

Phytochemical Analysis and *in vitro* Anti-Inflammatory and Anti-Bacterial Activities *Curcuma Pseudomontana* J.Graham

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Abstract

Aim: The present study is aimed to evaluate the Phytochemical analysis and *In-vitro* Anti-inflammatory and Anti-bacterial activity of *Curcuma pseudomontana* J.Graham. **Materials and methods:** In the present investigation, the rhizomes of *curcuma pseudomontana* powder was extracted by successive soxhlation extraction method with ethyl acetate and methanol. The ethyl acetate extracts responded positively to all the tests for carbohydrates and also to the tests for flavonoids and glycosides and methanolic extracts produced positive test for the presence of carbohydrates, proteins, steroids, flavonoid glycosides, tannins and phenol compounds. The extracts were used for testing the *in-vitro* anti-inflammatory activity by using albumin denaturation assay, proteinase inhibitory activity at a concentration of 20, 40, 60, 80 and 100mg/ml and Anti-bacterial activity against two gram positive microorganisms (*Bacillus subtilis* and *Staphylococcus aureus*) and two gram negative microorganisms (*Salmonella typhi* and *Escherichia coli*) at concentrations 100 mg/ml and 200 mg/ml by adopting cup plate method.

Results: The extracts exhibited significant *in-vitro* anti-inflammatory effect and inhibited the growth of both Gram positive and Gram-negative microorganisms at 100 mg/ml and 200 mg/ml concentrations. **Conclusion:** The findings of this study showed that the effectiveness of methanol extract shows more Anti-inflammatory and Anti-bacterial activity compared to ethyl acetate extract. Because of methanol extract contains more bioactive compounds comparatively then ethyl acetate extract and bioactive components justifying its traditional use.

Keywords

Curcuma pseudomontana, Anti-inflammatory activity, Anti-bacterial activity, Phytochemical analysis.

INTRODUCTION

Curcuma pseudomontana J. Graham is an extremely rare Zingiberaceae species found so far only in the Naikongchhari forest area of Bandarban district in the southeastern hilly area of Bangladesh¹. *C. pseudomontana* is endemic to the Western and Eastern Ghats, of peninsular India, the species found

in Karnataka, Maharashtra and Andhra Pradesh in English it is known as hill turmeric². Dried rhizomes of *C. pseudomontana* J. Graham., used in skin diseases and impurities of blood³. Rhizomes boiled in oil and used as an application to sprain and useful on snake bite⁴. Rhizome powder are useful in leucoderma, scabies, smallpox, and intestinal worms as well as

juice strong remedy against rheumatism and in combination of ginger used for smooth delivery in North East India⁵. Boiled tubers along with a pinch of salt in oral administration increase the secretion of milk among new mothers and lactating woman in Andhra Pradesh⁶, The Bagata and Valmiki tribes of Munchingiputtu Mandal, Visakhapatnam district, Andhra Pradesh use *C. pseudomontana* rhizome in the treatment of jaundice and diabetes⁷. The rhizome are used for skin problems and coughs by the tribals of Achampet Forest Division in Nallamalais, Telengana, India⁸, The Kattunaikan tribe of Malappuram district in Kerala, India, uses the rhizomes for cardiac disorders⁹. The rhizomes are used for muscle pain, leprosy and debility by tribal communities residing in Gundlabrahmeswaram Wildlife Sanctuary (Eastern Ghats), Andhra Pradesh, India¹⁰.

MATERIAL AND METHOD

Plant Material

The fresh rhizomes are collected from the chikmagalur, Western Ghats of Karnataka, India and authenticated by Dr. Madhavashetty, Dept of Botany; Sri Venkateshara University, Trupathi, Andhra Pradesh and the Voucher specimen was deposited in the herbarium of School of Pharmacy, Anurag Group of Institutions, Venkatapur, Ghatkesar, Medchal, Telengana.

