

# Comparative Cardiotoxic Activity of Fenugreek Seeds Extract with Digoxin on Isolated Frog Heart

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## **Abstract**

*Fenugreek is commonly used herb in Ayurveda. Fenugreek seeds (F.S) actually deadens the sense of sweet tastes and also the bitterness of bitter substances. Present study was carried out to determine the cardiotoxic activity by using infusion of F.S with different dilutions & compared with cardiotoxic activity of digoxin-the life saving cardiotoxic. The activity was tested by using isolated frog heart assembly. The present preliminary studies confirm the better cardiotoxic activity of Fenugreek seeds extract than digoxin. Further studies can confirm the reduced toxicity & this will be the advantage of F.S over digitalis. Thus, in future it will be interesting to isolate the active chemical constituents which are responsible for the cardiotoxic activity.*

**Keywords:** *Cardiotoxic activity, Digoxin, fenugreek, Isolated frog heart.*

## **INTRODUCTION**

Herbal products have gained increasing popularity in the last decade, and are now used by approximately 20% of the population. Herbal products are complex mixtures of organic chemicals that may come from any raw or processed part of a plant, including leaves, stems, flowers, roots, and seeds. Although herbs are often perceived as “natural” and therefore safe.[1,2]

Despite continuing advances in understanding the basic pharmacology of cardiac glycosides, digitalis intoxication remains a common clinical problem. It necessitates research for new nature based drugs which increase cardiac muscle contractility with a broad therapeutic index. The essential organ of the human body i.e. Heart when fails to work leads to sudden death. Since the potent cardiotoxic drug i.e. the digoxin which is of the plant origin has a long list of ADR and toxicity, it is a need of hour to develop and standardize cardiotoxic drugs of herbal origin. [3]

Fenugreek (Scientific name-*Trigonella foenum graecum*) is the medicinal herb belongs to the family Leguminose. This is the common part of man's diet. These fenugreek green leaves and dried seeds are used for preparation of different food items at the same time it is used for medicinal use that is the old therapeutic practice of human's history of medical system. The G.S was claimed to have general cardiotoxic activity and we decided to determine the same with the help of isolated frog heart assembly.[4]

## RESEARCH ELABORATION [5]

**Drug:** Infusion of Fenugreek seeds

**Chemicals:** Digoxin, Ringer Solution

**Animal:** Frog of Rana Tigrina species were used for the study and those were maintained as per CPCSEA guidelines.

**Instruments:** Sherington Rotating Drum, Sterling's heart lever

### Preparation of infusion

1gm of fenugreek seeds powder was mixed with 100ml distilled water

With the help of magnetic stirrer for half an hour. The material was filtered through Whatman

Filter paper no.40 and filtrate was collected. The prepared infusion was diluted with the

Help of distilled water in varying proportion and labeled as follows,

FS1-Undiluted filtrate

FS2-1:1 (filtrate: distilled water)

FS3-1:2 (filtrate: distilled water)

FS4-1:4 (filtrate: distilled water)

All the preparations were evaluated for their cardiotoxic activity by using isolated frog heart

Assembly. The rate and force of heart contraction was determined.

### Preparation of digoxin solution

The marketed digoxin ampoules (Samarth life sciences Pvt Ltd.) Were obtained from local market.

Various different dilutions were made with distilled water and labeled as follows,

D1- 25 µg/ml, D2- 50 µg/ml. Above prepared samples were evaluated for their

Cardio tonic activity and treated as standard.

### Preparation of hypo dynamic ringer solution[6]

Hypo dynamic ringer solution was prepared by using standard

Method. (Table-1)

**Table1:** Composition of hypo dynamic ringer solution

Sr.No	Ingredients	Quantity
1	Sodium chloride (NaCl)	6.5 gm
2	Potassium chloride (KCl)	0.14 gm
3	Calcium Chloride (CaCl <sub>2</sub> )	0.03 gm
4	Sodium bicarbonate (NaHCO <sub>3</sub> )	0.2 gm

5	Glucose	2 gm
6	Distilled Water	1000 ml

The frog of species *Rana tigrina* was pithed and pinned it to the frog board. A midline incision was given on the abdomen, the pectoral girdle was removed and the heart was exposed. The pericardium was carefully removed and put a few drops of hypodynamic frog ringer over the heart. The inferior venacava was traced, put a thread around it and given a small cut in order to insert the venous cannula. The cannula was inserted in the vein and the thread was tied to assure the cannula in place which is in turn connected to a saline bottle containing hypodynamic frog ringer solution. A small cut in one of the aorta was given for the ringer to come out. Heart was isolated and attached to the stand

with moderate flow of ringer. A thin pin hook was passed through the tip of the ventricle and with the help of a fine thread to the hook; it was tied to the free limb of the Sterling's heart attached lever which was fixed to a stand. A proper tension was adjusted by altering the height of the lever. The normal heart rate was noted. All test samples that is FS1, FS2, FS3, FS4, D1, & D2. were administered in different doses viz. 0.1ml, 0.2ml, 0.3ml respectively. The rate and force of heart contraction [8] were noted as given in (Table 2-7).

### RESULTS OR FINDINGS

All the dilutions of Fenugreek seeds restore cardiac activity of Hypodynamic frog heart i.e. it increases rapidity and force of contraction. It was found that undiluted sample showed better response as compared to other samples. It is interesting to know that F.S. has rapid onset of action compared to Digoxin. These preliminary studies confirm the better cardiotoxic activity of F.S. and it can stand as better option for digitalis. Further studies can confirm the reduced toxicity & this will be the advantage of F.S over digitalis.

**Table 2: Effect of different doses of FS1 on frogs heart**

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	37	Normal
2	FS1	0.1	33	Rapid Increase
3	FS1	0.2	30	Increase
4	FS1	0.3	27	Increase

**Table 3: Effect of different doses of FS2 on frogs heart**

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	33	Normal
2	FS2	0.1	31	Slight Increase
3	FS2	0.2	27	Slight Increase
4	FS2	0.3	28	Increase

**Table 4: Effect of different doses of FS3 on frogs heart**

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	33	Normal
2	FS3	0.1	29	Rapid Increase
3	FS3	0.2	27	Increase
4	FS3	0.3	27	Slight Increase

**Table 5: Effect of different doses of FS4 on frogs heart**

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	31	Normal
2	FS4	0.1	29	Slight Increase
3	FS4	0.2	27	Slight Increase
4	FS4	0.3	28	No change

**Table 6: Effect of different doses of D1 on frogs heart**

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	29	Normal
2	D1	0.1	24	Increase
3	D1	0.2	23	Slight Increase
4	D1	0.3	25	Slight Increase

**Table7: Effect of different doses of D2 on frogs heart**

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	32	Normal
2	D2	0.1	28	Increase
3	D2	0.2	25	Slight Increase
4	D2	0.3	22	Sudden Cardiac Block

## COCLUSION

*Fenugreek seeds extract* (FS) is commonly used herb in Ayurveda. Chewing the seeds actually deadens the sense of sweet tastes and also the bitterness of bitter substances. In conclusion, the *Fenugreek seeds extract* (FS) acts as for alternative or complementary medicine as a cardio tonic agent.

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