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Original Article

Seasonal variation in anti gastric ulcer effect of *Murrya koenigii* (Linn.) Spreng leaf in rats

Prasanta Kumar Mitra

Department of Biochemistry, North Bengal Medical College, Siliguri, Dist. Darjeeling, West Bengal, India

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ABSTRACT

Seasonal variation in anti gastric ulcer effect of Murrya koenigii (Linn.) Spreng leaf, if any, was studied in gastric ulcer models in rats. Results showed that *Murrya koenigii* (Linn.) Spreng leaf collected during the months of September and October had maximum anti gastric ulcer activity in hydrochloric acid and indomethacin induced gastric ulcers in albino rats.

***Keywords*:** *Murrya koenigii* (Linn.) Spreng leaf, gastric ulcer, Hydrochloric acid, Indomethacin

INTRODUCTION

Murrya koenigii (Linn.) Spreng has been described as a medicinal plant of the family 'Rutaceae'. It has several names. In Nepali it is called 'meehisaag', in Hindi 'bursunga' and in English it is known as 'curry leaf tree'.*Murrya koenigii* (Linn.) Spreng is widely distributed at foothills of Himalayas from Kumaon to Sikkim, Bengal, Assam, middle and lower hill forests up to the height of 5000 ft. It is a small tree with dark green bark, often cultivated. February to May is the flowering time of the plant. *Murrya koenigii* (Linn.) Spreng has several medicinal uses. Leaves and roots are bitter, acrid, cooling, alexeteric, anti helmintic, analgesic, cure piles, useful in leucoderma and blood disorders. Burk is used to cure eruptions, poisonous animal bites etc. The plant has also stomachic and tonic properties [1, 2]. In modern research this plant has been reported to have anti-oxidative, cytotoxic, antimicrobial, and antibacterial, anti ulcer, positive inotropic and cholesterol reducing activities [3-10]. Recently we observed anti gastric ulcer activity of *Murrya koenigii* (Linn.) Spreng leaf against experimental gastric ulcer models in albino rats [11]. As medicinal property of a plant varies with season [12-16] we were interested to note seasonal variation, if any, in anti gastric ulcer activity of *Murrya koenigii* (Linn.) Spreng leaf. The present paper deals with the experiments and results on seasonal variation in anti gastric ulcer activity of *Murrya koenigii* (Linn.) Spreng leaf in hydrochloric acid and indomethacin induced gastric ulcers in albino rats.

MATERIALS AND METHODS

Plant Material: *Murrya koenigii* (Linn.) Spreng leaves were collected in morning hours (9 - 10 AM) from the medicinal plants garden of the University of North Bengal, Dist. Darjeeling, West Bengal, India during the periods of January – February, March – April, May – June, July – August, September – October and November – December 2012. Leaves were authenticated by the experts of the department of Botany of the said University. A voucher specimen was kept in the department of Biochemistry, North Bengal Medical College, Dist. Darjeeling, West Bengal, India for future reference.

Preparation of the Test Drug: Leaves of *Murrya koenigii* (Linn.) Spreng were shade dried and powdered. This powder was used as test drug.

Experimental animals: Wistar strain albino rats (180 - 200 g) of either sex were used for the study. Rats were housed in colony cages (5 rats / cage) and were kept for at least a week in the experimental wing of the animal house (room temperature 25 – 28 degree centigrade and humidity 60 – 65% with 12 h light and dark cycle) before experimentation. Animals were fed on laboratory diet with water *ad libitum*. 8 rats were used for each set of experiment. The animal

***Corresponding Author Address:** Dr. **Prasanta Kumar Mitra,** Prof. & Head, Department of Medical Biotechnology, Sikkim Manipal Institute of Medical Sciences, Gangtok, Sikkim, India; E-mail: dr_pkmitra@rediffmail.com*

experiment was approved by the ethics committee of the Institute.

