

Analgesic activity of *Cissus quadrangularis* linn with *Zingiber officinale* rosc in male wistar rats

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ABSTRACT

Background: The global scenario, human beings are using various forms of treatment for relief of pain; among them, medicinal plant products have gained popularity because of its wide range of use and less side effects.

Methods: Adult Albino rats of either sex were selected and divided into 5 groups. The Eddy's hot plate was used and maintained temperature (55±0.5°C), the animals were placed on the hot plate and the time taken for paw licking or jumping was recorded and considered as nociceptive response. The reaction time was observed on 0, 30, 60, and 90 minute.

Results: The hot plate reaction time in sec was collected in the intervals of 0, 30, 60 and 90 minutes in all groups. Reaction times as follows: group III (*Cissus quadrangularis* Linn.) were 2.18±0.04, 3.13±0.05**, 5.83±0.05**, 5.39±0.04**; Group IV (*Zingiber officinale* Rosc.) were 2.12±0.03, 4.13±0.04**, 7.43±0.07**, 7.16±0.06**; Group V *Cissus quadrangularis* Linn+ *Zingiber officinale* Rosc.) were 2.21±0.75, 4.67±0.98**, 8.15±0.89**, 9.02±0.75**; Group II (Dexamethasone) were 2.14±0.05, 5.53±0.05**, 8.14±0.06**, 10.08±0.10** respectively, Results are presented as mean±SEM, (n=6), *p<0.01, **p<0.05 dunnet test used as compared to control.

Conclusions: Present study reveals that, the combination treatment of *Zingiber officinale* Rosc. + *Cissus quadrangularis* Linn. has been shown significant analgesic effect. High analgesic effect was observed with combination therapy; the effect was shown same as standard drug dexamethasone.

Keywords: Analgesic, *Cissus quadrangularis* Linn, Hotplate, *Zingiberofficinale* Rosc

INTRODUCTION

Cissus quadrangularis Linn is family of vitaceae, commonly found in India especially hotter places of India. It can be cultivated in plains coastal areas, jungles and wastelands up to 500m elevation various

photochemical were, triterpenes including α - and β -amyrins, β -sitosterol, ketosteroids, phenols, tannins, carotene and vitamin C identified in methanol extract of *Cissus quadrangularis* Linn.¹⁻³ The therapeutic effect depends upon their chemical constituents and Seven alicyclic lipids constituents also been reported from *Cissus*

quadrangularis it's exhibits strong antioxidant and free radical scavenging activity in vitro and in vivo due to the presence of β -carotene oral administrations of *Cissus quadrangularis* extract does not produce any toxic effect (1mg/Kg daily for 10 days) in mice, rats.⁴⁻⁸ *Cissus quadrangularis* used as various conditions like antihelminthic, dyspeptic, digestive tonic, analgesic in eye and ear diseases, scurvy, irregular menstruation, asthma, fractures of bones.^{9,10} *Zingiber officinale* Rosc belongs to the family of Zingiberaceae available in South-East Asia and It has been cultivated used as flavour to Indian food.¹¹ Besides also using in traditional herbal medicine and its having health-promoting perspective rich phytochemistry.¹² The constituents of *zingiber officinale* rosc are various depending on the place of origin and form of rhizomes either fresh or dry, those contains several components i.e., carbohydrates, minerals, phytochemicals, proximate components like moisture, proteins, fats, fiber, and also contains appreciable amounts of vitamins and minerals as well as some enzymes.¹³

METHODS

Selection of dose¹⁴

The dose selection plays vital role in animal studies, as it may sometimes increase mortality rate of rats. So scientific and recognised procedures were followed. The dose for rats was calculated extrapolating the human therapeutic dose (HTD) using the following formula: Dose in rats/200 g of body weight = HTD \times 0.018 (HTD = 5 gm Bd) Here, Rat dose = Human dose \times 0.018 for 200gm rat weight. i. e. 5gm \times 0.018 =0.09 gm or 90 mg, Conversion to dose/Kg body wt. = 90 \times 5=450mg/Kg

Preparation of drug administration

10gms of each tested drug mixed in 100 ml of water and kept overnight and next day morning it is filtered. From the filtrate 4.5 ml of aqueous solution is given to each rat (4.5 ml= 450mg).

Animals

Experimental Animals wister albino rats between 2 and 3 months of age (male) weighing 150-200 g were randomly selected and divided into the control and trial drug groups. The animals were kept in the cages for 5 days prior to the start of the study to allow acclimatized to the experimental room having ambient temperature (23 \pm 2°C), controlled humidity (55 \pm 5%) conditions, and 12 hours light and dark cycle. Animals were caged in polypropylene cages with maximum of three animals per cage. The rats were fed with standard food pellets and water ad libitum.

The experiment was carried out in Department of Pharmacology, V.P. Chest Institute, University of Delhi, New Delhi after obtaining the institutional animal ethical committee approval in accordance to the guidelines mentioned in the CPCSEA.

