AGRI MAGAZINE
(International E-Magazine for Agricultural Articles)
Volume: 02, Issue: 07 (July, 2025)
Available online at http://www.agrimagazine.in
©Agri Magazine, ISSN: 3048-8656

A Research Study on Marine Nutraceuticals

*Chetan DM
Department of Aquaculture, College of Fisheries, Mangalore, Karnataka Veterinary, Animal and Fisheries Sciences University, Bidar, India
*Corresponding Author's email: chetandm05@gmail.com

Marine nutraceuticals are bioactive compounds derived from marine organisms such as fish, shellfish, seaweeds, and microalgae, which provide health benefits beyond basic nutrition. These include antioxidants, anti-inflammatory agents, omega-3 fatty acids, and peptides that are beneficial for human health. The marine environment is a vast source of these functional ingredients which are increasingly utilized in functional foods and pharmaceuticals.

Objectives

- To identify various types of marine nutraceuticals.
- To understand their sources, structures, and bioactivities.
- To explore their health benefits and applications in human health.
- To study the extraction and formulation techniques.

Types of Marine Nutraceuticals

a) Omega-3 Fatty Acids (EPA and DHA)
  - Source: Fish oil (salmon, sardine, mackerel)
  - Benefits: Cardiovascular health, brain function, anti-inflammatory
b) Marine Collagen
  - Source: Fish skin, scales, jellyfish
  - Benefits: Skin health, joint support, anti-aging
c) Chitosan
  - Source: Shellfish (crab, shrimp shells)
  - Benefits: Weight management, cholesterol reduction
d) Astaxanthin
  - Source: Microalgae (Haematococcus pluvialis), krill
  - Benefits: Antioxidant, eye health, skin protection
e) Fucoidan
  - Source: Brown seaweed (e.g., Laminaria)
  - Benefits: Immune modulation, anti-cancer, anticoagulant

Extraction and Processing Techniques

- Solvent Extraction
- Supercritical Fluid Extraction
- Enzymatic Hydrolysis
- Freeze Drying and Microencapsulation

The choice of technique depends on the compound's stability, solubility, and desired purity.

Applications in Human Health

- Functional foods and beverages
- Dietary supplements
- Pharmaceutical formulations

- Anti-aging skincare products
- Prevention and management of chronic diseases like diabetes, cancer, and cardiovascular disorders

Market and Economic Potential

The global marine nutraceutical market is expanding rapidly due to increased consumer awareness of natural health products. Countries like Japan, Norway, and the USA are leading in production and consumption. Marine sources offer sustainable alternatives to synthetic supplements.

Challenges and Future Prospects

- Standardization of bioactive compounds
- Sustainable harvesting of marine resources
- Cost-effective extraction technologies
- Regulatory approval and safety evaluation
- Future prospects lie in genomics, biotechnology, and precision nutrition

Conclusion

Marine nutraceuticals hold immense potential as natural health-promoting agents. Through advanced research and sustainable technologies, the marine sector can contribute significantly to public health, nutrition, and economic development.

References

1. Shahidi, F. & Ambigaipalan, P. (2015). Bioactive compounds from marine foods: Plant and animal sources. Marine Drugs.
2. Kim, S. K. (2013). Marine Nutraceuticals: Prospects and Perspectives. CRC Press.
3. FAO (2020). The State of World Fisheries and Aquaculture.
4. Mendis, E. & Kim, S. K. (2009). Bioactive compounds from marine sources as potential nutraceuticals. Food Science and Biotechnology.