OPEN ACCESS
Saudi Journal of Medical and Pharmaceutical Sciences
Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) |ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com/journal/sjmps/home

Original Research Article

An Experimental Study for Muscle Relaxant Property of Cuminum Cyminum in Albino Rat

Kamal Kishore Khichi[1*], Akhtar Ali[2], Anusuya Gehlot[3], Rajkumar Rathore[4]
[1]Associate Professor, Department of Pharmacology, Dr. S.N. Medical College Jodhpur, Rajasthan, India
[2]Resident, Department of Pharmacology, Dr. S.N. Medical College Jodhpur, Rajasthan, India
[3]Sr. Professor, Department of Pharmacology, Dr. S.N. Medical College Jodhpur, Rajasthan, India
[4]Professor, Department of Pharmacology, Dr. S.N. Medical College Jodhpur, Rajasthan, India

***Corresponding author:** Kamal Kishore Khichi
| **Received:** 07.02.2019 | **Accepted:** 16.02.2019 | **Published:** 28.02.2019
DOI: 10.36348/sjmps.2019.v05i02.008

Abstract

Aim: To evaluate muscle relaxant property of Cuminum Cyminum in albino rats. ***Methodology:*** This is an experimental study conducted at Department of Pharmacology, Dr. S. N. Medical College, Jodhpur (Rajasthan) on albino rats to find out the muscle relaxant property of Cuminum Cyminum standard drug was diazepam. Adult albino rats of either sex (100-150g) were divided into 3 groups. Group I consisting of 6 animals, served as control and received distilled water. Group II subdivided into three groups II-A, II-B, II-C, consisting of six animals each, received Cuminum cyminum in three doses of 300mg, 750 mg, 1000mg per orally respectively. Group III subdivided into three groups III-A, III-B, III-C, consisting of 6 animals each, received the standard drug in three doses per orally. ***Result:*** Cumin were tested as muscle relaxant and compared with diazepam as standard drug. P- value for fall-off time was not significant in all the three doses of Cuminum cyminum. Fall-off time was decreased by 0.70%, 0.91%, 2.40%, respectively with all the three doses of Cuminum cyminum. ***Conclusion:*** Skeletal muscle relaxant property of Cuminum cyminum aqueous solvent extract was not significant. It may be because extract got heat thermal degradation so it may be lost some of its property. According to some studies and animal models cumins alcohol solvent extract is having muscle relaxant property while it is having relaxant property for tracheal smooth muscle.

Keywords: Cuminum Cyminum, Muscle Relaxant, Albino Rat, Diazepam.

INTRODUCTION

Cumin is popular as a culinary spice and used in folklore therapy because of the presence of aromatic substances in the herb. Cumin comes under the category of traditional spice from middle ages. It was too much popular, because of its peppery flavor. During the middle ages in Europe, cumin became as an icon of love and fidelity and also some people want to carry cumin in their pockets to give in wedding ceremonies. Cumin is a small hairy, brownish in color, boat-shaped seed plant that has a spicy sweet aroma property and powerful slightly bitter and pungent flavor [1].

Spices also have numerous medicinal properties and used to treat several disorders that form an important part of the Ayurvedic Pharmacopoeia (Indian System of Medicine). Spices have an increasingly larger role to play in Indian recipes as the bactericidal, bacteriostatic, fungistatic, antifertility, antihelminthic and other medicinal properties and also believed to aid digestion. In the traditional Indian system of medicine, more than a few spices and herbs have held and possess several medicinal properties such as antithrombotic, anti-atherosclerotic, hypolipidemic, anti-inflammatory, anti-aggregatory, eicosanoid inhibitor [2].

Cumin seeds contain aldehyde (60%) fats, amino acids, flavonoids and glycosides (22%), volatile oil (2-5%) and the yellow colored fresh oil contains cuminaldehyde as its chief component [3, 4]. The majority of compounds occurring in cumin are cuminaldehyde, limonene, α- and β-pinene, 1, 8-cineole, *o*-and *p*-cymene, α- and γ–terpinene, safranal, and linalool.

