



EVALUATION OF ANTISPASMODIC ACTIVITY OF CORIANDER OIL IN ISOLATED CHICK ILEUM: AN IN-VITRO STUDY

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ABSTRACT :

BACKGROUND

Essential oils (EOs) are hydrophobic liquids produced as secondary metabolites by specialized secretory tissues in the leaves, seeds, flowers, bark and wood of the plant, and they play an important ecological role in plants. EOs show biological properties such as anticancer, anti-inflammatory, antioxidant and antimicrobial. Due to their wide range of applications in the food and pharmaceutical industries, there is a huge demand for essential oil production on a large scale. *Coriandrum sativum* L. (*C. sativum*) is one of the most useful essential oil-bearing spices as well as medicinal plants, belonging to the family Umbelliferae/Apiaceae. The leaves and seeds of the plant are widely used in folk medicine in addition to its use as a seasoning in food preparation [1].

METHOD

Antispasmodic activity was conducted by using an isolated chick ileum which is freshly obtained from the local slaughter house. Then cumulative concentration-effect curves were recorded on kymograph for Acetyl choline in absence and presence coriander on Kymograph by using Sherrington's Recording Drum. The same procedure was carried for concentration-effect curve of Ach in presence of Atropine sulphate as a standard drug. The ED50 value was calculated from the graph plotted against log dose on x-axis and % response on y-axis [2].

RESULT

The result obtained from dose response curve by using isolated chick ileum shows positive results.

CONCLUSION

As a result of this investigation, it was concluded that coriander oil has antispasmodic properties in intestinal tissue. Therefore, it can be used as a potential therapeutic agent for treating muscular issues such as aches and spasms.

KEYWORDS: Acetylcholine, Antispasmodic, Atropine sulphate, Chick ileum, *Coriandrum sativum*, Essential oil, hydrophobic, Kymograph, Modified Tyrode solution, Sherrington's Recording Drum.

INTRODUCTION :

Essential oils are produced by different biosynthetic pathways in various species as a defense mechanism in response to various biotic and abiotic stressors. They are hydrophobic liquid product of secondary metabolism in plants that contains volatile compounds. EOs production varies greatly in different plants based on the environment and the growth conditions [3]. *Coriandrum sativum* L. is a culinary herb that belongs to the family Apiaceae (Umbelliferae). coriander has been cultivated globally in countries such as the USA, the UK, Argentina, India, France, Italy, Morocco, Myanmar, Mexico, Netherlands, Pakistan, Turkey, Spain, and Romania. *Coriandrum sativum* is a tropical crop that thrives best in a frost-free, relatively dry tropical and subtropical climate. It is a commercial crop that can be found growing in a variety of habitats, including gardens, open spaces, plains, hills, and railroads. It grows well in a climate with an average rainfall of 75–100 mm and a temperature between 15–28 °C. The plant prefers to grow in

loamy soil that drains well with a soil pH of 8–10. The best season to grow coriander is summer in temperate zones and cooler season in subtropical/tropical zones ^[4].



Figure 1: Coriander oil

The phytochemicals present in the oil such as linalool, a volatile flavor compound, confer medicinal properties. Essential oil uses are most prevalent in relation to the digestive system. The essential oil offers excellent mental relief, particularly when used in aromatherapy, and is also effective for treating muscular issues such as aches and spasms ^[5].

MATERIALS AND METHODS

The standards such as Acetylcholine, Coriander oil and chemicals for physiological salt solution is collected. The composition of physiological salt solution given below;

Modified Tyrode solution for chick ileum: Sodium chloride (8.0g), potassium chloride (0.2g), magnesium chloride (0.1g), calcium chloride (0.2g), sodium bicarbonate (0.1g) and glucose (1.0g).

CHICK ILEUM

Fresh chick intestine was obtained from local slaughter house in Tyrode solution and cleaned off the mesentery. The ileum part was separated and kept in modified Tyrode solution to keep it alive.

ANTISPASMODIC ACTIVITY

Procedure:

The segment of 1-2cm long chick ileum was mounted in a 20ml tissue organ bath containing Tyrode solution and maintained at 37°C with continuous oxygen supply. The tissue was allowed to equilibrate for 30 min, during which, the bathing solution was changed at every 10 min. Contact time of 60 sec, and base line of 30sec time cycle were opted for proper recording. Dose response curve of acetylcholine was recorded on the kymograph first. Then cumulative concentration-effect curves were recorded on kymograph for acetylcholine in absence and presence coriander on Kymograph by using Sherrington's Recording Drum. The same procedure was carried for concentration-effect curve of acetylcholine in presence of atropine sulphate as a standard drug. The percentage inhibition of extract and standard drug was calculated and graph was plotted by taking dose verses % decrease in response ^[6].



