



## PRIMARY PHYTOCHEMICAL STUDIES OF *CATUNAREGAM SPINOSA* (THUNB.) TIRVEN FOR SECONDARY METABOLITES

M. B. PATIL<sup>1</sup> AND P. A. KHAN\*<sup>2</sup>

<sup>1,2</sup>Department of Botany for UG, PG and Research, J.E.S's, Arts, Science and Commerce College, Nandurbar-425412 (MS) INDIA

### ABSTRACT

*Catunaregam spinosa* (Thunb.) (Rubiaceae), commonly called as Gedhphal and madanaphala in Ayurveda. Various ethno medicinal aspects are present in folk literature and new scientific documentation. It has been reported that *Catunaregam spinosa* used in diarrhoea, dysentery and as abortifacient, anthelmintic and antipyretic. Phytochemical extraction was carried out for qualitative test for secondary metabolites presence in different part of *C. spinosa*. Plant was collected, parts are dried and fine powder was subjected to different solvent extraction with Soxhlet apparatus. The result for test showed presence of Alkaloids, Cardiac glycosides, Coumarins, Flavonoids, Glycosides, Phenols, Reducing sugars, Saponins, Steroids, and Tannin in Leaves extract, Stem Bark extract and Root bark extract which varies according to variation in solvent system. Results reveals that the importance medicinal properties is due to the presence of these phyto-constituents which need to farther elaboration in future works to detect active ingredient for particular disease.

**KEY WORDS:** Phytochemical, Secondary metabolites, *Catunaregam spinosa*, Solvents.



**P. A. KHAN\***

Department of Botany for UG, PG and Research, J.E.S's, Arts, Science and Commerce College,  
Nandurbar-425412 (MS) INDIA

Received on: 20-01-2017

Revised and Accepted on: 17-04-2017

DOI: <http://dx.doi.org/10.22376/ijpbs.2017.8.2.p320-323>

## INTRODUCTION

*Catunaregam spinosa* (Thunb.) belongs to the family Rubiaceae commonly known as Gedhpal or Emetic nut. Though the traditional Indian system of medicine has a long history of use, they lacked adequate scientific documentation, particularly in light of modern scientific knowledge.<sup>1,2</sup> It consists of about 10 species, out of which two are in India with medicinal importance mentioned in Ayurveda. Plant bark reported for the treatment of diarrhoea, dysentery and as abortifacient, anthelmintic and antipyretic.<sup>3</sup> It is also considered to be sedative and hypoglycemic and also used in case of stomach ache as first aid remedy, roots are used in the treatment of epilepsy, eye ache and urinary infection, fruit is used as fish poison, emetic and the leaves are used in Pulmonary Infections.<sup>4,5</sup> It is carminative, alexiteric, antipyretic; cures abscess, ulcers, inflammations, wounds, tumours, skin diseases.<sup>6</sup> It contains triterpenoidal saponins, essential oil, veleric acid, tannins and resin.<sup>7,8</sup> The present study is designed to explore the preliminary phytochemical and physicochemical analysis of *C spinosa* leaf, which is responsible for its pharmacological properties. The various analyses carried out for both the plants *C. spinosa* and *P. zeylanica* have shown varied and

appreciable results. *Catunaregam spinosa* and *Pavonia zeylanica* were used in our study to evaluate the preliminary physicochemical and phytochemical analysis.<sup>4</sup> The current study deals to find out the possible ingredient of plant responsible for its medicinal properties. The present investigations were carried out to for qualitative estimation of secondary metabolites among different part of the plant with respect to different solvent system.<sup>9,10</sup> Phytochemical investigations of crude plant extracts and herbal plant extract shows the presence of active principles in the plant parts like bark, leaves, flowers, roots, fruits, seeds etc.<sup>21,23</sup> The effect and activity of plant secondary metabolites are always playing an important role in the plant medicine.