The cumin fruit contains resin, fatty matter, gum, lignin, protein bodies, and salts, largely composed of malates, extractive, and volatile oil. The proximate composition of the seeds indicates that they contain fixed oil (approximately 10%), protein, cellulose, sugar, mineral elements and volatile oil [5]. Cumin seeds contain volatile oil (1–5%) that imparts the characteristic aroma to the seeds. After the separation, a

plenty number of phenolic compounds are identified in cumin fruits that include phenolic acids, flavonoids, phenolic diterpenes, that are closely associated with their antioxidant activity and play an important role in inhibiting lipid peroxidation and various types of oxidizing enzymes [6]. The identified essential oils in cumin are octanol, limonene, thymol, anisyl alcohol, cuminaldehyde, anethole, vanillin and also benzoic acid. Te presenting organic acids in cumin are aspartic, citric, malic, tartaric, propionic, ascorbic, oxalic, maleic and fumaric acids and phenols are salicylic acid, gallic acid, cinnamic acid, hydroquinone, resorcinol, p-hydroxybenzoic acid, rutin, coumarine, and quercetin. Te cumin oil is used as a fragrance component in cosmetics (maximum use level of 0.4% in perfumes.

Cumin is having beneficial effects on several diseases but it is not scientifically stabilized properly so here we are doing an experimental study to stabilize the muscle relaxant property of Cuminum cyminum.

METHODOLOGY

The present study was conducted in the Department of Pharmacology, Dr. S. N. Medical College, Jodhpur, (Rajasthan). The designing of methodology involves a series of steps taken in a systematic way in order to achieve the set goal under the prescribed guidelines and recommendations. It includes in it all the steps from a field trip to the observation including selection and collection of the medicinal plant, selection of dose value, standardization protocol, usage of instruments, preparation of reagents, selection of specific solvents for extraction, the formation of protocols and final execution of the standardized protocol. All these require good build of mind and soft technical and to handle the materials and procedures in a truly scientific manner.

Experimental Animals

The albino rates were used as experimental animals. Adult albino rats of either sex (100-150g) were divided into three groups for each parameter under study. Group I consisting of six animals, served as control and received distilled water. Group II subdivided into three groups II-A, II-B, II-C, consisting of six animals each, received Cuminum cyminum in three doses of 300mg, 750 mg, 1000mg per orally respectively. Group III subdivided into three groups III-A, III-B, III-C, consisting of six animals each, received the standard drug in three doses per orally.

Drugs under study with doses

(A) Test drug

- Cuminum cyminum 300 mg per kg
- Cuminum cyminum 750 mg per kg
- Cuminum cyminum 1000 mg per kg

(B) Standard drugs for muscle relaxation activity [7]

- Diazepam 4 mg per kg
- Diazepam 6 mg per kg
- Diazepam 8 mg per kg

Preparation of Drug Solution by Hot Continuous Extraction Method

We have collected aqueous extract of Cuminum cyminum through soxhlet apparatus by hot continuous extraction method. The use of commercially available Soxhlet apparatus is a convenient way to prepare crude plant extract.

Mode of Administration

Cuminum cyminum & the standard drugs were administered orally by feeding needle, in various doses in the in-vivo experiment, half an hour before the actual procedure.

Experimental Setup

We have conducted rotarod test on albino rats for muscle relaxation property. Rota-Rod method of "Dunham & Miya" was used for assessment of muscle relaxation activity in albino rats [8]. Dunham and Miya suggested that the skeletal muscle relaxation induced by the test compound could be evaluated by testing the ability of mice or rats to remain on revolving Rota rods.

Apparatus consists of horizontal wooden rods coated with rubber with 3 cm diameter attached to a motor with the speed adjusted to 2 rotations per minute. The rod is 75 cm in length and divided into 6 sections by plastic discs, thereby allowing the simultaneous testing in 6 rats.

