BDPS
Bangladesh Pharmacological Society

Bangladesh Journal of Pharmacology

Volume: 11; Number 4; Year 2016

Cite this article as: Chander MP, Vijayachari P. *In vitro* antibacterial and anti-oxidant potentials of selected sea-weeds of Andaman and Nicobar Islands, India. Bangladesh J Pharmacol. 2016; 11: 874-875.

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, 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.v11i4.29094

Bangladesh J Pharmacol 2016; 11: 874-875

Letter to the Editor

In vitro antibacterial and anti-oxidant potentials of selected seaweeds of Andaman and Nicobar Islands, India

Sir,

Seaweeds are primitive non-flowering plants without true root, stem and leaves. Seaweeds have been used as food stuff in Asian countries from centuries as it contains carotenoids, dietary fibers, proteins, vitamins and minerals. Red and brown algae are mainly used as human food sources (Chander et al., 2014). Seaweeds have some valuable medicinal components such as anticoagulants, anti-angiogenic and anti-adhesive activities (Cumashi et al., 2007). Seaweeds have recently been received significant attention for their potential as natural anti-oxidants, anti-bacterial and cytotoxic properties (Patra et al., 2016, Rani et al., 2013). The prevention and treatment of infectious diseases by marine seaweeds appears to be a possible alternative resource.

Andaman Islands marine ecosystem is unique, isolated and understudied compared to other marine ecosystems, may have potential of rich source of anti-microbial compounds. Therefore, it was worthwhile to investigate the antibacterial and anti-oxidant properties of seaweeds against human pathogenic bacteria that often cause of infectious diseases in human beings.

The seaweeds were separately dried under shade, pulverized by a mechanical grinder. Hundred grams of coarsely powdered dry leaves were extracted by cold percolation method, by using 1000 mL 95% methanol as a solvent and keeping it for 72 hours at room temperature. The whole seaweed extract was collected in a conical flask, filtered, and the solvent was evaporated to dryness under reduced pressure in an evaporator at 40-45°C. Resulted residues were stored at 4°C for further use (Chander et al., 2014).

The seaweed extracts were screened for their ability to scavenging 2,2-diphenyl-1-picrylhydrazyl stable radicals (DPPH) by using the method described previously (Singh et al., 2015). The seaweed extracts were screened for antibacterial activity using the agar well diffusion method (Chander et al., 2016).

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 *S. swartzi* exhibited highest activity having IC_{50} value 73.2 ± 0.6 µg/mL followed by *T. ornate* and *H. opuntia* (Table I).

The antimicrobial activities of the investigated extracts against human pathogens used by agar well diffusion method were shown in Table II. Results obtained in the current study relieved that selected seaweed extracts were found to possess potential antimicrobial activity against tested organisms. The *G. corticata* extract showed activity against seven pathogens tested followed by *S. natans and P. tetrastromatica* while the highest activity (22.7 ± 1.5) was shown by *G. corticata* against *S. aureus*.

In the present study, seaweeds were found to possess antibacterial and anti-oxidant properties against human pathogens. The species *G. corticata*, *S. natans* and *P. tetrastromatica* were found to be very effective. These

Table I

Details of seaweeds and their anti-oxidant properties

Name of the seaweed	Family	Place of collection	(GPS Location)	Anti-oxidant IC_{50} (µg/mL)
Gracilaria corticata	Gracilariaceae	Wandoor	N 11°36'0.83" E 92°36'45.39"	276.8 ± 6.3
Halimeda opuntia	Halimedaceae	Wandoor	N 11°36'8.04" E 92°36'41.76"	99.8 ± 0.4
Padina tetrastromatica	Dictyotaceae	Little Andaman	N 10°34'8.45" E 92°33'43.29"	349.8 ± 5.8
Sargassum natans	Sargassaceae	Pongibalu	N 11°37'15.20" E 92°36'45.79"	357.3 ± 7.8
Sargassum swartzii	Sargassaceae	Little Andaman	N 10°39'8.25" E 92°34'9.78"	73.2 ± 0.6
Turbinaria ornate	Sargassaceae	Pongibalu	N 11°37'7.20" E 92°37'15.92"	99.7 ± 2.0

