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Original Research Article

ANTI-DIARRHOEAL ACTIVITY OF *POLYCARPAEA CORYMBOSA* (L.) LAM. WHOLE PLANT EXTRACTS (CARYOPHYLLACEAE)

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Abstract:
The objective of this study was to investigate the anti-diarrhoeal activity of whole plant of *Polycarpaea corymbosa* in rats. Anti-diarrhoeal effects of the ethanol extracts at 100, 200 and 400 mg/Kg were evaluated in rats using castor oil induced models. Results showed that the ethanol extract exhibited significant and dose dependent anti-diarrhoeal activity in the model used. A percentage diarrhoeal inhibition of extract at 400 mg/Kg was 75.63%. Diarrhoeal protection in the model used by the extract is dose dependent and the diarrhoeal inhibitory effects of the extract are comparable to loperamide. Therefore, a result of present study suggests that the ethanol extract of *Polycarpaea corymbosa* possesses anti-diarrhoeal activity.

Keywords: *Polycarpaea corymbosa*, anti-diarrhoea

Introduction:

Diarrhoeal diseases are one of the leading causes of morbidity and mortality in developing countries and are responsible for the death of millions of people each year [1]. There are large numbers of epidemiological and experimental evidence pertaining to worldwide acute diarrhoeal disease, which is one of the principal causes of death in the infants [2].

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A vast majority of the people of developing countries relies on herbal drugs for the management of diarrhoea. Considering this fact the World Health Organization has constituted a diarrhoeal disease control programme, which includes studies of traditional medicinal practices, together with the elevation of health education and prevention approaches [3].

Polycarpaea corymbosa (L.) Lam. belongs to 'Caryophyllaceae" is commonly known as "Pallipoondu" in Palliyar tribals of Sirumalai hills, Western Ghats Tamil Nadu. Paste prepared from the leaf is taken once in a day for a period of 2-3weeks to treat jaundice by the Palliyars [4] Biological activities such as anti-inflammatory, antioxidant and hepatoprotectivity were reported [5-7].

In spite of its abundant uses, the anti-diarrhoeal activity of *Polycarpaea corymbosa* whole plant has not been reported. Hence the present study was aimed to evaluate the possible anti-diarrhoreal activity of the whole plant extract of *Polycarpaea corymbosa* to continue the long-run to the improvement of health care.

Materials and Methods

Plant materials

Whole plant of *Polycarpaea corymbosa* (L.) Lam was collected from Sirumalai hills, Western Ghats, Tamil Nadu. With the help of local flora, voucher specimens were identified and preserved in the Ethnopharmacology Unit, Research Department of Botany, V.O.Chidambaram College, Tuticorin, Tamil Nadu for further references.

Preparation of plant extract

The whole plant of *Polycarpaea corymbosa* were dried separately under shade and then powdered with a mechanical grinder to obtain a coarse powder, which were then subjected to extraction in a Soxhlet apparatus using ethanol. The ethanol extract were concentrated in a rotatory evaporator. The concentrated ethanol extracts of whole plant of *Polycarpaea corymbosa* were used for anti-diarrhoeal activity.

Animals

Normal healthy male Wistar albino rats (180-240g) were used for the present investigation. Animals were housed under standard environmental conditions at temperature (25 ± 2^0C) and light and Dark (12:12h). Rats were fed with standard pellet diet (Goldmohur brand, MS Hindustan Lever Ltd., Mumbai, India) and water *ad libitum*.

Acute Toxicity Studies

Acute oral toxicity study was performed as per OECD-423 guidelines (acute toxic class method), albino rats of either sex selected by random sampling were used for acute toxicity study [8]. The animals were kept fasting for overnight and provided only with water, after which the extracts were administered orally at 5mg/kg body weight by gastric incubations and observed for 14 days. If mortality was observed in two out of three animals, then the dose administered was assigned as toxic dose. If mortality was observed in one animal then the same dose was repeated again to confirm the toxic dose. If mortality was not observed, the procedure was repeated for higher doses such as 50, 100 and 2000 mg/kg body weight.

Experimental setup

The animals were divided into four groups of six rats each.

Group I: Rats treated with castor oil (10 ml/Kg p.o) for 7 days

Group II: Rats treated with ethanol extract of whole plant of *Polycarpaea corymbosa*, at the dose of 100 mg/Kg body weight daily for 7 days.

Group III: Rats received ethanol extract of whole plant of *Polycarpaea corymbosa*, at the dose of 200 mg/Kg body weight daily for 7 days.

Group IV: Rats received ethanol extract of whole plant of *Polycarpaea corymbosa*, at the dose of 400 mg/Kg body weight daily for 7 days.

Group V: Rats treated with Loperamide (2 mg/Kg) body weight.

The anti-diarrhoeal activity was performed by the method developed by Havagiray *et* al., [9]. diarrhoea was induced in rats by administration of 10 ml/Kg castor oil to all groups by orally. Animals were fasted for 24hours with free access to water prior to the test. Ethanol extract of *Polycarpaea corymbosa* (100, 200 & 400 mg/Kg) and the standard drug (Loperamide) were given orally (2 mg/Kg).

Results and discussion

The extracts significantly reduced the number of diarrhoeal episodes in a dose-dependent manner when compared with the untreated control. At 400 mg/Kg dose *Polycarpaea corymbosa* showed 75.63% reduction in the number of fecal episodes when as loperamide (2 mg/Kg) offered 94.84% protection. The

results indicated that the ethanol extract of *Polycarpaea corymbosa* was higher effective in controlling castor oil induced diarrhoea at the doses of 100 mg/Kg, 200 mg/Kg and 400 mg/Kg body weight.

Although the extract was found to reduce castor oil induced diarrhoeal episodes but the mechanism of its anti-diarrhoeal activity is uncertain. Since castor oil produces diarrhoea by preventing fluid and electrolyte absorption and thus resulting in intestinal peristalsis [10], one of the probable mechanism of anti-diarrhoeal activity of the test extract *Polycarpaea corymbosa* may be disability to enhance fluid and electrolytic absorption through the gastrointestinal tract. As cholinergic stimulation often because diarrhoea by increasing GI mobility [11], the significant inhibition of GI mobility by test extract *Polycarpaea corymbosa* suggested its probable mode of action to be the prevention of cholinergic transmission or its anticholinergic effect on gastric mucosa.

Most plant species that have anti-diarrhoeal potential confirm tannins as one of the major constituents [12-14] and whole plant of *Polycarpaea corymbosa* also contain tannins. These tannins precipitate proteins of enterocytes, which in turn reduce the peristaltic movements and intestinal secretion [15]. Thus further phytochemical studies are required to isolate anti-diarrhoeal components from the extract to establish its extract mode of anti-diarrhoeal activity.

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Table 1: Anti-diarrhoeal activity of ethanol extract of whole plant of *Polycarpaea corymbosa*

Groups	Dose	% protection	Weight of stools (g)
Group I	10ml/kg	0.00	2.023±0.011
Group II	100mg/kg	71.13 %	0.584±0.0265*
Group III	200mg/kg	75.18 %	0.502.0.0721*
Group IV	400mg/kg	75.63 %	0.493±0.0383*
Group V	2mg/kg	94.84 %	0.104±0.0131***

Each Value is SEM ± 6 individual observations * P < 0.05; ** P<0.01; *** P<0.001
Compared to castor oil induced control vs drug treated rats