Principle

Rota rod method can evaluate the muscle relaxant property in a series of a compound such as the Benzodiazepines. Skeletal muscle relaxation together with a taming or calming effect, these agents also reduce anxiety and tension. The loss of muscle grip indicates muscle relaxation and also measures the strength and coordinated movement of rats. This effect can be easily studied in rats using a rotating rod. The differences in fall-off time from rotating rod between the control and test treated rats is taken as an index of muscle relaxation. The rate of rotation of rod should be adjusted such that normal rat can stay on the rod for an appropriate period (3-5 minute) of time [9].

Conduct of Experiment

Albino rats were trained on Rotarod. Rats were placed on the rod and made to walk. Each time rats fall down, kept it again on the rod. Training for a rat ended when rat remained on rod continuously for 180 seconds and completed 20 trials which were earlier. The test was conducted for 24 hours after training. "Fall off time" was recorded. "Fall off time" was compared after test drug administration. In group I we have given distilled water. In group II-A, II-B, II-C, we have given Cuminum cyminum in three doses viz. 300,750, 1000 mg per kg orally. Decreases in performance time on the

rod after standard drug diazepam 4, 6, 8 mg per kg were also recorded.

RESULTS

The musclerelaxant activity of Cuminum cyminum (jeera) was evaluated from "rotarod test". Three orally administered dose level 300, 750, 1000 mg per kg of Cuminum cyminum were tested as a muscle relaxant and were compared with diazepam which was used as standard drug. P- value for fall-off time was not significant in all the three doses of Cuminum cyminum. Fall-off time was decreased by 0.70%, 0.91%, 2.40%, respectively with all the three doses of Cuminum cyminum shown in Figure-1 and Table-1. Diazepam significantly decreased P-value for fall-off time [< 0.001] in all the three doses. Fall-off time was decreased by 90.90%, 91.95%, and 92.70%, respectively with all the three doses of diazepam shown in table 1 and figure-1.

- Group one was compared with groups II-A, II- B, II-C.
- Groups III-A, III-B, III-C were compared with groups II-A, II-B, II-C respectively.
- "Student's t-test" was used to compare different groups.

Table-1: Effect of Cuminum cyminum and Diazepam on Muscle relaxant Activity

Group	Treatment	Oral Dose mg /kg	Fall off Time in seconds Mean ± S.E.	Percent Reduction %	'P' Value
I	Control	Distilled water	72.80±0.61		
II-A	Cuminum cyminum	300	72.25±0.42	0.70	>0.05
II-B	Cuminum cyminum	750	72.08±0.54	0.91	>0.05
II-C	Cuminum cyminum	1000	72.16.00±0.29	0.8	>0.05
III-A	Diazepam	4	06.50±0.76	90.90	<0.001
III-B	Diazepam	6	05.80±0.94	91.95	<0.001
III-C	Diazepam	8	05.10±0.60	92.70	<0.001

*Each group consist of 6 animals, n=6

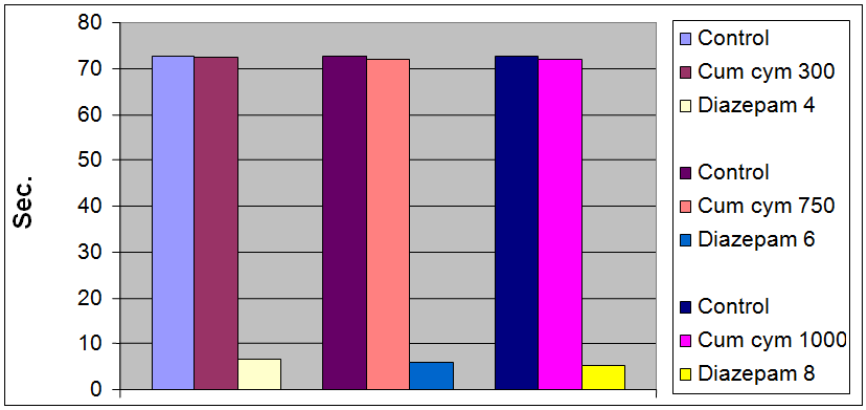

Fig-1: Effect of Cuminum cyminum & Diazepam on Muscle Relaxant Activity in Albino rats (Mean fall- off time)

DISCUSSION

In Indian traditional medicine, the fruits of Cuminum cyminum have been used for the treatment of some diseases, including gastrointestinal disease and epilepsy. The present study has evaluated the muscle relaxant activity of the Cuminum cyminum.