Chemicals and Drugs: Indomethacin (Torrent Research Centre, Gandhinagar), ethanol (Baroda Chemical industries Ltd., Dabhoi), HCl LR (Thomas baker, Mumbai), omeprazole (Kopran Pharma Ltd. Mumbai).

Acute toxicity study: In our earlier communication [17] we reported that leaves of *Murrya koenigii* (Linn.) Spreng is not toxic for rats.

Production of gastric ulcer: Gastric ulcers were induced in rats by HCl(Hydrochloric acid) as well as by indomethacin as per the methods of Parmer and Desai [18] as follow,

HCl induced gastric ulcer: Rats were fasted for 18 h when no food but water was supplied ad *libitum*. Gastric ulcers were induced by administering 0.6M HCl (1 mL/200 g body weight) orally through a feeding tube. 1h after administration of HCl, animals were sacrificed by cervical dislocation and the stomach was taken out and incised along the greater curvature. Stomach was then examined for the presence of ulcers.

Indomethacin induced gastric ulcer: Rats were fasted for 18 h when no food but water was supplied *ad libitum*. Gastric ulcers were induced by administering indomethacin (10 mg/kg) orally to rats in two doses at an interval of 15 hour through a feeding tube. Rest part is same to that of HCl induced gastric ulcer group.

Anti gastric ulcer Study: Rats were divided into following groups.

(1) Drug treated control : In this group either HCl or indomethacin was given to rats.

(2) Drug and Murrya koenigii (January – February) **:** Powder from leaves of *Murrya koenigii* (Linn.) Spreng of the periods January – February was given to the rats orally through feeding tube 30 minutes prior to administration of HCl and 30 minutes before each dose of indomethacin. Powder of *Murrya koenigii* (Linn.) Spreng leaves was used in the dose of 1g/kg body weight of rats as per our earlier work [17].

(3) Drug and Murrya koenigii (March – April) : Powder from leaves of *Murryakoenigii* (Linn.) Spreng of the periods of March – April was given to the rats. Rest part was same to that of group – 2.

(4) Drug and Murrya koenigii (May – June) **:** Powder from leaves of *Murrya koenigii* (Linn.) Spreng of the periods May – June was given to the rats. Rest part was same to that of group – 2.

(5) Drug and Murrya koenigii (July – August) **:** Powder from leaves of *Murrya koenigii* (Linn.) Spreng of the periods July – August was given to the rats. Rest part was same to that of group – 2.

(6) Drug and Murrya koenigii (September – October) : Powder from leaves of *Murrya koenigii* (Linn.) Spreng of the periods September–October was given to the rats. Rest part was same to that of group – 2.

(7) Drug and Murrya koenigii (November – December): Powder from leaves of *Murrya koenigii* (Linn.) Spreng of the periods November – December was given to the rats. Rest part was same to that of group – 2.

Evaluation of ulcer index: This was done by the method of Szelenyi and Thiemer [19]

Gastric lesions were counted and the mean ulcerative index was calculated as follows:

I - Presence of edema, hyperemia and single sub mucosal punctiform hemorrhage.

II – Presence of sub mucosal hemorrhagic lesions with small erosions.

III – Presence of deep ulcer with erosions and invasive lesions.

Ulcer index = (number of lesion I) x1 + (number of lesion II) x2 + (number of lesion III) x 3.

