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SCREENING OF SKELETAL MUSCLE RELAXANT ACTIVITY OF PLANT *VICIA FABA*

Kalakonda Rajesh[1], Kadiri Sunil Kumar[2]

[1]Department of Pharmaceutical chemistry, Vijaya College of Pharmacy, Munaganoor – 501511, Hyderabad, A.P, INDIA
[2]Department of Pharmacology, Vijaya College of Pharmacy, Munaganoor – 501511, Hyderabad, A.P, INDIA

***Corresponding author e-mail:** *kalakonda.rajesh@gmail.com*

ABSTRACT

The study was designed to investigate the skeletal muscle relaxant activity of vicia faba (400mg/kg, p.o) by using rota rod apparatus. Experiments were carried out on albino mice and the animals were randomly allotted to the different control, test and standard (diazepam 4mg/kg, p.o) groups. The methanolic extract significantly reduced the fall off time (4.33sec) in comparision with the fall off time of control treated animals (11.6 sec). This reduction in fall off time observed in test extract animals placed on rotarod apparatus indicates motor incoordination. As it is evident from phytochemical studies that vicia faba leaf extract possess tannins and hence the observed skeletal muscle relaxant activity may be attributed to tannins.

Key words: Skeletal muscle relaxant activity, Methanolic extract, Vicia faba.

INTRODUCTION

Skeletal muscle relaxants are used to treat muscle spasm and spasticity. Muscle spasm is defined as a sudden involuntary contraction of one or more muscle groups and is usually an acute condition associated with muscle strain (partial tear of a muscle) or sprain (partial or complete rupture of a ligament). Skeletal muscle relaxants consist of both antispasticity and antispasmodic agents, a distinction prescribers often overlook.[1] The antispasticity agents-baclofen, tizanidine, dantrolene, and diazepam-aid in improving muscle hypertonicity and involuntary jerks. Antispasmodic agents, such as cyclobenzaprine, are primarily used to treat musculoskeletal conditions. Vicia faba, also known as the broad bean, fava bean, faba bean, field bean, bell bean, or tic bean, is a species of bean (Fabaceae) native to North Africa, southwest and south Asia, and extensively cultivated elsewhere.[2] From the Literature review it is evident that vicia faba leaves contain saponins, steroids, tannins[3,4] and alkaloids. Therefore, the observed skeletal muscle relaxant activity may be attributed to these compounds.

MATERIALS AND METHODS

Preparation of Extraction: For this study, the leaves of vicia faba were collected from the surrounding gardens of the Nalgonda (dist). Fresh leaves of vicia faba were authenticated by a botanist and voucher specimens have been deposited at the museum of the college. Fresh mature leaves were shade dried at room temperature, coarse powdered and extracted with methanol by soxhlet's extraction method. Thereafter, the extracts were concentrated using electric water bath to obtain semisolids crude extract. The percentage yields of the leaf extract were found to be 7.8% and 9.7% respectively. The extract was stored in airtight container in refrigerator below 10ºc. Appropriate concentration of stock solution of extract were prepared using distilled water and used for

phytochemical investigation and invivo skeletal muscle relaxant activity.

***Experimental animals*:** Albino mice (20-26g) were used in the experiments. They were procured from sainath agencies, musheerabad, hyderabad. After randomization into various groups and before initiation of experiment, the mices were acclimatized for a period of 10 days. Animals were housed in polypropylene cages and maintained under standard environmental conditions such as temperature (26 ± 2ºc), relative humidity (45-55%) and 12hr. Dark/light cycle. The animals were fed with rodent pellet diet (Golden Mohur Lipton India Ltd.) and water ad libitum. The study protocol was approved from the institutional animal ethics committee (IAEC) before commencement of experiment. (1230/a/08/CPCSEA)

ACUTE TOXICITY STUDIES: A dose of 400mg/kg of vicia faba is selected for the present study as this dose is safer and available in the literature.[5]

SKELETAL MUSCLE RELAXANT ACTIVITY BY USING ROTA ROD APPARATUS IN ALBINO MICE

Procedure: Animals were weighed and marked. They were divided into 3 groups i.e control(C) test (T) and standard (S) each consisting of 3mice. Group I served as control which received distilled water, animals of group II received the vicia faba at a dose of 400 mg/kg , p.o and group III received standard diazepam (4mg/kg, p.o). Swiss albino mice underwent a pretest on the apparatus. Only those animals, which had demonstrated their ability to remain on the revolving rod (20 rpm) for 5 min, were used for the test.. The animals were placed on the rotating rod and fall off time i.e, when the animal falls from the rotating rod, was recorded, which was taken as grip strength.