Figure 2. Coriander oil pure

RESULT AND DISCUSSION :

Evaluation of Antispasmodic activity

Drug	Dose	Percentage response
Acetylcholine	0.1	37.5%
	0.2	56.25%
	0.4	81.25%
	0.8	100%
Atropine + Acetyl choline	0.1+0.1	50%
	0.1+0.2	62.5%
	0.1+0.4	75%
	0.1+0.8	100%
Coriander oil+ Acetylcholine	0.1+0.1	25%
	0.1+0.2	43.75%
	0.1+0.3	56.25%
	0.1+0.4	62.5%

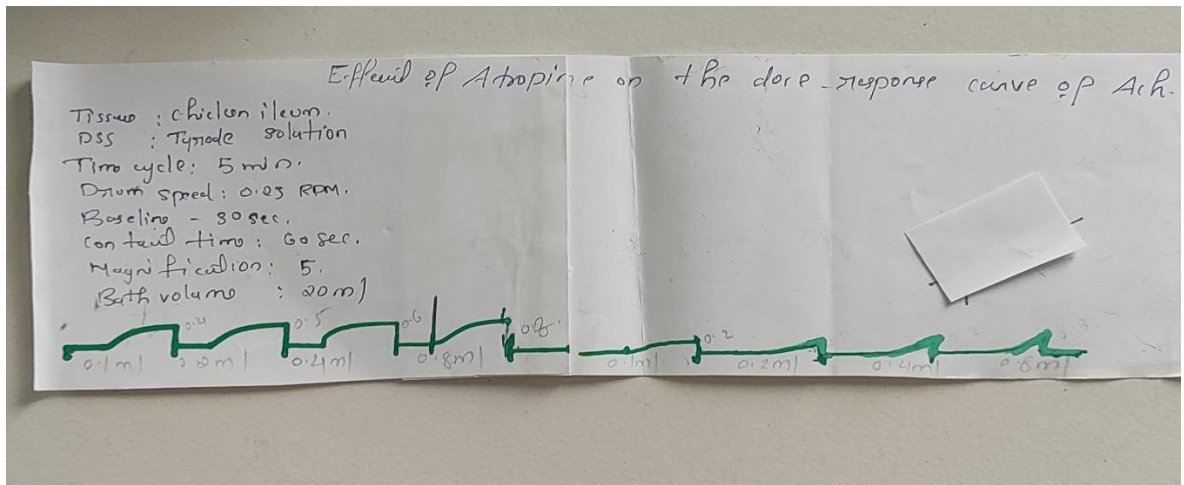


Figure 3: Dose response curve of Ach and Atropine

Effect of Ach on chicken ileum reflected an increase in spasmodic activity (response) with an increase in the dose. DRC of Ach in presence of atropine was taken as shown in figure.

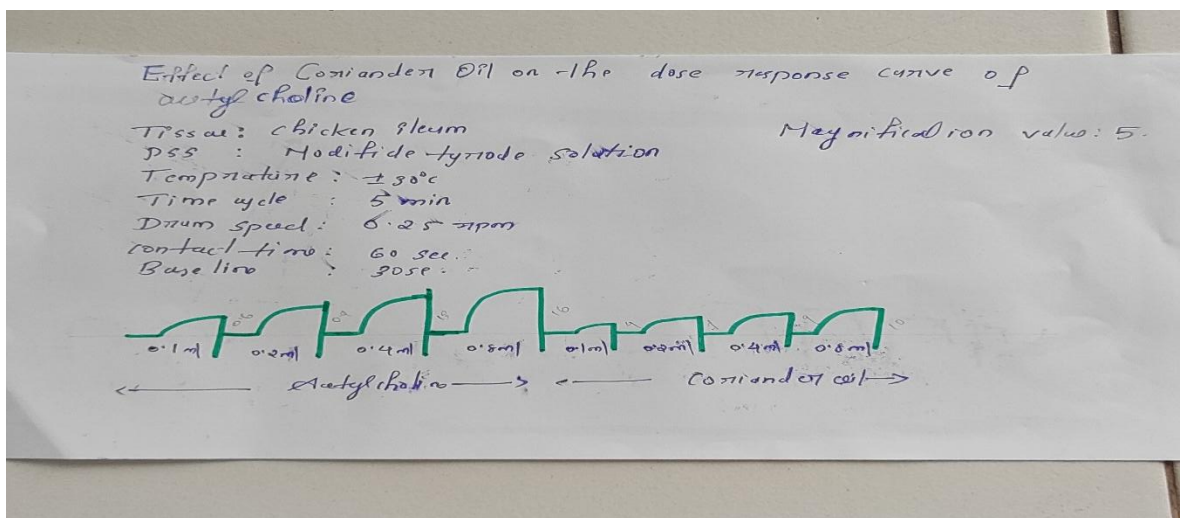
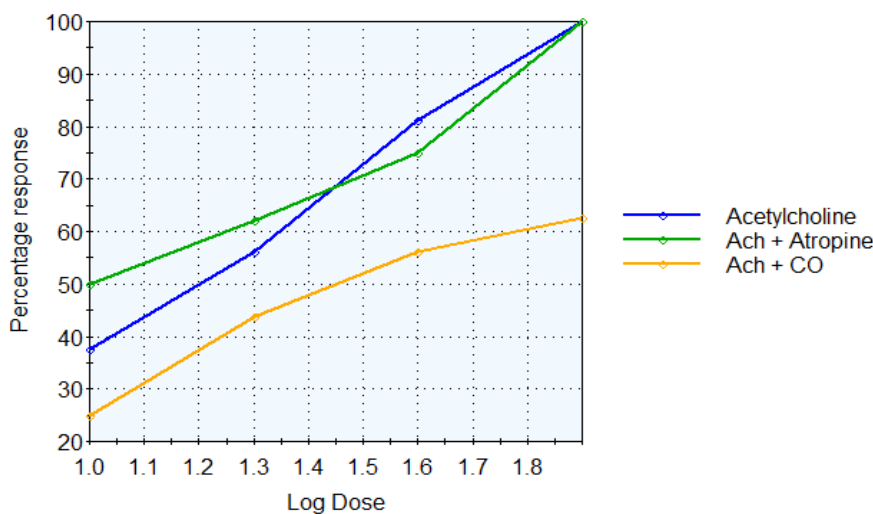


