

## A new report of *Trichogloea requienii* (Montagne) Kutzing from the South Andaman Sea and study of antibacterial activity of extracted compounds from the species

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The red seaweed *Trichogloea requienii*, Rhodophyta: Liagoraceae is being reported from the coast of South Andaman for the first time. The species was collected from the coast of Brookshabad, South Andaman, Andaman and Nicobar Islands, India. The crude ethanolic extract of the species was screened for antibacterial activity against six selected human pathogens such as *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Enterococcus faecalis* and *Micrococcus luteus* by in-vitro assay. The results suggested that the algal extract gives promising effect with a maximum zone of inhibition on *S. aureus* (42 mm) followed by *P. aeruginosa* (30 mm) and *P. mirabilis* (25 mm). No zone of inhibition was observed with *E. coli*, *E. faecalis* and *M. luteus*. The seaweed species *T. requienii* can be a potential source of bioactive compounds for pharmaceutical application.

[**Keywords:** *Trichogloea requienii*; Antibacterial activity; South Andaman Sea]

### Introduction

Selective utilization of marine algae as a potential source for pharmaceutically important compounds has been increasing in recent years. Many seaweed species were found to possess bioactive components, which have inhibiting effect on growth of some of the Gram positive and Gram negative bacterial pathogens. Several reports also suggest that seaweed extracts are being used as curative and preventive agent for various diseases in the form of antibiotics, antihelminthics, cough remedies, antihypertensive, antitumor and antidiarrhoea<sup>1,2,3,4,5,6,7,8,9,10</sup>. But the potential of several other seaweed species still remain unexplored and it requires proper studies.

As reported, there are more than 1, 50,000 seaweed species available in the world ocean, of which 844 species have been identified along the Indian coastline<sup>11, 12</sup>. In the Andaman Sea seaweeds are highly diversified and about 79 species have been reported by several authors<sup>12,13,14,15</sup>. But there is no substantial study pertaining to the food and pharmaceutical application of seaweeds of Andaman Sea being carried out yet. However, the present study was carried out with the objective of investigating antibacterial property of *T. requienii*, which is being reported for the first time from Andaman Sea, India.

In the present investigation the seaweed, *T. requienii* was found from the coast of Brookshabad, South Andaman, Andaman & Nicobar Islands. It has slippery branches that are extremely glutinous throughout their entire length. The length of the branches vary from 5 to 40 cm, whereas their diameter mostly remains within 3 to 6 mm and the species grows preferably on rocky substratum (Plate-1). The species was identified and classified as:

### Classification

Kingdom: Plantae

Phylum: Rhodophyta

Class: Florideophyceae

Order: Nemaliales

Family: Liagoraceae

Genus: *Trichogloea*

Species: *requienii*

### Materials and Methods

#### Collection of seaweeds

The seaweed, *Trichogloea requienii* was collected from Brookshabad area (Lat. 11°62.785' N; Long. 92°75.226' E) in sterile sample covers along with the

Plate 1 — Images of *Trichogloea requienii* at Brookshabad, South Andaman.

seawater and brought to the laboratory. The sample was washed thoroughly under running tap water to remove any attached debris, epiphytes and sand particles and then the final washing was done using sterile distilled water.

#### Extraction process

The extraction from the species was done by the modified method of Watee et al., (2015)<sup>16</sup>. In this, 100 gms of fresh seaweed was grinded with 200ml of absolute ethanol using mortar and pestle then the total material was transferred to a 500ml conical flask and kept on a shaker for 24 hrs at ambient temperature. The extract was then filtered with Whatman No. 1 filter paper and solvent was evaporated under reduced pressure at 45 °C using the rota evaporator (Buchi RII Rotavapour). The resulting crude extract was stored at 4°C in the refrigerator for further study.

#### Microbial test cultures

In-vitro antibacterial activity was evaluated against six pathogenic bacteria such as *Escherichia coli* (MTCC 443), *Staphylococcus aureus* (MTCC 96), *Pseudomonas aeruginosa* (MTCC 326), *Proteus mirabilis* (MTCC 1429), *Enterococcus faecalis* (MTCC 439) and *Micrococcus luteus* (MTCC 106).

#### Antibacterial assay

The antibacterial activity of the crude extract was carried out by agar well diffusion method<sup>17</sup>. The

Table 1 — Antibacterial activity of *Trichogloea requienii* against six human pathogens.

Test organism	Zone of inhibition in diameter (mm)
<i>Staphylococcus aureus</i> (MTCC 96)	42
<i>Pseudomonas aeruginosa</i> (MTCC 326)	30
<i>Proteus mirabilis</i> (MTCC 1429)	25
<i>Escherichia coli</i> (MTCC 443)	-
<i>Enterococcus faecalis</i> (MTCC 439)	-
<i>Micrococcus luteus</i> (MTCC 106)	-

bacterial strains were inoculated in nutrient broth and incubated for 18 hrs at 37°C. The sterilized petri plates were poured with Muller Hinton Agar (MHA) medium (HiMedia) and labeled. Following 0.1 ml of test pathogens was inoculated and spreaded on the agar medium using sterile swab so as to make lawn. The agar surface was allowed to dry for five minutes. Then the prepared algal extract was added to the well and kept for 24 hours at an incubating temperature of 37 °C. After 24 hours the zone of inhibition was measured and tabulated.

#### Results and Discussion

The antibacterial activity of crude ethanolic extract of *T. requienii* is presented in the Table 1. In which it shows that out of six pathogens tested, the extract exhibited prominent zone of inhibition against three pathogen i.e., *P. aeruginosa*, *S. aureus* and *P. mirabilis*. The maximum zone of inhibition was

observed against *S. aureus* (42mm) followed by *P. aeruginosa* (30mm) and minimum in *P. mirabilis* (25mm). This may be due to active components which are present in the seaweed extract. There were no inhibitory effect from *E. coli*, *E. faecalis* and *M.luteus*. As suggested by Schwarz and Noble (1999)<sup>18</sup>, these bacterial strains (*E. coli*, *E.faecalis* and *M.luteus*) may have some kind of resistance mechanisms such as enzymatic inactivation, target sites modification and decrease intracellular drug accumulation, which resulted in the no zone of inhibition. However, the effect of crude extract was well observed on species like *S.aureus*, *P. aeruginosa* and *P. mirabilis* giving the clue that *T. requienii* possess biomolecules, which is active against some human pathogens.

Seaweeds provide a rich source of structurally diverse and biologically active secondary metabolites. Most of the secondary metabolites produced by seaweeds have antibacterial compounds derived from seaweeds consist of diverse groups of bacteriostatic properties. Compounds with antibacterial activity have been detected in green, brown and red algae<sup>19</sup> suggested that the active compounds from red algae *T. requienii* can be used to develop drugs against pathogens responsible for infectious diseases.

### Conclusion

The present investigation shows that the red algae *T. requienii* has antibacterial activity against both the Gram positive (*E. faecalis*, *M. luteus* and *S. aureus*) and Gram negative bacteria (*P. aeruginosa*, *E. coli*, and *P. mirabilis*). Natural products from the marine algae could help in controlling the life threatening human bacterial disease. As this red algae is reported for the first time in India from Andaman sea, this study is a preliminary work to identify the new seaweed species and its antibacterial activity against human pathogen, and lots of research has to be done further to explore its bioactive potential.

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