## MATERIALS AND METHODS

### Plant Material

*Catunaregam spinosa* plant was collected from the forests of Toranmal of Shahda (21.840213° N, 74.456583° E) of Nandurbar District (Fig.1). Taxonomical identification was completed with the help of different flora like Flora of Presidency of Bombay, Flora of Dhule and Nandurbar District and recorded taxonomical characters.<sup>11,3</sup>



**Figure 1**  
*Catunaregam*  
*Spinosa* (Thunb)



**Figure 2** A = Extraction by Soxhlet  
B = Extraction in different Solvent  
C = Phytochemical Test

### Laboratory work

Different part of the plant viz. Leaves, Stem bark and Root bark were shade dried and grinded into thin powder for extraction procedures and phytochemical test. Extractions are carried to each powdered plant material (Leaves, Stem bark and Root bark) to successive solvent extraction by Soxhlet methods. Six different solvents systems viz. water, methanol, ethanol, chloroform, petroleum Ether and acetone were used to study phytochemical profile.<sup>21, 23</sup> Proportion of material to solvent was taken as 1:10 (w/v). Material soaked for 72 hrs. In amber color bottles and filtered with

Whatmann filter paper 1. Extract obtained from different material were subjected to following phytochemical analysis (Figure 1.)

### Phytochemical Test

As per the available literature, different tests were designed for estimation of secondary metabolites as Alkaloids, Anthraquinone, Cardiac glycosides, Coumarins, Flavonoids, Glycosides, Phenols, Reducing sugars, Saponins, Steroids, Tannin and Triterpenes. For each test standard procedure and observations has been made in replicates for validation of result (Table.1).

**Table1**  
**Procedures and observation for Phytochemical test with relative references**

Sr. No	Test	Procedure	Observation	References
1	Alkaloids	0.5 ml extract + treated with few drops of 1ml 2N HCl +Mayer's reagent / Dragandorf reagent and Hager's reagent	Orange precipitate, Orange color, White or Yellow ppt.	12
2	Anthraquinone	Few drops of extract was boiled with 10% HCl for few minutes and cool + CHCl <sub>3</sub> (Chloroform)to filtrate and few drops of NH <sub>3</sub> added and heated	Rose pink color obtain	13
3	Cardiac glycosides	0.5ml extract + 1ml water + aqueous solution NaoH some drops for coloration appearance	Brown or violet ring below and greenish ring at lowest part	14, 12
4	Coumarins	2 ml of extract added with 3 ml of 10% NaOH	Appearance of yellow color	15
5	Flavonoids	0.5ml extract + 5-10 drops of dilute Hcl + small amount / pieces + then boiled for few min. Shinodaw's Test , Zn-HCl acid reduction Test	Red or appearance of Magenta color	15, 16, 12
6	Glycosides	Anthrone + H <sub>2</sub> SO <sub>4</sub> + Heat	Purple or green	15, 13
7	Phenols	FeCl <sub>3</sub> Sample + lead acetate + water	Intense color Formation of white ppt	15 14, 13
8	Reducing sugars	0.5ml extract was dissolved in 5ml of water and filter it + boiled with Fehling's solution A & B for few min.	Orange red precipitate positively detects reducing sugars.	17, 13
9	Saponins	Sample + water + shaking	Formation of honey comb like froth	15, 14, 13
10	Steroids	Salkowski's test and Liebermann burchard's test	Dark green color in the upper layer and red color in the lower layer	18, 15, 13
11	Tannin	0.5ml of aqueous extract + 10% lead acetate few drops	Greenish-black colouration	18, 12, 13
12	Triterpenes	Liebermann Test Salkowski Test Noller's test	Bluish green , Red & fluorescent, Pink color OR Reddish-brown coloration	14, 6, 14, 13

## RESULT AND DISCUSSIONS

The followings are the results from the phytochemical of *Catunaregam spinosa* for Leaves, Stem bark and Root bark in six different solvent extracts. Soxhlet extract result for Aqueous (Aq), Methanol (M), Ethanol (E), Pet-Ether (Et), Chloroform (C) and Acetone (A) (Table 2.). Leaves, stem bark and root bark powder of *C. spinosa* shows positive result from extraction in Aqueous, Methanol and Ethanol extract for various phytochemical among all tested. Same is not always true for chloroform and acetone extract among all tested phytochemical with the help of soxhlet extraction methods as mention in table 2. Phytochemical properties as resulted in table