Statistical analysis: The values are represented as mean ± S.E.M, and statistical significance between treated and control groups was analyzed using One way ANOVA, Followed by student t test where $P<0.001$, $P<0.01$ and $P<0.05$ was considered statistically significant**.**

RESULTS AND DISCUSSIONS

***Phytochemical Screening*:** The results of the preliminary Phytochemical screening of Methanolic extract of Vicia Faba leaves have been presented below in Table I. Table II, III, and IV indicates the fall off time in control, test (vicia faba leaves extract) and diazepam treated groups.

DISCUSSION

The present results showed that the methanolic extract of Vicia faba leaves posses a significant skeletal muscle relaxant activity in experimental rats. At dose of 400mg/kg it showed highly significant skeletal muscle relaxant activity at 30min of duration. Preliminary phytochemical screening reveals the presence of tannins flavonoids , steroids, saponins, reducing sugars in the plant extract. Therefore, the observed skeletal muscle relaxant activity may be attributed to these compounds. Further studies are in progress to isolate the active constituents responsible for this activity.

CONCLUSION

Based on the results of the present study, we conclude that the methanolic extract of Vicia-Faba possess significant skeletal muscle relaxant activity. However, further studies are necessary to find the exact mechanism of skeletal muscle relaxant effect and to isolate the active compound(s) responsible for this pharmacological activity.

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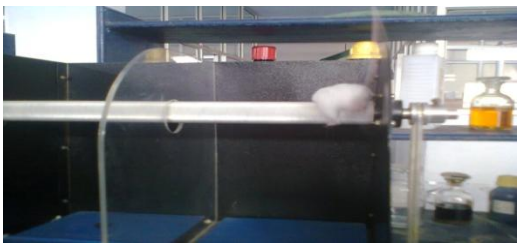

Figure I and II: Fall off time in albino mice recorded by using Rota rod apparatus

TABLE NO.I (Phytochemical screening)

Phytochemical constituents	Chloroform Leaf Extract
Carbohydrates	+
Steroids	+ +
Saponins	+ + +
Reducing sugars	+ + +
Glycosides	+
Flavonoids	+ + +
Alkaloids	+ +
Tannins	+ + +
proteins	-

– Absent ++ more clarity
+ indicates presence +++ better response

TABLE. NO: II (CONTROL: DISTILLED WATER)

S.NO	BODY WEIGHT(g)	BODY WEIGHT(g)	VOLUME OF DISTILLED WATER TO BE ADMINISTERED (ml)	FALL OFF TIME IN SECONDS
1	22	8.8	0.22	19
2	23	9.2	0.23	07
3	22	8.8	0.22	09

AVERAGE – 11.6 (Sec)

TABLE. NO: III (TEST: METHANOLIC EXTRACT 400mg/kg)

S.NO	BODY WEIGHT(g)	DOSE (mg/kg)	VOLUME OF EXTRACT TO BE ADMINISTERED (ml)	FALL OFF TIME IN SECONDS
1	22	8.8	0.22	06 ±0.14***
2	27	10.8	0.27	05±1.04
3	21	8.4	0.21	02±0.74*

AVERAGE – 4.33 (Sec)

P<0.001***, P<0.01** and P<0.05* was considered statistically significant

TABLE NO: IV (STANDARD: DIAZEPAM 4mg/kg)

S.NO	BODY WEIGHT(g)	DOSE (mg/kg)	VOLUME OF SELINE TO BE ADMINISTERED (ml)	FALL OFF TIME IN SECONDS
1	21	0.084	0.21	04±0.61***
2	24	0.096	0.24	02±0.15**
3	20	0.080	0.20	02±0.42*

AVERAGE – 2.66 (Sec)

P<0.001***, P<0.01** and P<0.05* was considered statistically significant

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