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Skeletal Muscle Relaxation Activity of the Ethanolic Extract of Turmeric on Wistar Rats

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Abstract: Several medications derived from traditional goods have been created in recent years, and contemporary drug research is actively studying the therapeutic effects of several Ayruvedic and Traditional Indian medical remedies. Turmeric is one of the plants being researched. Ethanolic extract of Turmeric contain Curcuminoids are the most important active component. Curcuminoids are phenolic chemicals that are extensively used as a spice, color, and anti-inflammatory agent. Smooth muscle relaxant effects of C. longa, were comparable to those of Diazepam, which could be due to the possible interaction with non-adrenergic non-cholinergic nervous system. The effect on motor co-ordination was assessed using Rota rod apparatus.

Keywords: C. longa, Ethanolic extract, Wistar rats, Diazepam.

I. INTRODUCTION

Curcuma longa L.'s common name is turmeric. (Zingiberaceae) is a perennial plant that is widely grown in India and Southeast Asia. C. Longa cultivation need a hot (20–30 °C) humid climate with enough of water. Curcumin, demethoxycurcumin, and bisdemethoxycurcumin are all found in turmeric, as well as volatile oils (such as tumerone, atlantone, and zingiberone), sugars,[1] proteins, and carbohydrates, Resins. Curcumin (diferuloylmethane), the plant's most significant component responsible for C. longa biological activities and is the source of the bright yellow colour. C. longa has a long history of use in Indian cuisine[2, 3] and in Ayurvedic medicine for the treatment of inflammatory diseases. This plant has a number of pharmacological qualities, including anticancer, antibacterial, anti-inflammatory, antioxidant, anti-apoptotic, and acetylcholinesterase inhibitory actions.[4]

Skeletal muscle is also known as striated somatic muscle and voluntary muscle, depending on whether the descriptor is based on appearance, position, or innervation. Individual cells or fibres differ significantly in size, ranging from over 6 inches in length to less than 0.04 inch. The sarcolemma, a complex membrane that surrounds these fibres, prevents them from branching. There are multiple nuclei within each fibre, hence it is a suncytium generated by the fusing of numerous progenitor cells. [5]The transverse striation of skeletal muscle is made up of a distinctive pattern of light and dark bands, each of which is constricted. The arrangement of the two sets of sliding filaments, as well as the connection between them, determines the appearance of these bands.[6, 7]

Figure 1: C. longa

II. MATERIALS AND METHODS

A. Collection of Plant Material

The rhizomes of C. longa were collected in the month of September 2020 from rural area of Uluberia, Howrah, West Bengal, India. The rhizomes was identified by Head of the Department, Department of Pharmacognosy, Bharat

