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World sea urchin fisheries: Their status, culture, management and sustainable utilizations

Sea urchins (Echinodermata: Echinoidea), also known as Echinoids, are marine invertebrates found in the benthic areas and deep seas. The gonads of sea urchins, commonly referred to as "Sea urchin Roe", are culinary delicacies in many parts of the world. The roe of sea urchins is considered as a prized delicacy in Asian, Mediterranean and Western Hemisphere countries and have long been using as luxury foods in Japan. Japanese demand for sea urchins raised concerns about overfishing, thus making it one of the most valuable sea foods in the world. The population of the Asian Pacific Region has been using it for long time as a remedy for improving general living tone and treatment for a number of diseases. Sea urchin gonads are also rich in valuable bioactive compounds, such as polyunsaturated fatty acids (PUFAs) and β -carotene. PUFAs, especially eicosapentaenoic acid (EPA, C20:5) (n-3)) and docosahexaenoic acid (DHA C22:6 (n-3)), have significant preventive effects on arrhythmia, cardiovascular diseases and cancer. β -Carotene and some xanthophylls have strong pro-vitamin A activity and can be used to prevent tumor development and light sensitivity. Sea urchin fisheries have expanded so greatly in recent years that the natural population of sea urchins in Japan, France, Chile, the northeastern United States, the Canadian Maritime Provinces, and the west coast of North America from California to British Colombia have been overfished to meet the great demand. Not surprisingly, the decrease in supply and the continued strong demand have led to a great increase in interest in aquaculture of sea urchins. Most, if not all, sea urchin fisheries have followed the same pattern of rapid expansion to an unsustainable peak, followed by an equally rapid decline. World landings of sea urchin, having peaks at 120,000mt in 1995, are now in the state of about 82,000mt. However, over half this catch comes from the recently expanded Chilean fishery for *Loxechinus albus*. In Europe, the sea urchin stocks (*Paracentrotus lividus*) of first France and then Ireland were overfished in the 1980s to supply the French markets. These decreasing patterns clearly reflect the overexploitation of most fishery grounds and highlight the need for aquaculture development, fishery management and conservation strategies. While the wild stocks decline, high market demand for food, nutraceuticals and pharmaceuticals, increases the price of the product and thus, culturing is most likely to become commercially viable. As this review shows, there have been dramatic progresses in the culture techniques of sea urchins in the last 15–20 years; we can conclude that currently the major obstacles to successful cultivation are indeed managerial, cultural, conservational and financial rather than biological. Therefore, the fate of the sea urchin fishery is closely connected to that of the fisheries, whose fortune will ultimately depend upon the stock enhancement, culture improvement, quality roe production and market forces that will shape this rising industry in a very significant and worthwhile manner.

Biography

M Aminur Rahman has completed his Doctoral degree in Marine and Environmental Sciences from University of the Ryukyus, Japan in 2001 and Post-doctoral researches from the same university in Japan (2003-2005) and the Smithsonian Tropical Research Institute USA (2007-2009). He also worked as a Chief Researcher in the Ocean Critters Ranch, Inc. Texas, USA. Currently, he is working as a Senior Research Fellow and has been involved in teaching/supervising undergraduate and postgraduate students in Universiti Putra Malaysia (UPM). Moreover, he worked as a Senior Scientist in Bangladesh Fisheries Research Institute during 1988 to 2007 in various fields of Breeding Biology, Nursing, Aquaculture and Fisheries. He has published 101 scientific articles in international and nationally reputed high impact peer-reviewed journals. He has written 2 books and 12 book chapters, a good number of scientific papers have also been presented and published in international conferences. He has also been serving as editor and Editorial Board Member of some reputed journals and proceedings.

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