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NEGATIVE IONOTROPIC AND CHRONOTROPIC EFFECT OF *ELLETARIA CARDAMOMUM*

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ABSTRACT

In this present study, effects of aqueous extract of *Elletaria cardamomum* on isolated frog heart and rectus abdominus muscles were studied. The extract was prepared by maceration and its effect was studied for various doses. Results show that aqueous extract of *Elletaria cardamomum,* dose dependently decreases the heart rate and force of contraction. To assess the probable cause of cardiac depressant action, K^+ content was assessed by using flame-photometer. The study of the aqueous extract on the rectus abdominus muscles resulted in smooth muscle relaxation, indicating involvement of muscarinic receptors. The effect of extract was significantly blocked in the presence of atropine, supporting the involvement of muscarinic receptors. The extract has also showed vasodilatory effect in hind limb perfusion experiment. From these studies, we concluded that *Elletaria cardamomum* has cardiac depressant effect, which might be due to the presence of muscarinic principles.

Key words: *Elletaria cardamomum*, Atropine, Cardiac depressant.

INTRODUCTION

Cardiouasculer health problems are the leading causes of disability, morbidity and mortility among the general population worldwide[1]. *Elletaria cardamomum* has an account of its aromatic and carminative properties. Extract of cardamom causes significant reduction in gastric secretion. Cardamom prevents the bad breath and also it is used as an additive in iron enriched foods to mask the unpleasant taste of haem. It is also combined with purgative of offset gripping. The effect of cardamom extract on gastric secretion is very similar to that of cimetidine with significant decrease in acid output.[2-4]

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EXPERIMENTAL

Materials and methods

Materials: Aqueous extract of *Elletaria cardamomum*, atropine (Atr.) and Adrenaline (Adr.).

Animal used: Six frogs (species: *Rana tigrina*) weighing 200-250 g were used for study.

Method

The aqueous extract of *Elletaria cardamomum* was prepared by macerating 100 g of powdered drug in 500 mL of distilled water for 7 days with regular stirring. The supernatant fluid was allowed to evaporate in petri dishes under tube light to provide heat and to prevent dampness so that no organism occurs. Extract was injected in isolated heart preparation and recording was done on smoked drum using starling heart lever. Perfusion was done by Bulbring's method as described by Burn.[5]

A stabilizing period of 15 minutes was allowed after basal recording. Then 0.1 mL of adrenaline was administered to identify the sensitivity of preparation and the time taken by the preparation to return the base line. The effect of various doses of aqueous extract was recorded. Sufficient time was allowed for the preparation to return at normal after every dose. To assess the probable cause of cardiac depressant action, the studies were further extended to evaluate the involvement of K^+ ions or muscarinic principle. K^+ was estimated using flame photometer to confirm its presence in the extract. In another study, the effect of extract on heart rate and force of contraction was measured in the presence of atropine. The effect of the aqueous extract on the blood vessels was checked using frog hind limb perfusion.[6]

RESULTS AND DISCUSSION

Table 1. Effect of *Elletaria cardamomum* (EC) on isolated frog heart [conc. – 1 mg/ mL] (Fig. 1 and 2)

S. No.	Drug	Dose (ml)	Mean H. R.	S. D.	SEM	P value	Effect of Atropine
1	NHR	-	49.66	5.31	2.17	-	-

Cont…

S. No.	Drug	Dose (ml)	Mean H. R.	S. D.	SEM	P value	Effect of Atropine
2	ADR	0.1	54.83	4.66	1.90	< 0.001	55
3	Drug	0.1	48.83	4.91	2.00	< 0.001	48
4	EC	0.2	41.33	5.08	2.07	< 0.001	51
5	EC	0.3	37.83	5.84	2.38	< 0.001	49
6	EC	0.4	34.83	5.70	2.33	< 0.001	50
7	EC	0.6	33.50	5.24	2.14	< 0.001	51
8	EC	0.8	32.16	4.95	2.02	<0.001	50
9	EC	1.2	29.0	5.47	2.23	< 0.001	52
10	EC	1.6	27.0	4.94	2.01	< 0.001	49

NHR – Normal heart rate, ADR. – Adrenaline

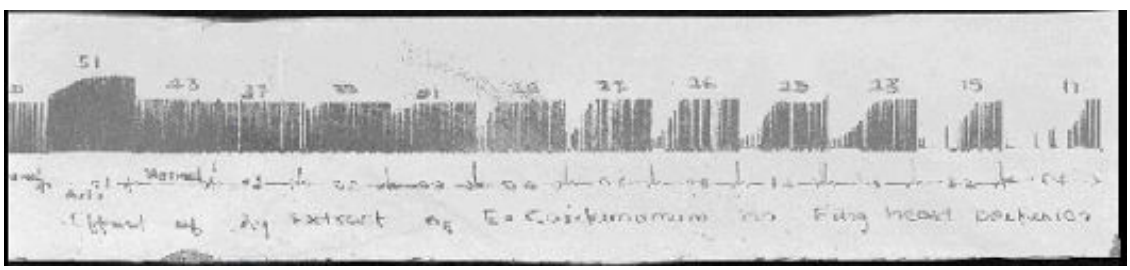

Fig. 1: Effect of *Elletaria cardamomum*on isolated Frog heart (Conc. – 1 mg/ mL)