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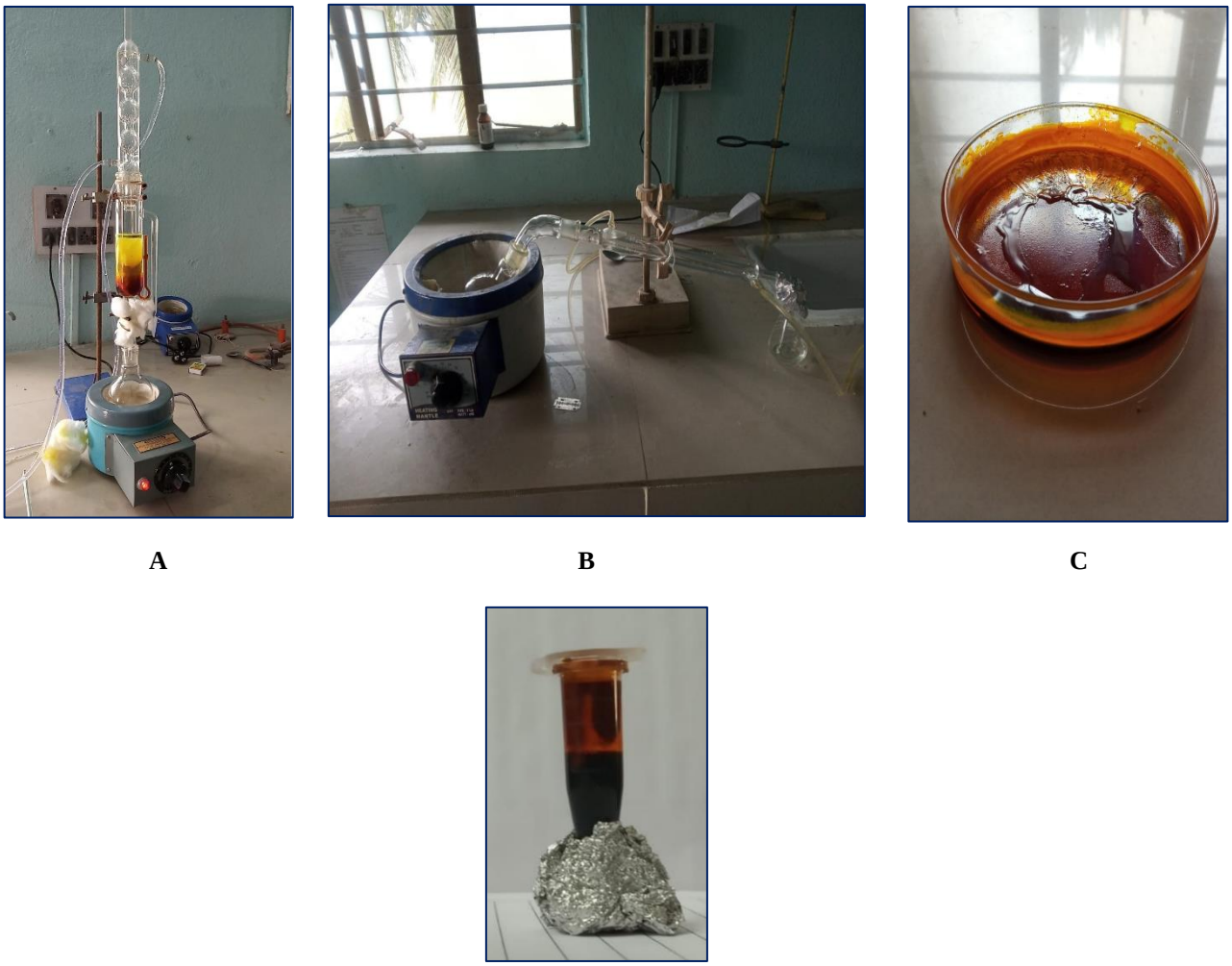
technology, Uluberia, Howrah. The rhizomes were cleaned by distil water and dried under sunlight for 20 days. Coarsely powdered, and stored under air tight container for further study.

B. Preparation of Ethanolic Extract [7, 8]

The coarse powder is collected and weighted, 40gm of coarse powder is added to 80ml petroleum ether and left for 48 hrs with occational shaking. The mixture is filter and the filter cake is collected, dried under the fan. The coarse the powder was extracted by Soxhlet apparatus using 100ml of ethanol. Removed solvent from extract by simple distillation. After removal of solvent, it was subsequently partitioned with Chloroform. Then the drug is collected in Eppendorf tube and storage in the refrigerator (5-8 ^{0}C) until the use.



A **B** **C**

D

Figure 2: Extraction of rhizomes of C. longa (A), Distillation of extracted drug (B), Evaporation of extracted drug(C), Storage of extracted drug (D)

C. Phytochemical Screening [9]

The ethanolic extract of rhizomes of C. longa was subjected to preliminary phytochemical screening for the detection of major active compound. The result of different chemical tests on the ethanolic extract of C. longa showed the presence of alkaloids, amino acids, carbohydrate, flavonoids, glycosides, protein, tannins, and phenolic compounds.

