

Acetylcholinesterase inhibitory activity of some seaweeds from Persian Gulf, Iran

A. Yegdaneh^{1,*}, A. Ghannadi¹, A. Plubrukarn², K. Zandi³, K. Sartavi⁴

¹Department of Pharmacognosy, School of Pharmacy and Isfahan Pharmaceutical Sciences Research centre, Isfahan University of Medical Sciences, Isfahan, Iran

²Department of Pharmacognosy and Pharmaceutical Botany, Faculty of Pharmaceutical Sciences, Prince of Songkla University, Hat-Yai, Songkhla, Thailand

³Department of Medical Microbiology

⁴Agricultural and Natural Resources Research Center, Bushehr, Iran

Background and Aims: Iran has coastal lines about 1260 km along the Persian Gulf and the Oman Sea representing more than 200 species of seaweeds but there are only limited publications about pharmaceutical abilities of this hidden treasure. This survey, focuses specifically on the Acetylcholinesterase (AChE) inhibitory activity of marine algae of Persian Gulf, Iran for the first time and looking for their potential application as future pharmaceutical candidates to be used for treatment of Alzheimer's disease.

Methods: *Cystoseira indica*, *C. merica* (Cystoseiraceae family), *Sargassum angostifolium*, *S. oligocystum* and *S. boveanum* (Sargasseae family) and *Padina australis* (Dictyotaceae family) and *Gracilaria corticata* and *G. salicornia* (Gracilariaceae family) were collected from Persian Gulf, cut in to small pieces, air-dried under shade and extracted with methanol. A modified Ellman and Ingkaninan method was used for measuring this activity. Inhibitory activity was calculated from 100 subtracted by the percentage of enzyme activity. Every experiment was done in triplicate and the IC₅₀ value was calculated by adopting a graphical method.

Results: Of the 8 seaweeds representing 4 different families, the most active extracts were made from *S. boveanum* (IC₅₀ 1 mg ml⁻¹) and *S. oligocystum* (IC₅₀ 2.5 mg ml⁻¹) while the least active extracts were made from *C. indica* (IC₅₀ 11 mg ml⁻¹), *G. corticata* (IC₅₀ 9.5 mg ml⁻¹) and *G. salicornia* (IC₅₀ 8.7 mg ml⁻¹) respectively. The 3 remaining showed medium activities

Conclusions: This was the first report of the selected species from Persian Gulf of Iran tested for AChE inhibitory activity. So a potential source of AChE inhibitors is certainly provided by seaweeds. Major classes of compounds reported to have such activity are the alkaloids, terpenoids, glycosides and coumarins. Work on new bioactive compounds from the active species may lead to the isolation and structure elucidation of a number of exciting new pharmacophores.

Keywords: Acetylcholinesterase inhibitory; Seaweed; Persian Gulf