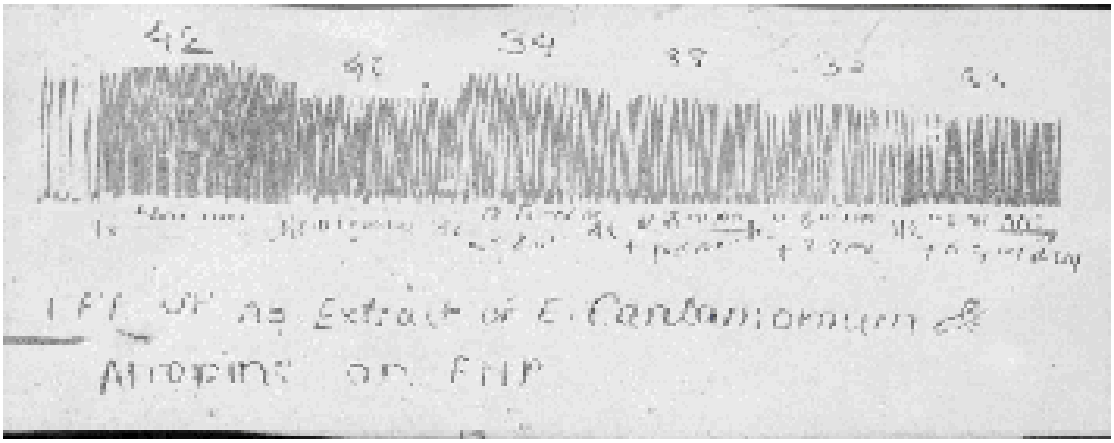

Fig. 2: Effect of *Atropine* + *Elletaria cardamomum* on isolated frog heart (Conc. – 1 mg/mL)

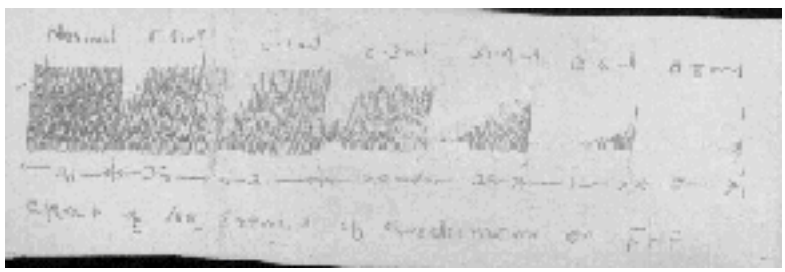

Fig. 3: Effect of *E. cardamomum* on force of contraction of isolated frog heart (Conc. – 1 mg/ mL)

Table 2. Effect of *E. cardamomum* on force of contraction of isolated frog heart (Conc. - 1 mg/ mL) (Fig. C)

S. No.	Drug	Dose	Mean FOC.(mm)	S.D.	SEM
1	NHR	-	14.1	1.42	0.63
2	ADR	0.1	17.1	0.8	0.35
3	EC	0.1	11.5	1.09	0.48
4	EC	0.2	8.4	1.85	0.37
5	EC	0.4	5.8	1.32	0.59

Cont…

6	EC	0.6	3.1	0.80	0.35
7	EC	0.8	1.7	0.60	0.26
8	EC	1.0	0.8	0.74	0.33

FOC.- Force of contraction

The result indicated that administration of various doses of aqueous extract of *Elletaria cardamom* dose dependently decreases heart rate and force of contraction. This indicates that the extract possesses cardiac depressant activity. K^+ ions in the extract of *Elletaria cardamomum* was found in negligible quantity. In another study, where the extracts were studied in presence of atropine it was found that atropine has blocked the effect of *Elletaria cardamomum* extract. The extract has also shown vasodilatory effect, which was evident from increase in number of drops/min in hind limb perfusion experiment.

CONCLUSION

From the present study, we conclude that *Elletaria cardamomum* has cardiac depressant effect, which may due to the muscarinic effect of the drug and not due to the K^+ ions present in negligible quantity in the extract. The extract has also shown vasodilatory effect, on frog hind limb perfusion experiment.

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