induced spasm and the effect of acetylcholine was reduced.

iv) Effect on pentobarbitone sleep time

The glycoside exhibited dose dependant increase in contraction of the smooth muscles. Unlike acetylcholine, the stimulant action of the drug was transient and the muscle approached its original tone without washing. However this stimulant action was antagonized by atropine. Further, the glycoside modified the acetylcholine-induced spasm and the effect of acetylcholine was reduced.
The glycoside did not show any significant change on sleeping time of rats induced by pentobarbitone.

v) **Effect on carrageenin-induced oedema**

The glycoside showed remarkable anti-inflammatory activity. In dose of 10, 30, 50 and 80 mg/kg body weight percent inhibition of oedema was found to be 8, 25, 39 and 65 respectively. The references drug phenylbutazone exhibited 72 percent inhibition.

In these preliminary experiments a trial was made to investigate some pharmacological activities of the isolated flavanone glycoside. It was found to exhibit slight hypertensive effect and spasmolytic effect on the smooth muscles of CVS. It showed spasmogenic effect on smooth muscles of GIT (**in vitro**) but did not show any significant activity on CNS. The glycoside exhibited promising anti-inflammatory activity.

These studies suggest that the glycoside can be further exploited for clinical anti-inflammatory trials.

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