1 INTRODUCTION

Seaweeds are marine macro algae growing in the intertidal and subtidal regions of the seas, estuaries and backwaters. They are unique with no distinguishable root, stem and leaves. In other words they are thalloid plants. Based on pigmentation, seaweeds are broadly classified into green, brown and red.

About 6000 species of red seaweeds (Rhodophyceae), 2000 species of brown seaweeds (Phaeophyceae) and 1200 species of green seaweeds (Chlorophyceae) occur globally of which approximately 220 species are economically important. In India, rich seaweed beds occur only in certain areas. Several species of green, brown and red algae occur along the south coast of Tamilnadu (Kaliaperumal 2007).

Seaweeds constitute one of the commercially important marine living renewable resources. They are the only source for the production of phytochemicals such as agar, carrageenan and algin. These phytochemicals are widely employed as gelling, stabilizing and thickening agent in many industries. Seaweeds contain many trace elements, minerals, protein, iodine, bromine, vitamins and many bioactive substances. Seaweeds are considered to be the potential nutraceuticals of the 21st century. Many protein rich edible seaweeds are consumed in the form of soup, salad and porridge. The food products like jelly, jam, chocolate, pickle and wafer can be manufactured from certain seaweeds. These marine algae are also used as animal feed and fertilizer for land plants (Kaliaperumal, 2005).

A large section of Indian population, roughly about 25%, live in the coastal areas depending directly or indirectly on the coastal resources and in turn generating and
releasing domestic sewage of the order of 3.3Km$^3$ annually to these waters (Sengupta and Kureishy, 1989).

The scientific definition derived by the Group of Experts on the Scientific Aspect of Marine Pollution (GESAMP) is: “The introduction by man directly or indirectly of substances or energy into the marine environment resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, improvement of quality for use of seawater and reduction of amenities”.

Johnston (1976) has characterized three broad categories of marine pollutants namely native or natural which are not caused by man, generated by man but not created by him and the synthetic pollutants wholly created by him (man). One can broadly put hydrocarbon, soluble inorganic and organic substances in the first category, redistribution and exploitation by man of these hydrocarbons etc in the second and plastic, radionuclides and pesticides (DDT, BHC, etc) in the third.

The major stress on seaweeds in the coastal zone of Tamil Nadu is pollution, through various means. In Tuticorin, untreated domestic sewage, effluents like fly ash waste from thermal station and effluent from petrochemical industries are discharged into the sea. All these heavily pollute seaweeds. Oil spills from boats cover these organisms in localized areas. Dredging of sand for construction of jetties also result in destruction of seaweeds and coastal erosion. The removal of coral reefs seriously affects the ecosystem and also causes coastal erosion. So there is a great threat of desertification of the coastal vegetation of Tuticorin by the industrial complex of Tuticorin (Sarojini Menon et al., 1993). Many of the seaweeds of Tuticorin coast have decreased in frequency and
diversity. Some of them are completely eliminated from the area (Sarojini Menon et al., 1993).

As on date there is no report on the bioassay of seaweeds from Tuticorin coast using different concentrations of different pollutants. Moreover this type of work has been amply carried out in the case of micro algae especially the blue green algae or the cyanobacteria. This urged to take up the present investigation which envisaged to assess the impact of common marine pollutants on the growth and biochemicals of the commonly available seaweeds of Tuticorin coast.

Objectives

- Collection of commonly available green, brown and red seaweeds from the Hare Island of Tuticorin coast.
- Culture of the collected seaweeds under laboratory conditions using sterile sea water as the basal growth medium.
- Assessment of the impact / effect of the following pollutants by the conduction of bioassays on the collected seaweeds, *Ulva lactuca* and *Caulerpa scalpelliformis* (Chlorophyceae), *Padina tetrastromatica* and *Stoechospermum marginatum* (Phaeophyceae), *Gracilaria corticata* and *Acanthophora spicifera* (Rhodophyceae) under laboratory culture conditions.
  (i) Heavy metals (Copper and Lead)
  (ii) Domestic sewage
  (iii) Industrial effluent (fly ash)
  (iv) Pesticide (monocrotophos)
(v) UV-B radiation

(vi) Hydrocarbon (diesel oil)

- The bioassay involved the assessment of the following parameters

(i) Daily growth rate (DGR)

(ii) Chlorophyll a, b, c, carotenoids and phycobilins.

(iii) UV absorbing pigments

(iv) Protein

(iii) Carbohydrate

(iv) Lipid

(v) Phycocolloids; agar and carrageen in red seaweeds and algin in brown seaweeds.

Statistical data of the treatment thus collected

The significance of this type of study is two prone; one is determination of pollution tolerant seaweed(s) and other is the usage of such seaweeds in phytoremediation processes and biomonitoring programmes.