Antiulcer Effect of Dried Fruits of *Carica Papaya* Linn in Rats

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The effect of alcoholic extract of dried fruits of *Carica papaya* were investigated in rats to evaluate the antiulcer activity by using pyloric ligation and aspirin-induced gastric ulcer. The parameters taken to assess antiulcer activity were volume of gastric secretion, free acidity, total acidity and ulcer index. The results indicate that the alcoholic extract significantly ($P<0.001$) decreases the volume of gastric acid secretion, free acidity, total acidity and ulcer index with respect to control.

Carica papaya (Family: Caricaceae) is a short lived, fast growing woody large herb to 10 or 12 feet in height. The green fruit contains papain similar to pepsin, pulp of the fresh fruit contains a caoutchron like substance, a soft yellow resin, fat, albuminoid sugar and pectin[1]. Fruits contain an alkaloid called carpaine and a glucoside named carposide[2]. A properly ripened papaya is juicy, sweetish and somewhat like a cantaloupe flavour. The fruits contain papain which helps in digestion and is used to tenderize meat[3]. The prolonged use of synthetic antiulcer drugs leads to adverse drug reaction hence search for new antiulcer agent that retain therapeutic efficacy and are devoid of adverse drug reaction. In this context, study of the extract of *Carica papaya* against pylorus ligation and aspirin-induced ulcers was undertaken.

The fruits of *Carica papaya* was collected in and around Salem District in the month of June and it was identified in the Botany department, National College, Truchirappalli found to comply with all specifications of the taxon. The fruits were cut into small pieces, shade dried and powdered. The powder was extracted with alcohol (95% v/v) using Soxhlet apparatus. The extract was evaporated under vacuum. The extractive value of the alcoholic dry extract was 4.5% w/w. The extract was suspended in 5% gum acacia and used for studying antiulcer activity.

Male Wistar rats weighing between 150 and 175 g were selected for pyloric ligation ulcer model[4]. Rats were divided into 3 groups, each group consisting of six animals. Animals were fasted for 24 h. One group received normal saline 2 ml/kg by oral route (negative control). The second group received ranitidine (20 mg/kg, p.o.) and the third group received alcoholic extract of *C. papaya* (250 mg/kg, p.o.) 30 min prior to pyloric ligation. The animals were sacrificed 4 h later and the stomach was opened to collect the gastric contents. The total volume of gastric content was measured. The free acidity, total acidity were estimated and ulcer index was scored. The gastric lesions were counted and the mean ulcerative index was calculated[5].

In the aspirin induced ulcer model[6], the rats were divided into 3 group each consisting of 6. The first group served as a control, the second group served as positive control and third served as the test. The second and third groups were treated respectively with ranitidine (20 mg/kg) and alcoholic extract of *C. papaya* (250 mg/kg) orally for 8 d. Control animals received normal saline (2 ml/kg) for 8 d. After 8 days of treatment, animals were fasted for 24 h. Ulcers were produced by administration of aqueous suspension of aspirin in a dose of 200 mg/kg orally on the day of experiment. The animals were sacrificed 4 h later and the ulcer index was calculated[5]. All the animal experimental protocols were approved by the Institutional Animal Ethics Committee.

The effect of alcoholic extract of *C. papaya* on pylorus-ligated rat and aspirin induced ulcer model is presented in Tables 1 and 2, respectively. The result of the present studies indicate that the alcoholic extract significantly reduces

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TABLE 1: EFFECT OF ALCOHOLIC EXTRACT OF *C. PAPAYA* ON PYLORUS-LIGATED RATS.

Design of treatment	Dose (mg/kg)	Volume of gastric secretion (ml/100g)	Free acidity (mEq/l)	Total acidity (mEq/l)	Ulcer Score
Control (Normal Saline)	2 ml/kg	7.5±0.22	23.6±0.04	54.0±0.30	2.8±0.07
Ranitidine	20	3.8±0.01	9.6±0.02	20.6±0.19	1.0±0.08
Alcoholic extract of *C. papaya*	250	4.9±0.10*	10.2±0.25*	28.6±0.28*	1.6±0.02*

Number of animal in each group were 6, *P<0.001 when compared to control. Values are expressed as mean±SEM.

TABLE 2: EFFECT OF ALCOHOLIC EXTRACT OF *C. PAPAYA* ON ASPIRIN-INDUCED GASTRIC ULCER IN RATS

Design of treatment	Dose (mg/kg)	Ulcer score	Percentage protection from ulcer
Control (Normal Saline)	2 ml/kg	3.1±0.33	-
Ranitidine	20	1.0±0.01	67.74
Alcoholic extract of *C. papaya*	250	1.7±0.02*	45.16

Number of animal in each group were 6, *P<0.001 when compared to control. Values are expressed as mean±SEM.

the total volume of gastric juice, free and total acidity of gastric secretion. The control animals had ulcers and haemorrhagic streaks, whereas in animals administered with the extract of *C. papaya* there was significant reduction in ulcer index (P<0.001).

It is generally accepted that gastric ulcers result from an imbalance between aggressive factors and the maintenance of the mucosal integrity through the endogenous defence mechanism[7]. Ulcer induction by aspirin results from the inhibition of the synthesis of prostaglandin in which arachidonic acid is involved in the synthetic pathway. This leads to gastric mucosal damage[8]. Hence, although there are multiple aetiologic factors in ulcer pathogenesis, the activity of the extract against aspirin-induced ulcer may be attributed in part to cytoprotective mechanism of action. In this study we observed that *C. papaya* provides significant antiulcer activity in rats.

REFERENCES

1. Nadkarni, A.K., In; Indian Materia Medica, Vol. 1, Popular Prakashan Pvt. Ltd, Mumbai, 1995, 273.
2. Schwab, E. and Schreier, P., Phytochemistry, **1988**, 27, 1813.
3. Samson, J.A., In; Tropical Fruits, 2nd Edn., Longman Scientific and Technical Publication, London, 1986, 256.
4. Shay, H., **Gastroenterology**, 1945, 5, 43.
5. Hedge, D.A., Khosa, R.C. and Goel, R.K., **Ancient Science of life**, 1994, 14, 77.
6. Szelenyi, I. and Thiemer, K., **Arch. Toxicol.**, 1978, 41, 99.
7. Szabo, S. and Szienji, S., **Trends Pharmacol. Sci.**, 1978, 8, 149.
8. Akah, P.A., Orisakwe, E.O. and Nwafor, S.V., **Pharm. Res. Dev.**, 1998, 3, 57.