Statistical analysis: The values were expressed as mean ± SEM and were analyzed using one-way analyses of variance (ANOVA) using Statistical Package for Social Sciences (SPSS) 20th versions. Differences between means were tested employing Duncan's multiple comparison test and significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Seasonal variation in anti gastric ulcer effect of the leaves of *Murrya koenigii* (Linn.) Spreng is given in Table – 1. HCl produced massive gastric ulcers in all albino rats. Ulcers were mostly superficial though few penetrating ulcers were found. There was bleeding in the stomach which was associated with adhesion and dilatation. Ulcer index came 30.8 ± 2.22. Maximum anti gastric ulcer activity of the leaves of *Murrya koenigii* (Linn.) Spreng was noted during the period September - October. Ulcer index came 14.1 ± 1.01. Ulcer inhibition was 54.22%. Table – 2 showed seasonal variation in anti peptic ulcer activity of the leaves of *Murrya koenigii* (Linn.) Spreng in indomethacin induced gastric ulcers in rats. Indomethacin produced profuse ulcer in the upper part of stomach of rats. Ulcer index was29.8 ± 2.10. Maximum anti peptic ulcer activity of the leaves of *Murrya koenigii* was noted during the period September -- October. Ulcer index came 12.1 ± 1.02. Ulcer inhibition was 59.39%. Fluck and Pharm [20] showed influence of climate on the active principles in medicinal plants. Thereafter, series of experiments were conducted

in this direction. Now a days numerous reports are available in literature which suggest that accumulation of chemical compounds in roots, stem and leaves of plants varies with season [12-16]. We, therefore, studied seasonal variation in the anti gastric ulcer activity of *Murrya koenigii* (Linn.) Spreng leaf against HCl and indomethacin induced gastric ulcer in albino rats. Results showed that *Murrya koenigii* (Linn.) Spreng leaf during the months September and October had maximum anti gastric ulcer activity. We are now interested to isolate the active compound(s) present in *Murrya koenigii* (Linn.) Spreng leaf responsible for anti gastric ulcer activity. Research in this direction is in progress.

CONCLUSION

Seasonal variation in anti gastric ulcer activity of *Murrya koenigii* (Linn.)Spreng leaf was studied. It was observed that *Murrya koenigii* (Linn.) Spreng leaf for the months September and October had maximum anti gastric ulcer activity against HCl and indomethacin induced gastric ulcers in albino rats.

Table - 1 : Showing seasonal variation in anti gastric ulcer activity of the leaves of *Murrya koenigii* in HCl induced gastric ulcer in rats.

Group & Dose	0.6MHCl (1 mL/200 g body weight) Ulcer index (mean ± SEM)	Ulcer inhibition (%)
Drug treated control	30.8 ± 2.22	--
Murrya koenigii (January - February)	28.5 ± 2.11	7.46
Murrya koenigii (March - April)	24.2 ± 2.01	21.42
Murrya koenigii (May - June)	22.3 ± 1.82	27.59
Murrya koenigii (July - August)	19.7 ± 1.45*	36.04
Murrya koenigii (September - October)	14.1 ± 1.01**	54.22
Murrya koenigii (November - December)	20.3 ± 1.64*	34.09

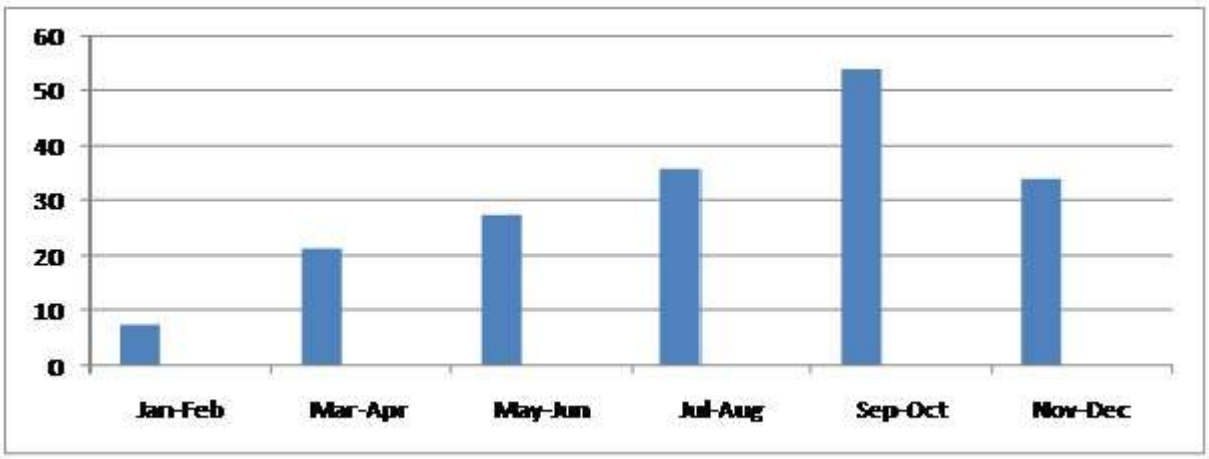
Murrya koenigii (1 g/kg). Values were mean ± SEM of eight animals in each group. * $p<0.05$, ** $p < 0.001$ when compared to drug control.

