The present investigation was undertaken to study the pharmacognostic aspects and phytochemical quantification of six seaweeds collected from the Gulf of Mannar region viz., *U. lactuca*, *C. scalpelliformis*, *S. wightii*, *P. tetrastromatica*, *G. foliifera* and *A. spicifera*. From utility point of view, three types of bioactivity were assessed namely antioxidant activity and antimicrobial activity of the six seaweeds and antiarthritic activity entailing pharmacological study of one of the seaweeds viz., *A. spicifera*. The pharmacognostic study of the seaweeds is hitherto wanting. The information on the antioxidant activity of the seaweeds is scanty while that of antiarthritic activity (pharmacological study) is nil. The salient findings of the present study are furnished below.

1. The total ash, acid insoluble ash and water-soluble ash values were highest in *P. tetrastromatica* and lowest in *C. scalpelliformis*.

2. The powder of *U. lactuca* exhibited fluorescent dark green, that of *C. scalpelliformis* yellowish dark green, *S. wightii* showed fluorescent brownish green, that of *P. tetrastromatica* yellowish fluorescent green, *G. foliifera* exhibited fluorescent red and that of *A. spicifera* reddish fluorescent green.

3. The petroleum ether soluble extractive value was the highest in all the seaweeds except *G. foliifera* which exhibited the maximum extractive value in methanol solvent.

4. Hexane, petroleum ether, benzene and methanol extracts of *U. lactuca* and *G. foliifera* showed the presence of all the fourteen phytochemicals screened for, whereas extracts of *C. scalpelliformis*, *S. wightii* and *P. tetrastromatica* obtained in hexane, petroleum ether, benzene and chloroform answered for
all the phytochemicals. Interestingly in the case of *A. spicifera* all the phytochemicals were present in all the organic extracts except acetone.

5. Among the different species of seaweeds *S. wightii* registered the highest amount of protein, carbohydrate, nitrogen, magnesium, phenol and caloricity. The other brown seaweed *P. tetrastromatica* showed maximum value of lipid, anthocyanin, vitamin B₃ and C (ascorbic acid). The highest amount of tannin was recorded in the red seaweed *A. spicifera* while the other red seaweed *G. foliifera* showed the highest content of vitamin A, organic carbon and potassium. Highest amounts of vitamin E, crude fibre and calcium were registered in the green seaweed *U. lactuca*. The other green seaweed *C. scalpelliformis* exhibited the highest amount of β-carotene and sodium.

6. GC-MS study of the six seaweeds revealed the presence of saturated fatty acids (palmitic acid, myristic acid) and their esters, unsaturated fatty acids (oleic acid, linoleic acid) and their esters, phytol (diterpene), iodo and furanone compounds and a host of other compounds possessing antimicrobial, antioxidant, antiarthritic and other biological activities.

7. All the six seaweeds exhibited antioxidant activity in terms of NO scavenging activity, \( \text{H}_2\text{O}_2 \) scavenging activity and total antioxidant activity. Among these seaweeds the green seaweed *U. lactuca* and the brown macroalga *P. tetrastromatica* showed the highest antioxidant activity. The \( \text{H}_2\text{O}_2 \) scavenging activity of methanol extract of *P. tetrastromatica* was more than that of the standard vitamin E (tocopherol) at 100µg/ml concentration while that of *U. lactuca* equated with the standard.
8. The methanol and acetone extracts of the two green seaweeds *U. lactuca* and *C. scalpelliformis* and the brown macroalga, *S. wightii* exhibited strong antibacterial activity against *S. aureus*, *E. coli*, *K. pneumoniae* and *P. aeruginosa* whereas the extracts of *P. tetrastromatica*, *G. foliifera* and *A. spicifera* also showed antibacterial activity but to a lesser extent. The extracts of *C. scalpelliformis*, *S. wightii* and *U. lactuca* showed good correlation between DDT and TDT (MBC). Except for *C. scalpelliformis* rest of the seaweed extracts failed to show antifungal activity.

9. The methanolic extract of the red seaweed *A. spicifera* possessed marked antiarthritic activity which was statistically significant and comparable with the activity of the synthetic antiarthritic drug Indomethacin.

10. So the present study revealed the nutraceutical potential of the seaweeds collected from Gulf of Mannar region. The pharmacognostic and pharmacological studies of these seaweeds showed that the drugs obtained from these marine organisms could be used as antioxidants, in controlling some of the bacterial diseases and chronic health problems like arthritis.