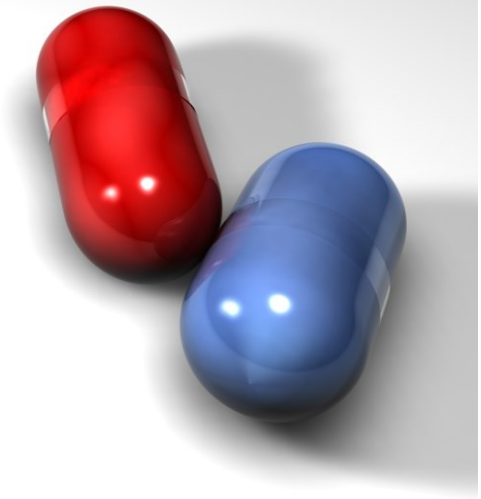
BDPS Bangladesh Pharmacological Society

Bangladesh Journal of Pharmacology

Volume: 9; Number 4; Year 2014



Cite this article as: Dhamija I, Kumar N, Pai KSR, Setty MM, Kumar S, Jana AK. Exploration of antioxidant and anti-microbial potential of methanolic extract of root stock of *Premna herbacea.* Bangladesh J Pharmacol. 2014; 9: 663-664.

A Journal of the Bangladesh Pharmacological Society (BDPS); www.bdps.info
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, Global Health, 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.v9i4.21165

Letter to the Editor

Exploration of antioxidant and antimicrobial potential of methanolic extract of root stock of *Premna herbacea*

Sir,

The unstable radical tries to steal electrons from other molecules and causes damage to the structural and functional proteins, lipids, DNA and other vital molecules. Sometime such damages become irreversible and lead to various diseases (Vanderauwera et al., 2011). Another problem in current scenario is microbial resistance to chemotherapeutic/antimicrobial agents. Infectious diseases account for approximately one-half of all death in tropics (Lobo et al., 2011). This problem created a serious requirement in developing new antimicrobial agents.

So, the goal of current research was directed towards finding naturally-occurring antioxidants and antimicrobial agents of plant origin, which will be in support to internal antioxidants for preventing reactive oxygen species mediated and microbial damages. Bharangin, obtained from hexane extract of *Premna herbacea* root nodules, was reported to have antimicrobial activity against gram positive and gram negative bacteria and fungi (Murthy et al., 2006). Based on this report, we tried to explore the antimicrobial potential of other extracts and fractions of *P. herbacea*. The purpose of this study was to evaluate *P. herbacea* as new potential source of natural antioxidants and antimicrobial agents.

The extracts of *P. herbacea* and their fractions were prepared by our group earlier and described in literature (Dhamija et al., 2013). Aqueous extract, alcoholic extract, ethyl acetate fraction and butanol fraction of alcoholic extract were used for this study. Determination of antioxidant activity was carried out using various models like DPPH, ABTS radical, superoxide scavenging assay, iron chelating activity assay, total antioxidant capacity and non-enzymatic hemoglobin glycosylation assay. Broth serial microdilution method using microtitre plate of 96-wells was employed to determine minimum inhibitory concentration (MIC) values (Kumar et al., 2012). Stocks of all extracts and standard antibiotic chloramphenicol were prepared by dissolving in dimethyl sulfoxide as solvent. The MIC was the lowest concentration where no viability was observed after 24 hours on the basis of metabolic activity (Klancnik et al., 2010).

Several concentrations ranging from 5-200 µg/mL of the aqueous & alcoholic extracts; and ethyl acetate & butanol fraction of alcoholic extract of *P. herbacea* were tested for their antioxidant activity in different *in vitro* models. It was observed that free radicals were scavenged by the test compounds in a concentration dependent manner in all tests. The antioxidant activity was estimated by IC_{50} value and the values of aqueous & alcoholic extracts; and ethyl acetate & butanol fraction of alcoholic extract were 73.2, 55.1, 12.5 and 25.4 µg/mL (DPPH radical scavenging); 70.6, 22.7, 8.9 and 14.7 µg/mL (ABTS radical scavenging), 12.0, 41.8, 9.4 and 20.9 µg/mL (iron chelating activity), 375.7, 284.5, 94.7 and 313.4 µg/mL (superoxide scavenging), respectively. In the total antioxidant capacity assay, 1 mg of aqueous &

