



The High-valued Sea Cucumbers (Echinodermata: Holothuroidea): Their Biology, Culture and Bioactive Compounds for Therapeutic and Human Health Benefits

Prof. Dr. Md. Aminur Rahman

Department of Fisheries and Marine Bioscience, Faculty of Biological Science and Technology,
Jashore University of Science and Technology, Jashore-7408, Bangladesh
E-mail: aminur1963@gmail.com / amin2019@just.edu.bd

Abstract

Sea cucumbers (Echinodermata: Holothuroidea), are elongated tubular or flattened soft-bodied marine invertebrates, typically with leathery skin, ranging in length from a few millimeters to a meter. Holothuroids encompass 14,000 known species occur in most benthic marine habitats worldwide, in both temperate and tropical oceans, and from the intertidal zone to the deep sea, and are considered as an important part of oceanic ecosystems. They have high commercial value coupled with increasing global production and trade. Over many decades, sea cucumbers either fresh or in the form of dried body-wall (bêche-de-mer), have long been considered as a high-priced delicacy and therapeutic cure for the peoples of Asia with *Stichopus japonicas*, *S. hermanni*, *Thelenota ananas*, *T. anax*, *Holothuria fuccogilva*, *H. scabra* *Actinopyga mauritiana*, as the most highly-valued species. In the nutritional points of view, sea cucumbers are enriched with valuable nutraceuticals such as Vitamin A, Vitamin B1 (thiamine), Vitamin B2 (riboflavin), Vitamin B3 (niacin), and minerals, especially calcium, magnesium, iron and zinc. The presence of different bioactive compounds such as saponins, chondroitin sulfates, glycosaminoglycans, sulfated polysaccharides, glycoprotein, glycosphingolipids, and essential fatty acids, are the causes for their biological properties. Saponins, which are produced for compatibility with the environment, are as their secondary metabolites. The comprehensive number of unique biological and pharmacological properties including anti angiogenic, anticoagulant, anticancer, anti-hypertension, anti-inflammatory, antimicrobial, antiviral, antioxidant, antithrombotic, hemolytic, ichthyotoxic, cytostatic, antineogenic, antineoplastic, uric acid lowering and wound healing have been attributed to various species of sea cucumbers. According to the literatures, the aqueous extract and high molecular weight compounds from sea cucumbers can inhibit tumour activity, via apoptosis induction. Sea cucumbers have been classified as an invigorating food due to the high percentage of essential protein content and the absence of bad cholesterol. They have also long been well recognized as a tonic and traditional remedy in Chinese literature for their effectiveness against, asthma, rheumatism, tuberculosis, stomach and duodenum ulceration, diabetes, aplastic anaemia. cuts and burns, impotence and constipation. In order to meet up the increasing market demands, the collection of sea cucumbers



from the wild has seen a depletion of this resource in the traditional fishing grounds close to Asia and more recently the expansion of this activity to new and more distant fishing grounds. Presently, there has been documented that sea cucumber fisheries are harvesting around most of the resource range areas, including the remote parts of the Pacific, the Galapagos Islands, Chile and the Russian Federation. When wild stocks decline, the demand created in the market place raises the price of the product and, consequently, culturing is more likely to become viable economically. This review shows that sea cucumber stocks are under intense fishing pressure in many parts of the world and need effective culture and conservation measures. It also shows that sea cucumbers provide an important contribution to economies and livelihoods of coastal communities, being the most commercially important fishery and non-fish export in many countries. Reconciling the need for conservation with the socio-economic importance of sea cucumber fisheries is shown to be a challenging endeavour, particularly for the countries with limited management capacity. Current research directions are looking at diversifying technology to increase success in a range of coastal conditions, better understanding the social, biophysical and economical conditions required for success, and finding appropriate ways to develop systems and technologies related to stock enhancement, aquaculture and biodiversity conservation of these important sea cucumber fisheries in commensurate with local, national and global perspectives.

Keywords: *Sea Cucumber, Biology, Life Cycle, Breeding, Larval Rearing, Aquaculture, Bêche-De-Mer, Bioactive Compounds, Biomedicine.*