NOTES ON NATURAL HISTORY

An Analysis for Herbal Potentiality of *Curcuma angustifolia* Roxb.

Divya Paikara^{1*}, Bhawana Pandey², Ashis Kumar Sarkar¹

¹School of Biological and Chemical Sciences, MATS University, Raipur, Chhattisgarh

²Department of Biotechnology and Microbiology, Bhilai Mahila Mahavidyalaya, Hospital sector, Bhilai, Chhattisgarh

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Introduction:

From ancient period plants play a crucial role to maintain human health, especially with more intensive studies in the last decade for natural therapies (Gislene *et al.*, 2000). The secondary metabolites of the plants are the major sources of pharmaceutical, food additives and fragrances. Plants are used in the treatment of indigestion, skin diseases, cough, bronchitis, allergy, leucoderma and as general tonic, it has also found beneficial in diarrhoea, dysentery and colitis, typhoid fever, ulceration of bowels, bladder and in painful micturition (Quamar & Bera, 2014). The different parts of plants were used and extracts were subjected to antimicrobial assays have been checked against microorganism.

Tikhur (*Curcuma angustifolia* Roxb.) is rhizomatous herb. It is one of over 80 species belonging to the *Curcuma* L. genus in the family Zingiberaceae. The genus *Curcuma* is an important source of phytochemicals from which both the extracts and essential oils are known for their biological activities. Essential oils of *Curcuma* sp. have been studied extensively resulting in the identification of several volatile compounds, viz., terpenoids predominated (Asem & Laitonjam, 2014; Rameshkumar *et al.*, 2015; Gao *et al.*, 2016). The phytochemical analysis was carried out for the different parts of the plant extracted with different solvent.

Phytochemical analysis:

After proper identification, from Jagdalpur district of Chhattisgarh, fresh plant parts were of *Curcuma angustifolia* collected randomly and washed under tap water, shade dried and then homogenized to a fine powder and stored in airtight bottles. The crushed leaves and rhizome were taken in mortar and pestle and to which different solvents, ethanol, acetone, and methanol were added individually and mixed well. The mixtures were further centrifuged at 1000 rpm for 15 min and the supernatants were collected separately for further study.

Phytochemical properties: various qualitative chemical tests were done for establishing the profiles of ethanol, acetone and petroleum ether extract for its chemical

composition. The following tests were performed (Wadood *et al.*, 2013; Gracelin *et al.*, 2013; Ndam *et al.*, 2014) Table-1.

Table 1: Phytochemical Evaluation of *Curcuma angustifolia*

Test for	Rhizome	Leaves	Method/Tests
Alkaloid	+ve	+ve	Dragendoff's Test
Tanins	-ve	-ve	Neutral FeCl ₃
Saponins	+ve	+ve	Chloroform & H ₂ SO ₄
Cardiac Glycosides	-ve	+ve	Molisch Test
Terpenoid	+ve	-ve	Noller's Test
Phenol	+ve	+ve	Ferric chloride Test
Flavonoid	+ve	+ve	Shinoda Test
Carbohydrate	+ve	-ve	Molisch Test
Protein	+ve	+ve	Million's Test

Antibacterial test: sterile molten nutrient agar at around 400C was added and poured in sterile Petri plate and allowed to be solidified. After solidification 4 mm wells were prepared and in which the prepared solvent extracts were added. The plate were incubated over night at 37°C. After incubation the zones of inhibition were measured.

The microorganism used for the purpose were *Stephylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Streptococcus pneumonia* and *Escherichia coli*, (Balaabirami & Patharajan, 2012).

In *C.angustifolia* leaves of ethanol extract, maximum zone of inhibition was 20mm in concentration 80mg/ml, against *P.aeruginosa* and minimum zone of inhibition was 10mm in concentration of 20(mg/ml), against *B.subtilis* and *S.aureus*. In acetone extract of *C. angustifolia* maximum zone of inhibition was 20mm in concentration of 80mg/ml against *P.aeruginosa* and minimum zone of *C.aungustifolia* rhizome inhibition was 10mm in concentration of 20mg/ml, against *S.aureus*. In petroleum ether extract of *C. aungustifolia*. showed very less antimicrobial property. Ethanol and acetone solvent using leave extract showed antimicrobial property. In *C.aungustifolia* rhizome of ethanol extract, maximum zone of inhibition was 9mm in concentration 80mg/ml, against *B.subtilis* and minimum zone of inhibition was 0mm in concentration of 20(mg/ml), against *P.aeruginosa*. In acetone extract of *C.aungustifolia*, maximum zone of inhibition was 10mm in

*Corresponding Author: divyapaikara@gmail.com

NOTES ON NATURAL HISTORY

concentration of 80mg/ml against *E.Coli* and minimum zone of inhibition was 1mm in concentration of 20mg/ml, against *S. pneumoniae*. In petroleum ether extract of *C.aungustifolia* rhizome showed a very less antimicrobial property. Ethanol and acetone solvent using rhizome extract shows antimicrobial property.

