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Development and applications of bioactive substances derived from marine organisms



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برگزیده سی و سومین جایزه بین المللی خوارزمی

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<p>General Field of Research</p>	<p><i>Marine Biotechnology</i></p>
<p>Biography of the KIA Laureate</p>	<p>Se-Kwon Kim, Ph.D., is presently working as a Distinguished Professor in Hanyang University, South Korea, Formerly, he was working as a distinguished professor in Korea Maritime and Ocean University and Research advisor of Kolmar Korea Company and. He was worked as distinguished Professor at Department of Marine Bio Convergence Science and Technology and Director of Marine Bioprocess Research Center (MBPRC) at Pukyong National University, Busan, South Korea.</p> <p>He received his M.Sc. and Ph.D. degrees from Pukyong National University and conducted his postdoctoral studies at the Laboratory of Biochemical Engineering, University of Illinois, Urbana-Champaign, Illinois, USA. Later, he became a visiting scientist at the Memorial University of Newfoundland and University of British Columbia in Canada.</p> <p>Dr. Kim served as president of the ‘Korean Society of Chitin and Chitosan’ in 1986-1990, and the ‘Korean Society of Marine Biotechnology’ in 2006-2007. To the credit for his research, he won the best paper award from the American Oil Chemists’ Society In 2002. Dr. Kim was also the chairman for ‘7th Asia-pacific Chitin and Chitosan Symposium’, which was held in South Korea in 2006. He was the chief-editor in the ‘Korean Society of Fisheries and Aquatic Science’ during 2008-2009. In addition, he is the board member of International Society of Marine Biotechnology Associations (IMBA) and International Society of Nutraceuticals and Functional Food (ISNFF).</p> <p>His major research interests are investigation and development of bioactive substances from marine resources. His immense experience of marine bio-processing and mass-production technologies for marine bio-industry is the key asset of holding majorly funded Marine Bio projects in Korea. Furthermore, he expended his research fields up to the development of bioactive materials from marine organisms for their applications in oriental medicine, cosmeceuticals and nutraceuticals. To this date, he has authored around 650 research papers, 70 books, and 120 patents.</p>

Abstract of the topic

While more than 80% of living organisms are found in marine ecosystems, only less than 5% of the marine resources have been utilized as human food materials. Nutritional properties of fish, shellfish, algae and marine microorganisms are generally well known. However, their functional characteristics have not been fully revealed. It is believed that they contain biologically active compounds including potential nutraceuticals. For example, marine macroorganisms produce a vast array of secondary metabolites including terpenes, steroids, polyketides, peptides, alkaloids, porphyrins and polysaccharides. These secondary metabolites serve many biopharmaceutical purposes (antioxidant, antitumor, anti-inflammation, anti-allergy, antifungal, anti-HIV, and antihypertensive). However, development of a new drug requires sufficient amounts of pure compounds that exceed by large quantities, but it is extremely difficult to collect them in higher amounts from a marine environment. If the compound of interest was originally isolated from a bacterium, fungus, or microalga, the organisms could be cultured at a large scale by fermentation. With limits for the recovery of natural bioactive compounds from different resources, molecular biological and genetic approaches should be integrated as standard husbandry practices that play an increasingly important role in the enhancement of production efficiency of bioactive substances through biotechnological improvement of the transformed microorganism species. Moreover, with the respect to investigation and development of marine bioactive substances for industry applications, many studies have been conducted to develop marine biotechnologies, such as membrane bioreactor, bioconversion and continuous mass producing process technology.

Industrially developed marine medicinal substances have been widely popular because of their biological activities. The biotransformation technology consisting of membrane bioreactor-assisted bioconversion and continuous mass production made significant contributions to the commercial development of marine nutraceutical and biomedical substance. A membrane bioreactor equipped with ultrafiltration for the production of bioactive compounds has recently been considered as a potential method to bioprocess marine organisms and byproducts efficiently.