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STUDY OF THE PHYTOCHEMICAL AND ANTIINFLAMMATORY ACTIVITY OF *CURCUMA AMADA* IN ANIMAL MODEL

Veeresh Kumar. P*[1], Kalyani Jatoth[2], Ajmera Shanti Priya[3], T.Mangilal[4]

[*1]JPNES Group of Institutions, Faculty of Pharmacy, Mahabubnagar, T.S, India.

[2]Department of Microbiology, Pingle College of Science, Kakatiya University, Warangal, T.S, India.

[3]Department of Microbiology, Kakatiya University, Warangal, T.S, India.

[4]Department of pharmacy, UCT, OU, Hyderabad, Telangana, India.

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For Correspondence:

Veeresh Kumar. P.

Resident, Department of Forensic Medicine. Pt. BDS. PGIMS. Rohtak

E-mail:

veeresh.pmahendra@gmail.com

ABSTRACT

The present study was to investigate the anti-inflammatory activity of curcuma amada. *Curcuma amada* is a unique spice having morphological resemblance with ginger (*Zingiber officinale*) but imparts a raw mango (*Mangifera indica*) flavour. Collected Rhizome of curcuma amada was shade dried and were powdered and extracted with various solvents. Wistar rats of both sex weighing (180- 250g) were used for the pharmacological studies. The animals were kept under standard conditions (day/night rhythm) 8.00 am to 8.00 pm (12 hrs), 22°C room temperature, standard pelleted diet (Hindustan Lever, Bangalore) and water *ad libitum*. Rats were divided into groups. Male albino rats of groups of 3, fasted overnight prior to and during the experiment but have free access to water. Group A was served as toxicant control treated with toxicant formalin, Group B: standard (diclofenac 30 mg/kg p.o.) that served as standard. Group C is administered with extract (400 mg / kg) respectively. The Rat groups of B, C were administered with1% of formalin into sub plantar region of right hind paw of rats 1hr after administration of diclofenac and plant extract. Immediately thereafter the oedema volumes of the injected paws were measured plethismographically at prefixed time intervals. The difference between paw volumes of treated animals was measured and the mean oedema volume was calculated. Results indicated a significant effect of the aqueous extract of *Curcuma Amada and* supports its traditional usage as an anti-inflammatory agent. Further, studies is required for the detailed studies in isolation of the compounds and pharmacological investigations of constituents, which have many pharmacological activity reported in traditionally and its exact mechanism of action.

INTRODUCTION

Inflammation is part of the complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells, or irritants[1]. The classical signs of acute inflammation are pain, heat, redness, swelling, and loss of function. Inflammation is a protective attempt by the organism to remove the injurious stimuli and to initiate the healing process. The practice of herbal medicine dates back to the very earliest periods of known history. There is evidence of herb having been used in treatment of diseases and for revitalizing body systems in almost all ancient civilizations. Medicinal plants were existing even before human beings made their appearance on the earth. It is therefore often said that where ever we are born we have around us herbs, shrubs &plants which are useful for us[2]. The use of plants, plant extracts or plant derived pure chemicals to treat disease is therapeutic modality, which has stood the test of time. Indeed many pharmacological classes of drugs including a natural product prototype. There is a revival interest in herbal products (botanicals) at a goal level and conventional medicine is now beginning to accept the use of botanicals once they are scientifically validated. Isphagula, Garlic, Ginseng, Ginger, Ginkgo, St. John's Wort and a Saw palmetto are a few examples of botanicals which are gaining popularity amongst modern physicians and this trend is likely to continue partly due to high cost involved in the development of patentable chemical drugs. There is growing evidence to show that medicinal plants contain synergistic and/or side-effects neutralizing combinations. Ethnopharmacology has already played important role in the development of conventional medicine and is likely to play more significant role in the years to come[3].

Researchers from Michigan Medical School reported that ginger supplements were found to reduce the markers of colon inflammation. Chronic colon inflammation is associated with a higher risk of developing colon cancer. They added that ginger supplements may help prevent colon cancer. Turmeric *(Curcuma longa)* - also a plant of the ginger family. Current research is looking into the possible beneficial effects of turmeric in treating arthritis, Alzheimer's disease, and some other inflammatory conditions. Curcumin, a substance found in turmeric, is under investigation for the treatment of several illnesses and disorders, including inflammation. Ginger, also known as ginger root, is the mass of roots (rhizome) of the *Zingiber officinale* plant. It is used as a medicine or a spice. Jamaican ginger was the traditional medical form of this root, and has been used as a carminative (to treat gas or wind) and a stimulant. It has been used for hundreds of years to treat dyspepsia, constipation, colic, other gastrointestinal problems, as well as rheumatoid arthritis pain.

Curcuma amada is a unique spice having morphological resemblance with ginger (*Zingiber officinale*) but imparts a raw mango (*Mangifera indica*) flavour. The genus name *Curcuma* was coined by Linnaeus in 1753 in his *Species Plantarum*. The word probably derives from the Arabic word '*kurkum*', which means yellow colour . *Curcuma amada* Roxb. is commonly known as mango ginger. It is a perennial, rhizomatous, aromatic herb belonging to the family Zingiberaceae. This family is composed of 70–80 species of rhizomatous annual or perennial herbs .