Table I

Antimicrobial activity of *Premna herbacea* extracts and fractions on Gram negative and Gram positive organisms

Organism	Strain	MIC value of various extracts and standard (µg/mL)				
		Aqueous	Alcohol	Ethyl acetate	Butanol	Chloramphenicol
Gram negative						
Escherichia coli	MTCC 40	160	80	40	80	2
Serratia marcesense	MTCC 97	320	80	80	160	16
Pseudomonas aeruginosa	MTCC 1036	640	80	40	320	64
Gram positive						
Staphylococcus aureus	MTCC 3160	320	40	20	80	2
Sphingobium japonicum	MTCC 6362	80	160	40	80	2

alcoholic extracts; and ethyl acetate & butanol fraction of alcoholic extract were found to be equivalent to 49, 64, 71 and 59 µg of ascorbic acid and showed 38.2, 78.8, 89.2 and 54.3% inhibition of hemoglobin glycosylation respectively. The antimicrobial activities of *P. herbacea* extracts and fractions against both Gram negative and Gram positive microorganisms obtained by broth microdilution method (Table I).

The results showed that the ethyl acetate fraction of alcoholic extract possessed best antimicrobial activity as compared to other extracts and fractions. Ethyl acetate fraction of alcoholic extract was also showing good activity against resistant bacteria (*P. aeruginosa*) even better than chloramphenicol.

These extracts or fractions may contain different compounds for the activity in concern. Since one fraction of alcoholic extract, i.e., ethyl acetate fraction is potential, both as antioxidant and antimicrobial so this could be a motivation and idea for research to work on determination of chemical constituent/s responsible for such activities.

Isha Dhamija[1], Nitesh Kumar[1], K. S. R. Pai[1], M. Manjunath Setty[2], Sandeep Kumar[3] and Asim K. Jana[3]

[1]Department of Pharmacology, Manipal College of Pharmaceutical Sciences, Manipal University, Manipal 576104, India; [2]Department of Pharmacognosy, Manipal College of Pharmaceutical Sciences, Manipal University, Manipal 576104, India; [3]Department of Biotechnology, Dr. B R Ambedkar National Institute of Technology, Jalandhar, Punjab 144011, India.

Corresponding author: ksr.pai@manipal.edu

References

Dhamija I, Kumar N, Manjula SN, Parihar V, Setty MM, Pai KSR. Preliminary evaluation of *in vitro* cytotoxicity and *in vivo* antitumor activity of *Premna herbacea* Roxb. in Ehrlich ascites carcinoma model and Dalton's lymphoma ascites model. Exp Toxicol Pathol. 2013; 65: 235-42.

Klancnik A, Piskernik S, Jersek B, Mozina SS. Evaluation of diffusion and dilution methods to determine the antibacterial activity of plant extracts. J Microbiol Methods. 2010; 81: 121-26.

Kumar N, Shishu, Bansal G, Kumar S, Jana A. Ditosylate salt of itraconazole and dissolution enhancement using cyclodextrins. AAPS Pharm Sci Tech. 2012; 13: 863-74.

Lobo DA, Velayudhan R, Chatterjee P, Kohli H, Hotez PJ. The neglected tropical diseases of India and South Asia: Review of their prevalence, distribution, and control or elimination. PLoS Negl Trop Dis. 2011; 5: e1222.

Murthy MM, Subramanyam M, Giridhar KV, Jetty A. Antimicrobial activities of bharangin from *Premna herbaceae* Roxb. and bharangin monoacetate. J Ethnopharmacol. 2006; 104: 290-92.

Vanderauwera S, Suzuki N, Miller G, Van De Cotte B, Morsa S, Ravanat JL, Hegie A, Triantaphylids C, Shulaev V, Van Montagu MCE. Extranuclear protection of chromosomal DNA from oxidative stress. Proc Natl Aca Sci. 2011; 108: 1711-16.