

Phytochemical and anti diarrhoeal activity of combined extracts of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa*

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ABSTRACT

Diarrhoea is a condition that involves frequent passing of loose or watery stools. According to the WHO, approximately 3.5 million deaths each year are attributable to diarrhoea. Medicinal plants have been used as traditional remedy for diarrhoea for years long and there is renewed interest from the discovery of novel compounds from plants to fight against diarrhoea. WHO also encourages studies on diarrhoea which include research on traditional herbs. The present study was designed to investigate antidiarrhoeal potential of combined 70% hydro ethanolic extracts of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa*

Castor oil induced diarrhoea in wister rats. phyto chemical screening of the plant extract for their active constituents was also carried out using standard procedures. Oral administration of combined hydro ethanolic extract of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa*, and dose dependently delayed the onset of diarrhoea induced by castor oil and also significantly reduced the number of diarrhoeal episodes and number of animals exhibiting diarrhoea. The results were comparable with standard synthetic antidiarrhoeal drug, loperamide. Phytochemical screening also revealed the presence of alkaloids, tannins, flavonoids, carbohydrates as the major constituents. The results point out the presence of active principles *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa* possessing a promising antidiarrhoeal effect substantiate the use of herb non specific treatment of diarrhoea in folk medicine.

Key words: *Acalypha* species combined extract, castor oil, anti diarrhoeal activity, phytochemicals

INTRODUCTION

Diarrhoea is important health problem in India as well as world wide. More than 5-8 millions of death of infants children under 5 years has been a greatest interest in herbal remedies for the treatment of ailments. Indigenous plants such as *Andrographis paniculata*, *Cassia auriculata*, *Holarrhena antidysenterica*, *Cyperus rotundus* and others are widely used for the treatment of diarrhoea. *Acalypha* species or tiger nut seeds known as bhadrāmūṣṭā in Sanskrit is an annual or perennial herb growing up to 90cm long with solitary stems growing from a tuber. According to ayurveda the tuber is cooling, acrid, galactagogue to the bowels, aphrodisiacs: sharpens the appetite and improves the taste useful in eye troubles, burning sensations antidiarrhoeal and leprosy

MATERIALS AND METHODS

Preparation of extracts: The roots of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa* were collected from different parts of Andhra Pradesh authenticated were dried under shade and then powdered with mechanical grinder macerated with ethanol-water (70:30). After exhaustive extraction the ethanol extracts were made solvent free by distillation under reduced pressure and the resulting semisolid masses were dried to yield a solid-hydro ethanolic extracts.

Phytochemical investigation: Phytochemical tests were carried out to find the presence of phytochemical constituents viz. alkaloids, carbohydrates, proteins, flavanoids, glycosides, fats, steroids, triterpenoids and tannins according to the standard procedures.

Animals: Wister albino rats weighing between 150-200g were maintained under standard laboratory condition on 12-day/night cycle with free access to food and water being *ad libitum*. The animals were acclimatized to laboratory condition prior to experimentation. The animals were drawn at random for the study. All the experiments were performed according to current guidelines for the care of the laboratory animals and the ethical guidelines.

Screening of antidiarrhoeal activity: Castor oil induced diarrhoea before the experimental study; the animals were fasted overnight with free access to water. The experimental animals were grouped into four, each group containing wistar albino rats.

Group.1: Received vehicle orally served as control

Group.2: Ethanol extracts (200mg/kg)

Group.3: Ethanol extracts (400mg/kg)

Group.4: Received loperamide and served as standard

All test preparations and standard drug were administered 1hr prior to castor oil. Each rat was then housed separately in the cages, and observed for diarrhoeal episodes for a period of 4hr. During that number and weight of diarrhoeal faeces were taken after every 1/2 hr using mean diarrhoeal episodes percentage diarrhoea and percentage protection were calculated castor oil induced enteropooling. Rats are fasted for 24hrs prior to the experiment .then the drugs were administered accordingly as per groupings for 1hr2mii/ rat castor oil is was given orally to the all groups. Two hrs later threats were sacrificed. Small intestine from pylorus to caecum was isolated there was intestinal content were collected b y milking in to graduated tube. Volume was measure in ml.