Curcuma amada has documented *to possess* antipyretic, aphrodisiac, diuretic Activity[4, 5] *but* the effect of *Curcuma amada* as a Anti-inflammatory agent is still not reported. Hence it was thought worth while to screen extract of *Curcuma amada* for its Anti-inflammatory activity.

MATERIALS AND METHODS

Animals: Colony in bred strains of Wistar rats of both sex weighing (180- 250g) were used for the pharmacological studies. The animals were kept under standard conditions (day/night rhythm) 8.00 am to 8.00 pm (12 hrs), 22°C room temperature, standard pelleted diet (Hindustan Lever, Bangalore) and water *ad libitum*. The animals were housed for one week in polypropylene cages prior to the experiments to acclimatize to laboratory conditions. Rats were divided into groups. Each group containing six animals and were kept in different cages. Animals were selected at random and both sexes were used[6-8].

Preparation of plant extracts:

Rhizome of *Curcuma amada* was procured from local market. It was shade dried and were powdered with help of electric grinder and Passed through sieve for coarse powder. This powder was used for the preparation of different extracts successively using various solvents. Successive extraction was carried out by using Petroleum ether, Chloroform and Aqueous solvents. Each extraction was concentrated to a small volume and allowed to dry. After drying, the respective extracts were weighed and percentage yield of extracts were determined[9].

Acute Oral Toxicity: The Mice Treated with extracts at a dose of 2000 mg/kg, p.o. prohibited normal behavior, without any signs of passivity, stereotypy, and vocalization. Their motor activity and secretory signs were also normal and no signs of symptoms[10].

Phytochemical Tests:

The extracts of the plant material was subjected to various chemical tests for identification of its chemical constituents. Such as tests for alkaloids, carbohydrates, glycosides, fixed oils, tannins and phenolic compounds, saponins etc.

Pharmacological Screening:

Antiinflammatory Method:

Male albino rats of groups of 3, fasted overnight prior to and during the experiment but have free access to water. Group A was served as toxicant control treated with toxicant formalin, Group B: standard (diclofenac 30 mg/kg p.o.) that served as standard. Group C is administered with extract (400 mg / kg) respectively. The Rat groups of B, C were administered with1% of formalin into sub plantar region of right hind paw of rats 1hr after administration of diclofenac and plant extract. Immediately thereafter the oedema volumes of the injected paws were measured plethismographically at prefixed time intervals. The difference between paw volumes of treated animals was measured and the mean oedema volume was calculated. Percentage Reduction in odema volume was calculated[11].

RESULTS AND DISCUSSION

Curcuma Amada has particularly shown some interesting biological activities related to its worldwide uses in traditional medicine. Acute oral toxicity studies indicate no mortality recorded. Subjected plant extracts were for phytochemical screening and found to contain tannins, sterols, flavonoids, glycoside, and alkaloids in aqueous extract (Table 1).

Table1: Phytochemical Evaluation of different extract of rhizomes of Curcuma amada

S.NO.	TESTS	PETROLEUM ETHER	CHLOROFORM	WATER.
1.	Alkaloids	-Ve	-Ve	+Ve
2.	Carbohydrates	-Ve	-Ve	+Ve
3.	Glycosides	-Ve	-Ve	+Ve
4.	Fixed Oils	-Ve	-Ve	+Ve
5.	Tannins	-Ve	-Ve	+Ve
6.	Sterols	+Ve	+Ve	+Ve
7.	Saponins	-Ve	-Ve	+Ve
8.	Proteins	-Ve	-Ve	+Ve
9.	Flavoniods	-Ve	-Ve	+Ve

+Ve Indicates Present -Ve Indicates Absent

Anti-inflammatory activity by induced paw oedema model in Rats:

Plant extracts were at a dose of 400 mg/kg has exhibited a significant reduction in formalin induced paw oedema in rats at different time intervals. Diclofenac Sodium (30mg/kg) was used as standard reference and it has significantly reduced paw volume by 30.55% at 1st hr, 57.08.83% at 2nd hr, 75.83%at 3rd hr, and 86.40% at 4th hr which was found to be a time dependent effect (Table 2).

Table 2: Anti-inflammatory Effect of Curcuma amada on paw volume in formalin induced paw edema in rats.

Groups	Treatment	Paw Oedema volume and percentage of inhibition							
		60 Min	% Reduction	120 min	% Reduction	180 min	% Reduction	240 min	% Reduction
Control	Formalin	0.46±0.06	-	0.48±0.05	-	0.51±0.022	-	0.57±0.042	-
Standard Diclofenac Sodium	30 mg/kg	0.36±0.080	30.55	0.31±0.06	57.08	0.25±0.08	75.83	0.15±0.022	86.40
Plant extract	400mg/kg	0.42±0.05	13.54	0.37±0.06	44.90	0.32±0.03	65.25	0.25±0.022	73.56

CONCLUSION

The present study indicated a significant effect of the aqueous extract of *Curcuma Amada and* supports its traditional usage as an anti-inflammatory agent. Further, studies is required for the detailed studies in isolation of the compounds and pharmacological investigations of constituents, which have many pharmacological activity reported in traditionally and its exact mechanism of action.

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