In the present study on the rotarod, fall-off time was not significant in all the three doses of Cuminum cyminum compare to the diazepam. Which indicate there were some muscle relaxant activities of Cuminum cyminum but not significant which was quite similar to the Sayyah *et al*., [7] study, in their study they demonstrate that mean fall time decreased on rotarod by using alcohol extract of Cuminum cyminum, Jabeen *et al*., [8] also demonstrated the same activities in their study which was done by using cumin oil.

Boskabady *et al*., [9] in their study indicate a relatively potent relaxant (bronchodilatory) effect of Cuminum cyminum on the tracheal chains of guinea pigs. A stimulatory effect of the plant on ß-adrenoceptors and/or an inhibitory effect on histamine H1 receptors are suggested as the possible mechanisms, apart from the opening of potassium channels and inhibition of calcium channels.

CONCLUSION

Skeletal muscle relaxant property of Cuminum cyminum aqueous solvent extract was not significant. It may be because extract got heat thermal degradation so it may be lost some of its property. According to some studies and animal models cumins alcohol solvent extract is having muscle relaxant property while Cuminum cyminum is having relaxant property for tracheal smooth muscle.

Limitation of Study

This study has its limitation especially experiment is conducted only on Rota Rod and the solvent is being recycled, the extract that collects in the lower container is continuously being heated and may suffer thermal degradation reactions. To overcome this limitation need further study with more advanced test and extract without heat degradation.

Acknowledgments

The authors express their thanks to the Dr. Omi Chouhan, Ex-Head of Department, Department of Pharmacology, Dr. S. N. Medical College, Jodhpur (Rajasthan) for her guidance and assistance in conducting the study.

Conflict of Interest

The authors declare that no conflict of interest, financial or otherwise exists.

REFERENCES

1. Rebey, I. B., Jabri-Karoui, I., Hamrouni-Sellami, I., Bourgou, S., Limam, F., & Marzouk, B. (2012). Effect of drought on the biochemical composition and antioxidant activities of cumin (Cuminum cyminum L.) seeds. *Industrial Crops and Products*, *36*(1), 238-245.
2. Srivastava, K. C. (1989). Extracts from two frequently consumed spices—cumin (Cuminum cyminum) and turmeric (Curcuma longa)—inhibit platelet aggregation and alter eicosanoid biosynthesis in human blood platelets. *Prostaglandins, leukotrienes and essential fatty acids*, *37*(1), 57-64.
3. Iacobellis, N. S., Lo Cantore, P., Capasso, F., & Senatore, F. (2005). Antibacterial activity of Cuminum cyminum L. and Carum carvi L. essential oils. *Journal of agricultural and food chemistry*, *53*(1), 57-61.
4. Eikani, M. H., Golmohammad, F., Mirza, M., & Rowshanzamir, S. (2007). Extraction of volatile oil from cumin (Cuminum cyminum L.) with superheated water. *Journal of food process engineering*, *30*(2), 255-266.
5. Li, R., & Jiang, Z. T. (2004). Chemical composition of the essential oil of Cuminum cyminum L. from China. *Flavour and fragrance journal*, *19*(4), 311-313.
6. Gallo, M., Ferracane, R., Graziani, G., Ritieni, A., & Fogliano, V. (2010). Microwave assisted extraction of phenolic compounds from four different spices. *Molecules*, *15*(9), 6365-6374.
7. Kulkarni, S. K. (2008). Practical pharmacology and clinical pharmacy. *Vallabh Prakashan, Delhi, India*, 131-133.
8. Dunham, N. W., & Miya, T. S. (1957). A note on a simple apparatus for detecting neurological deficit in rats and mice. *Journal of the American Pharmaceutical Association*, *46*(3), 208-209.
9. Novack, G. D., & Zwolshen, J. M. (1983). Predictive value of muscle relaxant models in rats and cats. *Journal of pharmacological methods*, *10*(3), 175-183.