Statistical analysis: Results were calculated by student t test to assess statistical significance and data summarized as mean \pm -SEM.

RESULTS AND DISCUSSION

Phytochemical screening of hydro ethanolic extract of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa* Combined

Table.1.Results of Phytochemical analysis of hydro ethanolic extract of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa* Combined

Phytochemical	Result
alkaloids	++++
carbohydrates	++++
flavonoids	+++
steroids	-
Triterpenoids	-
Tannins	++++
proteins	-
glycoside	++
lipids	-

Castor oil induced diarrhoea:

Table.2.Results of Castor oil induced diarrhoea of hydro ethanolic extract of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa* Combined

Group no	Group	Watery diarrhoea no	% of protection	Mean weight of stools
1	Vehicle (1% cmc)	6.20 \pm 0.42	00.00	5.71 \pm 0.31
2	Ethanol extracts (200mg/kg)	2.8 \pm 0.61	57.72	3.40 \pm 0.41
3	Ethanol extracts (400mg/kg)	2.00 \pm 0.21	67.20	2.50 \pm 0.21
4	Loperamide (2mg/kg)	1.3 \pm 0.52	78.67	1.72 \pm 0.13

Values are expressed as mean \pm SEM (n=6 animals in each group)

Castor oil induced enteropooling:

Table.3.Results of Castor oil induced enteropooling of hydro ethanolic extract of *Acalypha hispida*, *Acalypha nervosa* and *Acalypha fruticosa* Combined

Group no	Group	volume	% of protection
1	Vehicle(1%cmc)	7.50 \pm 0.19	00.00
2	Ethanol extracts(200mg/kg)	3.10 \pm 0.48	55.57
3	Ethanol extracts(400mg/kg)	2.20 \pm 0.31	68.73
4	Loperamide(2mg/kg)	1.30 \pm 0.23	82.57

Values are expressed mean \pm SEM (n=6 animals in each group)

The extract showed dose dependent inhibition of frequency of defecation as well as reduction in no of wet faeces. However this value significant at 400mg/kg dose. The loperamide as shown significant reduction frequency of defecation and wet faeces. The %inhibition of faecal and small intestinal content with 200 and 400mg/kg doses of combined hydro ethanol extracts results shown in tables. It is well known that ricinoleic acid an active component of castor oil induces changes in mucous permeability, electrolyte transport and intestinal peristalsis leading to hyper secretory of the intestinal mucosa, leading to prostaglandins release which causes an increase in net secretion of water and electrolytes in to the small intestine. Ricinoleic acid causes irritation and inflammation bio synthesis delay castor oil induced diarrhoea. The mechanism has been associated with dual effects on gastro intestinal motility as well as on water and electrolyte transport. PGE2 also inhibits the absorbtion of water and

electrolytes. The presence of flavonoids and tannins already reported for their antidiarrhoeal activity has been proven in this experiment. Tannins can evoke antidiarrhoeal effect and these substances may precipitate proteins of the electrolytes reduce peristaltic movement and intestinal secretion. The antidiarrhoeal activity of flavonoids has been ascribed to their ability to intestinal motility and hydroelectric secretion which is known to be altered in intestinal condition. In-vitro and in-vivo experiments shown the flavonoids are able to inhibit intestinal secretary response induced by prostaglandinE2 in addition to flavonoids possess anti oxidant properties which are presumed to be responsible for inhibitory effect exerts up on several enzymes include those involved in the arachidonic acid metabolism.

CONCLUSION

The root extract contains tannins, flavonoids which may be able to have contribution to the anti diarrhoeal activity. Further research needed to identify the specific constituents responsible for this activity and it may lead to a new hope against this world wide problem.

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