D. Selection and Maintenance of Animals

Healthy adult albino rats (Wistar rats) of either sex, weighing between 160 gm and 200 gm were obtained from M/S Sadhukhan Enterprises, Uluberia, West Bengal, India. The animals were acclimatized under laboratory condition in a polypropylene cage for 2 weeks before the starting of experiments. They were provided with standard diet and water and maintained under standard conditions of temperature (24 ± 1 ° C) and humidity (49%) with an alternating 12 h

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light/dark cycles. All the studies were conducted in conformity with the proper guidance for care and standard experimental animals study ethical protocols.

E. Acute Toxicity Test [10]

C. longa shown toxic effect of ethanolic extract of rhizomes in rats in high dose. Albino mice selected by random sampling technique were employed in this study. The animals were fasted for 3 hr. with free access to water only. The extract administered orally at a dose of 4 mg/kg initially and observed mortality, all mice were live normally then 50 mg/kg and 400 mg/kg also resulted that all mice were normally alive, after final toxicity pass 2000 mg /kg. The final acute toxicity test is passed out the ethanol fraction (Alkaloid) of Curcuma longa was 2000mg/kg orally.

F. Experimental Design

After 14 days accilmatization, male wistar rats will be randomly divided into three groups (n=6). The wistar will be pre-treated daily with extract rhizomes of C. longa (500mg/kg), then wistar rats will be treated with Diazepam, 4mg/kg,p.o. Each group will receive the following treatment.

Group I-(Normal control):

Will receive clean water and normal food. No drug given.

Group II-(Standard):

Will receive Diazepam (4 mg/ kg) for one time.

Group III-(Test):

Will receive extracted drug from rhizomes of C. longa (500mg/kg; p.o.)

After given the all dose measure the hang over time of all groups' animals and take the reading after induced (0hr, 0.5 hrs, 1hrs, 1.5hrs, 2hrs).

G. Statistical Evaluation

Result will be expressed Mean ± SEM from 6 animal in each group comparison the groups made by using one way analysis of variance (ANOVA) followed by dunnett's multiple comparison test using graph pad prism version 9. $P<0.05$ will be considered as stastically significant.

III.RESULTS AND DISCUSSION

A. Effect of administration of diazepam (4mg/kg;op)in Wistar Rats:

In diazepam (4mg/kg;op)treated group II. The hanging time was found (30 min intervalve) 132±1.366, 102±1.32, 72.33±1.45, 42.17±2.056.

B. Effect of administration of extracted drug from rhizomes of C. longa (500mg/kg; p.o.) on Wistar Rats:

Curcumin 500 mg /kg treated group III, hanging time was found 145.833±0.401, 121.67±1.994, 92.05±1.355, 52.33±1.06.The above value has decrease the hanging time compare to group II.

Table 1. Effect of ethanolic extract of rhizomes of C. longa on Wistar rats.

Group	Treatment	Dose	Reaction (hanging)/ 15 Sec drug administration in different time				
			0 min	30 min	60 min	1.30 hr.	2 hr
1	**Normal**	-------	152.67±3.051	152.67±3.051	152.67±3.051	152.67±3.051	152.67±3.051
2	**Standard**	4mg/kg	152.67±3.051	132±1.366**	102±1.37**	72.33±1.45**	42.17±2.056**
3	**Test**	500mg/kg	152.67±3.051	145.833±0.401*	121.67±1.994**	92.05±1.355***	52.33±1.06**

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Figure 3: Test on muscle relaxant on Rota rod