Figure 4: Response curve of Ach+ Coriander oil.

Ach induced spasm followed by the treatment of showed prominent antispasmodic activity as shown in the figure.

Effect of CO on DRG of Ach & Atropine on chick ileum



DISCUSSION :

For screening the activity of a drug on intestinal smooth muscles, chick ileum preparations can be used. Chicken intestine is easier to acquire, handle and easier to dissect and has the same reactions to spasmogenic and spasmolytic drugs. Cholinergic agonists like acetylcholine elicit a contractile response in isolated chicken ileum. M_3 receptor, a subtype of cholinergic receptor activation causes contraction of intestinal smooth muscle. The M_3 receptor function through Gq protein and trigger membrane bound phospholipase C (PLC) provoking inositol triphosphate (IP_3) and diacylglycerol (DAG) which in succession release Ca^{2+} intracellularly leads to actin-myosin phosphorylation causing increased smooth muscle tone. Thus, the contraction of intestinal smooth muscle in vitro has often been utilized for the study of contractile/dilator responses of agonists as well as antagonist. In current investigation, acetylcholine showed greater contraction while peppermint oil significantly inhibited the acetylcholine induced contraction on isolated chicken ileum preparation. The parallel shift of graph towards right side in acetylcholine dose-response curves in the presence of increasing concentrations of CO indicating that there was competitive antagonism between acetylcholine and CO for M_3 receptors present on the smooth muscle. It was found that coriander oil produced dose dependent inhibition of ileum contractions induced by acetylcholine.

CONCLUSION :

As a result of this investigation, it was concluded that coriander oil has antispasmodic properties in intestinal tissue. Therefore, it can be used as a potential therapeutic agent for treating muscular issues such as aches and spasms.

REFERANCES :

1. Mandal S *et al*, Coriander (*Coriandrum sativum* L.) essential oil: Chemistry and biological activity. Asian Pacific Journal 2015;5:421–428.
2. Mounita Tambuli *et al*, Antispasmodic activity of *Musa paradisiaca* peel aqueous extract, World Journal of Pharmaceutical Research. 2022;11(12): 1365-1373.
3. Yee L.L *et al*, Physiological production of essential oil in plants-Ontogeny, secretory structures and seasonal variations: Review. Pertanika Journal of Science. 2016;2:1–10.
4. Khan I.U *et al*, Taxonomical aspect of coriander (*Coriandrum sativum* L.) International Journal of Current Research. 2014;6:9926–9930.
5. Simona Codruta Heghes *et al*, Antispasmodic Effect of Essential Oils and Their Constituents: A Review, molecules. 2019;24:1675.
6. Jasmine Shalet D. Souza *et al*, Evaluation of anti-spasmodic effect of *Mangifera indica* stem bark using isolated chicken ileum, World Journal of Pharmaceutical Research. 2022; 11(16)1790-1797.
7. Albertina Antonielli *et al*, Antispasmodic effect of *Mentha piperita* essential oil on tracheal smooth muscle of rats. Journal of Ethnopharmacology. 2010; 130:433–436.