Table - 2 : Showing seasonal variation in anti gastric ulcer activity of the leaves of *Murrya koenigii* in indomethacin induced gastric ulcers in rats.

Group & Dose	Indomethacin (10 mg/kg) Ulcer index (mean ± SEM)	Ulcer inhibition (%)
Drug treated control	29.8 ± 2.10	--
Murrya koenigii (January - February)	26.4 ± 2.02	11.40
Murrya koenigii (March - April)	24.8 ± 2.01	16.78
Murrya koenigii (May - June)	21.1 ± 1.98	29.19
Murrya koenigii (July - August)	18.0 ± 1.40*	39.59
Murrya koenigii (September - October)	12.1 ± 1.02**	59.39
Murrya koenigii (November - December)	21.9 ± 2.03	26.51

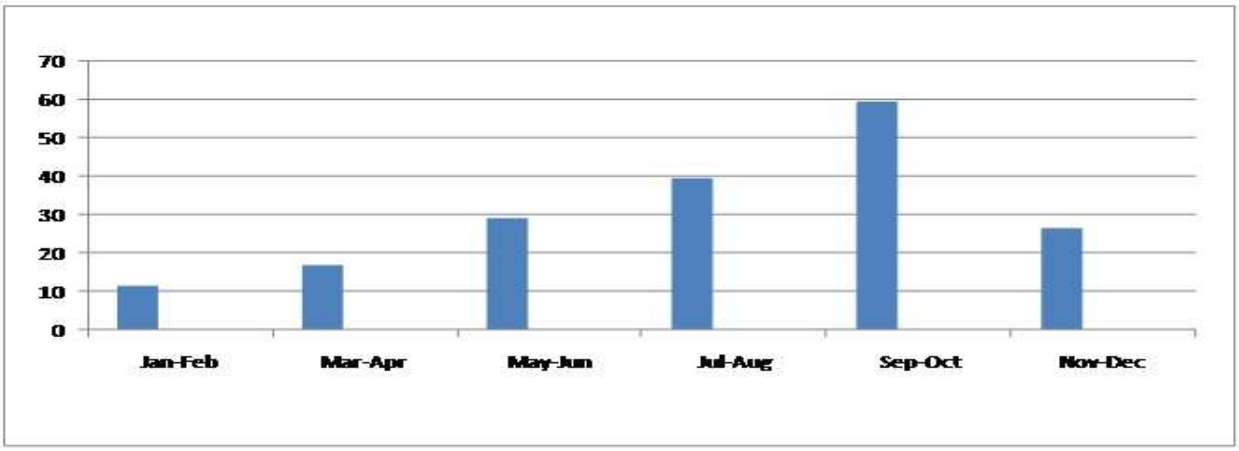
Murrya koenigii (1 g/kg). Values were mean ± SEM of eight animals in each group. * $p<0.05$, ** $p < 0.001$ when compared to drug control.

Fig 1 :Leaves of *Murrya koenigii* (Linn.) Spreng



■ Ulcer inhibition(%)

Fig 2 : Seasonal variation in ulcer inhibition by the leaves of *Murrya koenigii* in HCl induced gastric ulcer in rats.



■ Ulcer inhibition (%)

Fig 3 : Seasonal variation in ulcer inhibition by the leaves of *Murrya koenigii* in indomethacin induced gastric ulcer in rats.

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