

Cite this article as: Chander MP, Vijayachari P. *In vitro* antimicrobial and anti-oxidant potentials of selected medicinal plants used by the indigenous tribes of Andaman and Nicobar Islands, India. Bangladesh J Pharmacol. 2016; 11: 330-32. A Journal of the Bangladesh Pharmacological Society (BDPS) Journal homepage: www.banglajol.info

Abstracted/indexed in Academic Search Complete, Agroforestry Abstracts, Asia Journals Online, Bangladesh Journals Online, Biological Abstracts, BIOSIS Previews, CAB Abstracts, Current Abstracts, Directory of Open Access Journals, EMBASE/Excerpta Medica, Google Scholar, HINARI (WHO), International Pharmaceutical Abstracts, Open J-gate, Science Citation Index Expanded, SCOPUS and Social Sciences Citation Index ISSN: 1991-0088; DOI: 10.3329/bjp.v11i2.26771

Letter to the Editor

In vitro antimicrobial and anti-oxidant potentials of selected medicinal plants used by the indigenous tribes of Andaman and Nicobar Islands, India

Sir,

Systematic screening of plants used in traditional medicines could pave the way for the discovery of novel and effective compounds (Diallo et al., 1999). In the contemporary, emergence of multidrug resistant strains of bacteria is being frequently noticed, and quite recently, this phenomenon has been critically analyzed and documented (Chethana et al., 2013). It indicated the necessity to continue the search for newer compounds to combat new infections. In the present study, the traditional knowledge of treatment among the Nicobarese tribe was generated (Chander et al., 2014), and 18 plant species which are regularly used in traditional medicines were selected, to determine their antibacterial and anti-oxidant activities as well as preliminary photochemical analysis.

Hundred grams of coarsely powdered dry leaves were extracted by cold percolation method, by using 95% methanol as a solvent and keeping it for 72 hours at room temperature (Chattopadhyay et al., 2001). The whole plant extract was collected in a conical flask, filtered, and the solvent was evaporated to dryness under reduced pressure in an evaporator (Eppendroff 5304) at 45°C. Resulted residues were stored at 4°C for the purpose of further *in vitro* studies.

The plant extracts were screened for the presence of different classes of secondary metabolites including alkaloids, flavonoids, triterpenes, sterols, tannins and saponins using previously described methods (Harborne, 1998; Kokate et al., 2004). The plant extracts were screened for antibacterial activity using the agar well diffusion method (Rojas et al., 2006). DPPH assays of sample were performed according to the procedure as reported by Singh et al. (2015).

The phytochemical studies reveals that the extracts of medicinal plants have variety of phytochemical constituents, namely alkaloids, triterpenes, flavonoids, tannins, steroids and saponins, whereas some of the phytochemical are restricted to certain medicinal plant species except the alkaloids which was reported in all the studied plant species (Table I). However, saponins were absent in seven extracts while in six extracts tannins were not found.

Table I Phytochemical analysis of the methanol extracts of selected ethnomedicinal plants												
Abutilon indicum (L.) Sweet	Present	Present	Present	Present	Present	Present						
Ageratum conyzoides L.	Present	Present	Present	Present	Absent	Absent						
Annona squamosa L.	Present	Present	Present	Present	Present	Absent						
Boesenbergia rotunda (L.) Mansf.	Present	Present	Present	Present	Present	Present						
Cleome viscosa L.	Present	Present	Absent	Absent	Present	Present						
Ganophyllum falcatum Blume.	Present	Present	Present	Present	Present	Present						
Glyptopetalum calocarpum (Kurz.) Prain	Present	Present	Present	Present	Present	Present						
Ipomoea obscura (L.) Ker Gawl.	Present	Absent	Absent	Present	Present	Absent						
Leea aequata L.	Present	Absent	Present	Present	Absent	Absent						
Leea indica (Burm.f.) Merr.	Present	Present	Present	Present	Absent	Absent						
Macaranga peltata (Roxb.) Muell.	Present	Absent	Present	Present	Absent	Absent						
Morinda citrifolia L.	Present	Present	Present	Present	Present	Present						
Moringa oleifera Lam	Present	Present	Present	Present	Absent	Present						
Premna corymbosa (Burm.f.) Rottl. et Willd.	Present	Present	Present	Absent	Present	Absent						
Senna alata (L.) Roxb.	Present	Present	Absent	Absent	Absent	Present						
Tabernaemontana crispa Roxb.	Present	Absent	Absent	Absent	Present	Present						
Urena lobata L.	Present	Present	Present	Present	Present	Present						
Wedelia biflora (L.) DC.	Present	Present	Present	Present	Present	Present						