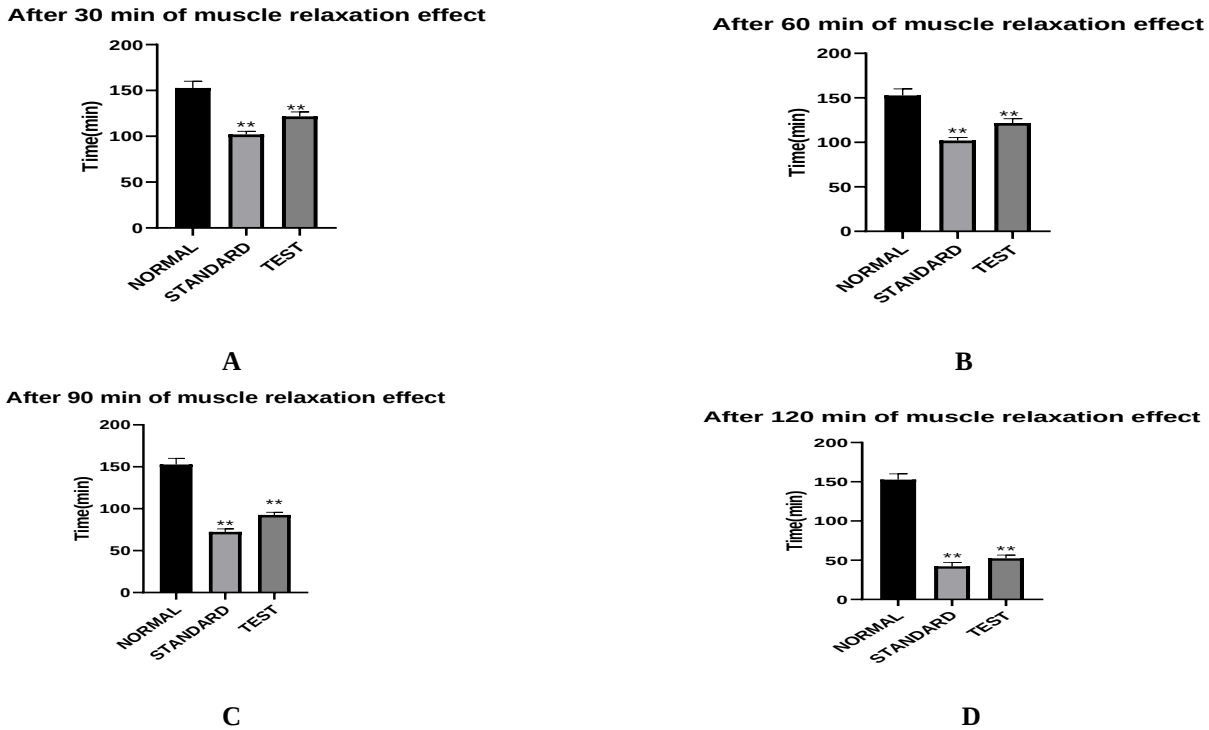

Figure 4: Graphical representation effect on muscle relaxant of Curcuma longa extract (A, B, C, and D).

Phytochemicals, such as alkaloids and flavones, have been discovered in practically all plants and their parts. The current findings suggest that the various extracts from C. longa have a considerable muscular relaxing effect. The most hazardous extract was the methanolic extract. In terms of the extracts' LD50 values and toxicity classification, the methanolic extract is "somewhat hazardous," whereas the ethanol extract is "low toxic." As a result, these agents may be responsible for muscle relaxant activity. The fact that the activity was detected in polar fractions, and flavonoid glycosides are polar and water soluble molecules, backed up this theory. To better understand the interaction of active components with passive components, more research is needed, [12] including separation of the different fractions of the rhizome and radioligand binding techniques benzodiazepine receptors (or sites). There are three different groups of rats in this experiment. The first is Normal, the second is Standard, and the third is a test. Normal is treated with polyethylene glycols, which have little effect. The second group was given diazepam and had to exhibit their activities after a 30-minute delay. They reveal that as time passes, the muscular relaxing effect becomes stronger. The test group was given an ethanolic extract of curcumin and showed rat activity after 30 minutes.[12] They reveal that as the amount of time passes, the effect of muscular relaxation increases.

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IV. CONCLUSION

The present study reveals that the ethanolic extract of Curcuma longa significantly improve the muscle relaxant, Thus it concluded that the alkaloid contain extract of rhizome of curcuma longa having significant muscle relaxation activity on rats.[13]

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