Eddy's hot plate method¹⁵

Rats were divided into five groups of six each. The animals were placed individually in hot plate regulated at temperature (55 \pm 0.5°C) before the treatment and its reaction time was determined. The tested drugs were given to each rat of different groups. Then the each animal was placed in the Eddy's hot plate under regulated temperature to obtain animal response licking of the forepaws or jump of the Hot plate surface was recorded as the hot-plate latency. The reaction time was noted by stop-watch and then the reaction time was re-determined after 0, 30, 60 & 90 min. after oral administration of standard and test drugs.

Animal experimental groups

- *Group I:* Normal saline (control) orally.
- *Group II:* Treatment of Dexamethasone in a dose of 8ml/kg orally(Standard).
- *Group III:* Treatment of *Cissus quadrangularis* Linn.in a dose of 450 mg/kg orally.
- *Group IV:* Treatment of *Zingiber officinale* Rosc. in a dose 450mg/kg orally.
- *Group V:* Treatment of both *cissus quadrangularis* Linn. with *Zingiber officinale* Rosc. in a dose of 450mg/kg orally.

Statistical analysis

The statistical package Graph Pad Prism 3.1 version was used to analyse all results. Values are expressed as mean \pm SEM. One way ANOVA followed by post hoc Dunnett's test was used for analysis of data and for comparisons between treated and control groups; p <0.05 was considered significant.

RESULTS

Table 1: Analgesic activity by Eddy's Hot Plate method.

Group	Post drug reaction time(sec)			
	0 min	30 min	60 min	90 min
Group-I	2.11 \pm 0.03	2.19 \pm 0.07	2.19 \pm 0.07	2.15 \pm 0.03
Group-II	2.14 \pm 0.05	5.53 \pm 0.05**	8.14 \pm 0.06**	10.08 \pm 0.10**
Group-III	2.18 \pm 0.04	3.13 \pm 0.05**	5.83 \pm 0.05**	5.39 \pm 0.04**
Group-IV	2.12 \pm 0.03	4.13 \pm 0.04**	7.43 \pm 0.07**	7.16 \pm 0.06**
Group-V	2.21 \pm 0.75	4.67 \pm 0.98**	8.15 \pm 0.89**	9.02 \pm 0.75**

Results are presented as mean \pm SEM, (n=6), *p<0.01, **p<0.05 dunnet test as compared to control. The control group at 0 min. 30min, 60 min and 90 min shows hot plate reaction time in sec is 2.11 \pm 0.03, 2.19 \pm 0.07, 2.19 \pm 0.07 and 2.15 \pm 0.03 respectively. The corresponding mean

volumes in Dexamethasone (8 ml/kg) treated group were 2.14 ± 0.05 , $5.53 \pm 0.05^{**}$, $8.14 \pm 0.06^{**}$, $10.08 \pm 0.10^{**}$ respectively, indicating significant analgesic activity of Dexamethasone from 60 min onwards when compared to control. *Zingiber officinale* Rosc. and combination extracts had produced significant increase in hot plate reaction time from 0 to 90 min. The results of *Zingiber officinale* Rosc. and combination groups also showed significant analgesic effect, but the results of combination group were in par with standard drug group.

DISCUSSION

Zingiber officinale bioactive molecules are effective treatment of colorectal, gastric, ovarian, liver, skin cancers several studies support the fact that ginger can cure breast and prostate cancers.¹⁶⁻¹⁹ The anti-inflammatory effect of *zingiber officinale* has been scientific investigations reported concentration-dependent inhibition of arachidonic acid-induced platelet aggregation and formation of thromboxane B. Gingerol, shogaol, and other structurally-related substances in ginger inhibit prostaglandin and leukotriene biosynthesis through suppression of 5-lipoxygenase or prostaglandin synthetase and also inhibit synthesis of IL-1, TNF- α and IL-8 as pro-inflammatory cytokines.^{20,21} Antioxidant are rich in *Zingiber officinale* preparations and effective in reducing the extent of diabetes mellitus, pregnancy-induced maladies, arthritis, etc. This drug considered a safe herbal medicine with few adverse effects. *Cissus quadrangularis* exhibited significant inhibition in DPPH free radical formation, superoxide radical production and lipid peroxide production in erythrocytes. liver enzymes and oxidant defense enzymes controlled in experimental animals *Cissus quadrangularis* is a popular plant, commonly used in Ayurveda for treatment of gastric ulcers.²² The anti-ulcer effect of a methanolic extract of *Cissus quadrangularis* was comparable to that of sucralfate.²³ *Cissus quadrangularis* have an inhibitory effect on edema induced by both carrageenin and arachidonic acid, it is evident that both cyclooxygenase and lipoxygenase pathways of arachidonic acid metabolism are inhibited by *Cissus quadrangularis*.²⁴ According to previous findings, the present study additionally demonstrated that, The Combination treatment of *Zingiber officinale* with *Cissus quadrangularis* have been high significant analgesic than the indusial preparation. More studies are needed to conduct kinetics of functional ingredients of tested drugs.

CONCLUSION

Present study reveals that, *Zingiber officinale* Rosc. and combination treatment of *zingiber officinale* Rosc.+ *Cissus quadrangularis* Linn was shown significant analgesic activity. The analgesic effect was nearly same as dexamethasone in the combination treatment of *zingiber officinale* + *Cissus quadrangularis*.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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