Preparation of Extract:

Freshly collected rhizomes were dried at room temperature and coarsely powdered. The rhizomes powdered 500 gm were extracted successively with ethyl acetate and methanol using Soxhlet apparatus. The crude extract was evaporated to dryness and found to be 30 and 20gms respectively. Preliminary phytochemical screening was performed. ethyl acetate extract of *Curcuma psedomonota* revealed the presence of carbohydrates, steroids, Phenol compounds and flavonoids, methanol extract tested positive for carbohydrates, proteins, glycosides, Phenol compounds and Flavonoid. The constituents present in the ethyl acetate extract and methanol extracts are carrying out the In-vitro Anti-inflammatory and Anti-bacterial activity.

RESULTS

In-vitro Anti-inflammatory activity effect of *Curcuma pseudomontana* on heat induced protein denaturation

Concentration (μ g/ml)	% inhibition of protein denaturation		
	Diclofenac sodium (standard)	Ethyl acetate extract of <i>Curcuma pseudomontana</i>	Methanol extract of <i>Curcuma pseudomontana</i>
20	58.24 \pm 3.12	33.14 \pm 3.16	35.48 \pm 5.18
40	65.32 \pm 1.24	35.18 \pm 2.35	38.74 \pm 3.24
60	72.40 \pm 2.24	48.90 \pm 2.04	59.20 \pm 2.42

80	76.65±3.54	62.05±1.40	72.10±3.4
100	83.15±2.26	68.60±1.53	78.12±1.82

Each value represents the mean ± SD. N=3, Experimental group were compared with control **p <0.01considered extremely significant; *p < 0.05, non-significant.

In-vitro anti-inflammatory activity Curcuma psedomontana on heat induced protein denaturation

Concentration (μ g/ml)	% inhibition of proteinase action		
	Diclofenac sodium (standard)	Ethyl acetate extract of <i>Curcuma psedomontana</i>	Methanol extract of <i>Curcuma psedomontana</i>
20	60.25±3.64	34.44±2.52	35.98±.84
40	70.02±4.62	22.4±1.48	26.5±2.88
60	71.49±2.54	31.6±3.62	33.00±2.84
80	76.35±4.12	42.2±2.84	48.1±2.60
100	84.10±2.20	54.6±1.84	58.8±2.64

Each value represents the mean ± SD. N=3, Experimental group were compared with control
**p <0.01considered extremely significant; *p < 0.05, non-significant.

STATISTICAL ANALYSIS

Results are expressed as Mean ± SD. The difference between experimental groups was compared by One Way Analysis of Variance (ANOVA) followed by Dunnet Multiple comparison test (control Vs test).

In-vitro anti-bacterial activity of Curcuma psedomontana

Name of organism	Zone of inhibition (mm)					
	Streptomycin		Ethyl acetate extract of <i>Curcuma psedomontana</i>		Methanol extract of <i>Curcuma psedomontana</i>	
	100 μ g/ml	200 μ g/ml	100mg/ml	200mg/ml	100mg/ml	200mg/ml
<i>E. coli</i>	10.8±0.22	12.2±0.27	6.6±0.24	8.2±0.12	8.0±0.40	9.2±0.50
<i>K. pneumonia</i>	9.5±0.4	11.2±0.12	6.1±0.24	8.0±0.32	8.1±0.22	9.0±0.54
<i>B. subtilis</i>	10.4±0.32	12.6±0.12	5.6±0.12	7.2±0.12	7.1±0.40	8.1±0.42
<i>S. aureus</i>	10.6±0.74	11.8±0.44	5.5±0.22	6.8±0.16	7.2±0.72	8.4±0.30

ZI were expressed as mean+ standard deviation of three replicates.
Low activity (1-6 mm), moderate activity (7-10mm), high activity (11-15 mm).
Represents mean ± S.D. mm; p < 0.05.

CONCLUSION

The above results of preliminary phytochemical analysis and anti-inflammatory and anti-bacterial activity of *Curcuma psedomontana* rhizomes extracts confirmed as a useful Anti-inflammatory and Antimicrobial agent. The present study provides evidence that *Curcuma psedomontana* rhizomes extracts contains medicinally important bioactive compounds like carbohydrates, proteins, alkaloids, glycosides, flavonoids and phenol compounds and this justifies the use of plant species as traditional medicine for treatment of inflammation and bacterial infections.

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