Table II

Antibacterial activity of methanol crude extracts of seaweeds

Microorganisms	*G. corticata*	*H. opuntia*	*P. tetrastromatica*	*S. natans*	*S. swartzi*	*T. ornate*
S. aureus	22.7 ± 1.5	-	12.7 ± 0.6	-	-	-
B. cereus	18.3 ± 0.6	10.7 ± 0.6	13.3 ± 1.5	21.3 ± 0.6	-	10.7 ± 0.6
P. aeruginosa	-	-	-	13.3 ± 1.5	-	-
K. pneumonia	14.0 ± 1.0	10.7 ± 0.6	-	-	13.7 ± 1.2	-
E. coli	13.7 ± 2.1	-	11.3 ± 1.5	14.7 ± 1.2	15.7 ± 1.2	-
S. flexeneri	12.3 ± 0.6	-	11.3 ± 1.5	13.3 ± 2.1	-	13.7 ± 0.6
S. typhi	10.3 ± 1.5	-	-	-	13.7 ± 1.2	-
S. epidermidis	16.7 ± 1.2	11.7 ± 0.6	-	-	-	-
P. mirabilis	-	-	-	-	-	-

organisms need to investigate in detail, in order to isolate biologically active molecules and thus paving the way to search for novel compounds. Furthermore, the encouraging biological activity observed in this study show that the Andaman and Nicobar Islands are potential source of variety of marine organisms worthy of further investigation.

The authors acknowledge to the Indian Council of Medical Research, New Delhi, India for providing financial grant for the study (Project No. Tribal/43/2008-ECD-II). Authors are also thankful to the Department of Ocean Studies and Marine Biology, Port Blair and Zoological Survey of India, Port Blair for their help in collection and identification of seaweed 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, Pillai CR, Sunish IP, Vijayachari P. Antimicrobial and antimalarial properties of medicinal plants used by the indigenous tribes of Andaman and Nicobar Islands. Microb Pathog. 2016; 96: 85-88.

Chander MP, Sachithanandam V, Vijayachari. Antimicrobial and haemolytic activity of seaweed *Padina gymnospora* from South Andaman, Andaman and Nicobar Islands of India. Int J Curr Microbiol Appl Sci. 2014; 3: 364-69.

Cumashi A, Ushakova NA, Preobrazhenskaya ME, et al. A comparative study of the anti-inflammatory, anticoagulant, antiangiogenic, and antiadhesive activities of nine different fucoidans from brown seaweeds. Glycobiology 2007; 17: 541 -52.

Nilgun GB, Gulcin O, Samin Y. Evaluation of the antiradical and anti-oxidant potential of grape extracts. Food Control. 2007; 18: 1131–36.

Patra JK, Lee SW, Park JG, Baek KH. Anti-oxidant and anti-bacterial properties of essential oil extracted from an edible seaweed *Undaria pinnatifida*. J Food Biochem. 2016; doi: 10.1111/jfbc.12278

Rani RJ, Sundar SK, Parthipan B, Antonisamy JM. *In vitro* cytotoxicity studies on selected seaweeds from South East Coast of India. Indo-Am J Pharm Res. 2013; 3: 3183-91.

Rattaya S, Benjakul S, Prodpran T. Extraction, antioxidative, and antimicrobial activities of brown seaweed extracts, *Turbinaria ornate* and *Sargassum polycystum*, grown in Thailand. Int Aquat Res. 2015; 7: 1–16.

Singh R, Muftah AMS, Asma B. Antibacterial and anti-oxidant activity of *Mentha piperita* L. Arabian J Chem. 2015; 8: 322-28.