Antifungal test: fresh leaves and rhizome of *Curcuma angustifolia* was collected, washed thoroughly 2-3 times with running tap water and dried under shade. The total dried mass was grounded to a fine powder and the same powder was kept in small plastic bags with proper labeling.

Antifungal activity were tested against *Aspergillus niger*, *Aspergillus fumigatus*, *Mucor*, *Rhizopus* and *Aspergillus flavus*. (Balaabirami & Pahtharajan, 2012).

Table 2: Antimicrobial activity of leaf extract in different solvents against bacteria and fungus by agar well plate method

Ethanol				Acetone				Petroleum ether			
2%	4%	6%	8%	2%	4%	6%	8%	2%	4%	6%	8%
Bacteria: Escherichia coli											
11	14	12	14	11	14	12	14	0	3	6	10
Bacteria: Bacillus subtilis											
10	14	15	16	10	14	15	16	0	0	0	1
Bacteria: Pseudomonas aeruginosa											
13	14	15	20	13	14	15	20	0	0	7	8
Bacteria: Stephylococcus aureus											
10	13	13	20	10	13	13	20	0	0	0	2
Bacteria: Streptococcus pneumonia											
12	14	12	17	12	14	12	17	0	0	1	3
Fungus: Aspergillus fumigatus											
12	13	14	15	7	8	8	9	0	1	3	3
Fungus: Aspergillus flavus											
10	11	12	15	10	12	14	15	0	0	1	1
Fungus: Aspergillus niger											
6	8	9	10	7	9	12	13	0	2	3	4
Fungus: Mucor											
0	1	1	2	0	0	0	1	0	0	0	0
Fungus: Rhizopus											
5	7	8	10	3	4	6	8	0	0	1	2

C.aungustifolia's leaves of ethanol extract showed maximum zone of inhibition as 15mm in concentration of 80mg/ml, against *A.flavus* and *A.fumigatus*, minimum zone of inhibition was 0mm in concentration of 20(mg/ml), against *Mucor*. In acetone extract of *C. aungustifolia* leaves, maximum zone of inhibition was 15mm in concentration of 80mg/ml against *A.flavus*, minimum zone of inhibition was 0mm in concentration of 20(mg/ml), against *Mucor*. In petroleum ether extract of *C. aungustifolia* leaves showed very less antifungal property. *C.aungustifolia* rhizome of ethanol extract maximum zone of inhibition was 12mm in concentration 80mg/ml, against *A.flavus* and *A.fumigatus* minimum zone of inhibition was 3mm in concentration of 20(mg/ml), against *Rhizopus*. In acetone extract of *C. aungustifolia* rhizome, maximum zone of inhibition was 10mm in concentration of 80mg/ml against *A.flavus* and *A.fumigatus*, minimum zone of

inhibition was 1mm in concentration of 20mg/ml, against *Rhizopus*. In petroleum ether extract of *C. aungustifolia* rhizome showed very less antifungal property.

Table 3: Antimicrobial activity of rhizome extract in different solvents against bacteria and fungus by agar well plate method

Ethanol				Acetone				Petroleum ether			
2%	4%	6%	8%	2%	4%	6%	8%	2%	4%	6%	8%
Bacteria: Escherichia coli											
4	6	7	8	7	8	9	10	3	4	5	6
Bacteria: Bacillus subtilis											
6	7	8	9	6	7	8	9	0	0	0	0
Bacteria: Pseudomonas aeruginosa											
0	0	1	1	4	6	7	8	0	0	0	0
Bacteria: Stephylococcus aureus											
0	1	1	2	3	5	6	7	0	0	0	0
Bacteria: Streptococcus pneumonia											
4	6	7	8	1	3	4	6	0	2	2	3
Fungus: Aspergillus fumigatus											
9	10	11	12	8	9	10	10	1	2	2	3
Fungus: Aspergillus flavus											
7	8	9	12	7	8	9	10	0	0	1	2
Fungus: Aspergillus niger											
6	7	8	10	6	8	9	9	0	1	1	2
Fungus: Mucor											
0	0	0	0	0	0	0	0	0	0	0	0
Fungus: Rhizopus											
3	4	5	6	1	2	3	4	0	0	1	1

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