2. predicts the active components responsible for abortive activity<sup>20</sup>, diarrhoea and dysentery<sup>7</sup> like activity found in stem and fruit and sometime in root bark of the plant. Plant also important in rheumatism, relieve pain of bruises and bone aches during fevers and to disperse abscesses<sup>9,19</sup>. For leaves, Stem Bark and Root Bark sample it was found that all phytochemical are present except Anthraquinone and Coumarins among all parameters in six different solvent.<sup>21</sup> By considering these literature aspects we tried to reveals the facts regarding the chemical ingredients in different plant parts.<sup>22,23</sup>

**Table 2**  
**Results for Phytochemical test of *Catunaregam spinosa***

Sr. No.	Phyto- constituents	<i>Catunaregam spinosa</i>																	
		LEAVES						STEM BARK						ROOT BARK					
	Solvent System	Aq	M	E	Et	C	A	Aq	M	E	Et	C	A	Aq	M	E	Et	C	A
1	Alkaloids	+	+	+	-	-	-	+	+	+	-	-	-	+	+	+	-	-	-
2	Anthraquinone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Cardiac glycosides	+	+	+	+	-	-	+	+	+	+	-	-	+	+	+	+	-	-
4	Coumarins	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Flavonoids	-	+	+	-	-	-	-	+	+	-	-	-	-	+	+	-	-	-
6	Glycosides	-	-	+	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-
7	Phenols	+	+	+	-	-	-	+	+	-	-	-	-	+	+	-	-	-	-
8	Reducing sugars	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-
9	Saponins	-	-	-	+	+	-	-	-	+	+	-	-	-	-	-	-	+	-
10	Steroids	-	-	+	+	+	+	-	-	+	-	-	+	-	-	+	-	-	+
11	Tannin	+	+	+	+	-	-	+	+	+	+	-	-	+	+	+	+	-	-
12	Triterpenes	+	+	+	-	-	-	+	+	+	-	-	-	-	+	+	-	-	-

“+” indicates presence of phytochemical and “-” indicates absence of phytochemical

## CONCLUSIONS

The current work for *Catunaregam spinosa* found that there is very significance medicinal important of plant

among tribes. The present investigation shows positive result for Alkaloids, Cardiac glycosides, Coumarins, Flavonoids, Glycosides, Phenols, Reducing sugars, Saponins, Steroids, Tannin and Triterpenes in all different solvents. As mention in above result table 2

there is a variation in the presence and absence of some phyto-constituents with respect to plant part as well as change in solvents. Variations due to solvent changes are due to polar and non polar property of solvent.

## ACKNOWLEDGMENTS

Authors would like to acknowledge and thank full to

support Jijamata College Nandurbar, and UGC for financial support during the current research work.

## CONFLICT OF INTEREST

Conflict of interest declared none.