				Table II									
Antimicrobial and anti-oxidant activities of the selected ethnomedicinal plants													
Botanical Name	Sa	Se	Bc	Ec	Pa	Кр	Ca	DPPH activit IC50 (µg/ml					
A. indicum	-	-	-	11.0 ± 0.0	-	9.7 ± 0.6	-	80.7 ± 0					
A. conyzoides	-	-	-	-	-	-	-	96.1 ± 1					
A. squamosa	-	-	-	-	-	-	-	49.3 ± 0					
B. rotunda	14.3 ± 0.6	17.7 ± 0.6	17.0 ± 0.0	14.7 ± 1.5	9.7 ± 0.6	12.3 ± 0.6	-	51.4 ± 2					
C. viscosa	-	-	-	-	-	-	-	136.1 ± 2					
G. falcatum	-	-	-	14.7 ± 0.6	-	-	-	149.5 ± 3					
G. calocarpum	18.3 ± 1.5	15.7 ± 1.5	19.7 ± 0.6	-	11.3 ± 0.6	-	-	63.2 ± 0					
I. obscura	-	-	-	-	-	-	-	557.6 ± 32					
L. aequata	12.3 ± 0.6	-	-	12.0 ± 0.0	-	-	-	67.5 ± 0					
L. indica	-	-	-	-	-	-	-	44.2 ± 0					
M. peltata	-	-	-	-	-	-	-	46.7 ± 0					
M. citrifolia	21.3 ± 0.6	17.0 ± 1.0	14.0 ± 1.0	15.7 ± 1.5	13.3 ± 1.2	21.7 ± 0.6	13.3 ± 0.6	26.4 ± 0					
M. oleifera	-	-	10.7 ± 0.6	-	-	9.7 ± 0.6	-	44.9 ± 0					
P. corymbosa	11.3 ± 2.1		-	12.7 ± 0.6	-	-	-	74.3 ± 0					
S. alata	-	-	-	-	-	-	12.0 ± 1.0	124.2 ± 1					
T. crispa	-	-	-	-	-	-	-	64.3 ± 2					
U. lobata	-	11.3 ± 0.6	14.0 ± 0.0	10.0 ± 0.0	-	-	-	47.5 ± 3					
W. biflora	13.3 ± 0.6	-	-	-	-	-	-	263.9 ± 12					
Ascorbic acid	ND	13.9 ± 0											
Gentamicin	17.7 ± 0.6	21.7 ± 0.6	22.7 ± 1.2	18.3 ± 0.6	12.7 ± 0.6	14.0 ± 0.0	-	N					
Nystatin	-	-	-	-	-	-	17.7 ± 0.6	Ν					

Sa- S. aureus; Se- S. epidermidis; Bc- B. cereus; Ec- E. coli; Pa- P. aeruginosa; Kp- K. pneumonia; Ca- C. albicans; '-' indicates No activity; 'ND' Not done

The antimicrobial activities of the investigated extracts against human pathogens used by agar well diffusion method were shown in Table II. Extracts was compared with gentamicin and nystatin as standards. Results obtained in the current study relieved that selected plant extracts were found to possess potential antimicrobial activity against tested organisms. The *M. citrifolia* extract showed activity against all the pathogens tested followed by *B. rotunda* and *G. calocarpum* while the highest activity (21.7 ± 0.6) was shown by *M. citrifolia* against *K. pneumonia*.

The effect of anti-oxidant on DPPH radical scavenging was thought to be due to their hydrogen donating ability or radical scavenging activity. The free radical scavenging activity depends upon the chemical composition of extracts (Nilgun et al., 2007). The DPPH radical scavenging results showed that *M. citrifolia* extract exhibited highest activity having IC₅₀ value 26.4

 \pm 0.9 µg/mL followed by *L. indica* and *M. oleifera* (Table II).

Thus, this study indicates that scientific studies carried out on medicinal plants having traditional claims of effectiveness might warrant fruitful results.

The authors acknowledge to the Indian Council of Medical Research (ICMR), New Delhi, India for providing financial grant for the study (Project No. Tribal/43/2008-ECD-II). Authors are also thankful to Botanical Survey of India, Port Blair for their help in identification of plant specimens.

M. Punnam Chander and P. Vijayachari

Department of Medical Microbiology and Molecular Biology, Regional Medical Research Centre (Indian Council of Medical Research), Port Blair 744 101, Andaman and Nicobar Islands, India.

Corresponding author: email: pblicmr@sancharnet.in

References

- Chander MP, Kartick C, Gangadhar J, Vijayachari P. Ethnomedicine and healthcare practices among Nicobarese of Car Nicobar: An indigenous tribe of Andaman and Nicobar Islands. J Ethnopharmacol. 2014; 158: 18–24.
- Chattopadhyay D, Maiti K, Kundu AP, Chakraborty MS, Bhadra R, Mandal SC, Mandal AB. Antimicrobial activity of *Alstonia macrophylla*: A folkore of bay islands. J Ethnopharmacol. 2001; 77: 49-55.
- Chethana GS, Hari VKR, Mirzaei F, Gopinath SM. Review on multidrug resistant bacteria and its implication in medical sciences. J Biol Sci Opin. 2013; 1: 32-37.
- Diallo D, Hveem B, Mahmoud MA, Betge G, Paulsen BS, Maiga A. An ethnobotanical survey of herbal drugs of Gourma District, Mali. Pharm Biol. 1999; 37: 80-91.

- Harborne JB. Phytochemical methods: A guide to modern techniques of plant analysis. London, Chapman and Hall, 1998.
- Kokate CK, Purohit AP, Gokhale SB. Practical pharmacognosy. 2nd ed. Delhi, Vallabh Prakashan, 2004.
- Nilgun GB, Gulcin O, Samin Y. Evaluation of the antiradical and anti-oxidant potential of grape extracts. Food Control. 2007; 18: 1131–36.
- Rojas JJ, Ochoa VJ, Ocampo SA, Munoz JF. Screening for antimicrobial activity of ten medicinal plants used in Colombian folkloric medicine: A possible alternative in the treatment of non-nosocomial infections. BMC Complement Altern Med 2006 6: 2.
- Singh R, Muftah AMS, Asma B. Antibacterial and antioxidant activity of *Mentha piperita* L. Arabian J Chem. 2015; 8: 322-28.