## REFERENCES

- Santapu H., Henry AN. The Dictionary of the flowering plants in India New delhi. 1973; 79: 183-185.
- Tribhubana Panda and Rabindra N Padhy, Ethnomedicinal plants used by tribes of Kalahandi district, Orissa. Indian Journal Of Traditional Knowledg. 2008; 7(2): 242-249.
- The world health report, Life in the 21st century: a vision for all. World Health Organization Geneva. 1998.
- Sharma PC, Yelne MB, Denis JJ. Data base on Medicinal plants used in Ayurveda. 2000; 2: 380-383.
- Warrier PK, Ramankutty C, Nair RV. Indian Medicinal Plant- A Compendium of 500 Species. Orient Longman. 1999; 3: 32-36.
- Agrawal SS, Singh VK. Immuno modulators-A review of studies on Indian medicinal plants and synthetic peptides, Part- 1, Medicinal plants. Proc Indian Natl Sci Acad. 1999; 62 (2): 179-204.
- Chopra RN, Nayar SL, Chopra IC. In Glossary of Indian Medicinal plants. Council of Scientific and Industrial Research, New Delhi, India. 1956; 4 (3): 206-209.
- Iyengar MA, Bibliography of Investigated Indian Medicinal Plants (1950-1975), Manipal. Manipal Power Press. 1976; 8(5): 1-144.
- Dastur JF. In Medicinal Plants of India and Pakistan, Bombay. B Taraporevala Son's and Co. Pvt. Ltd. 1962; 4 (4): 135-140.
- M. B. Patil and P. A. Khan. Review: Techniques towards the Plant Phytochemical. International Journal of Science Info (IJSI). 2016; 1(3): 157-172.
- Patil DA. Flora of Dhule and Nandurbar District (Maharashtra). 2002; Pp-301-302.
- Vaishali Rai M, Vinitha Ramanath Pai, Pratapchandra Kedilaya H, Smitha Hegde. Preliminary Phytochemical Screening of Members of Lamiaceae Family: Leucas linifolia, Coleus aromaticus and Pogestemon patchouli int. J. Pharm. Sci, Rev. Res. 2013; 21(1): 131-137.
- Yusuf, AZ, Zakir A, Shemau Z, Abdullahi M and Halima SA. Phytochemical analysis of the methanol leaves extract of Paullinia pinnata linn. Journal of Pharmacognosy and Phytotherapy. 2014; 6 (2): 10-16.
- Kangogo KG, Kagira MJ, Maina N, Karanja M, Simon. Qualitative Phytochemical Screening of Camellia sinensis and Psidium guajava Leave Extracts from Kericho and Baringo Counties. International Journal of Advanced Biotechnology and Research (IJBR). 2014; 5(3): 506-512
- Dharmendra Singh, Poonam Singh, Abhishek Gupta, Shikha Solanki, Ekta sharma, Rajeev Nema. Qualitative Estimation of the Presence of Bioactive Compound in *Centella asiatica*: An Important Medicinal Plant. International Journal of Life Science and Medical Science. 2012; 2 (1): 5-7.
- Krishnaiah D, Sarbatly R, Bono A. Phytochemical antioxidants for health and medicine: A move towards nature. Biotechnol Mol Biol Rev. 2007; 1(6): 97-104.
- Duraes N, Bobos I, Ferreira Da Silva E. Chemistry and FT-IR spectroscopic studies of plants from contaminated mining sites in the Iberian Pyrite Belt, Portugal, Mineralogical Magazine. 2008; 72 (1): 405-409.
- Mohammad Abdul Motalib Momin, Sm Faysal Bellah, Sarder Mohammad Raussel Rahman, Ahmed Ayedur Rahman, Gazi Mohammad Monjur Murshid, Sarder Mohammad Saker Billah, Talha Bin Emran. Phytopharmacological evaluation of ethanol extracts of *Sida cordifolia* L. Roots. Asian Pac J Trop Biomed. 2014; 4(1): 18-24.
- Martín JA, Solla A, Woodward S, Gil L. Fourier transform-infrared spectroscopy as a new method for evaluating host resistance in the *Dutch elm* disease complex, Tree Physiology. 2005; 25: 1331-1338
- Yang J, Yen HCE. Early Salt Stress Effects on the Changes in Chemical Composition in Leaves of Ice Plant and Arabidopsis. A Fourier Transform Infrared Spectroscopy Study, Plant Physiology. 2002; 130: 1032-1042.
- Sarini G and Bopaiah AK, Phytochemical Screening Of The Leaf And Flower Extracts Of Five Ipomoea Species Collected From In And Around Bangalore. Int J Pharm Bio Sci 2016 Oct ; 7(4):71 – 73
- Dasgupta S, Parmar A., Patel H. Preliminary phytochemical studies of Kalanchoe Gastonisbonnieri. International Journal of Pharma and Bio Science, 2013; 4(4):550-557.
- Padmanabha Rao and Kaiser Jamil, Pharmacological Evaluation of Herbal Extracts for their In vitro Hypoglycemic Activity. International Journal of Pharma and Bio Sciences. 2011; 2 (3): 408-416.

## Reviewers of this article

### **DR MAHINDRA MALI Ph.D**

Assistant Professor of Botany  
Arts, Science and comm College  
Taloda Dist Nandurbar  
MS India.



**Prof. Srawan Kumar G.Y**

Affiliation  
Associate Professor, Nalanda Institute of  
Pharmaceutical Sciences, Sattenapalli,  
Guntur, Andrapradesh, India



**Prof. Dr. K. Suriaprabha**

Asst. Editor, International Journal  
of Pharma and Bio sciences.



**Prof. P. Muthuprasanna**

Managing Editor, International  
Journal of Pharma and Bio sciences.

**We sincerely thank the above reviewers for peer reviewing the manuscript**