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A Review on Marine Bivalve Molluscs as Nutrient-Rich Food

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Abstract

Marine bivalve molluscs, including clams, oysters, mussels, and scallops, are widely recognized for their exceptional nutritional value and health benefits. These shellfish are rich in essential nutrients such as vitamins, minerals, proteins, and omega-3 fatty acids, which contribute to their role in promoting overall health. This review explores the nutrient composition of bivalve molluscs, highlighting their abundance of vital micronutrients like vitamin B12, selenium, zinc, and iron, as well as their high-quality protein content and healthy fats. Furthermore, the review delves into the health benefits associated with consuming bivalve molluscs, which are known to support cardiovascular health, enhance cognitive function, promote bone health, and bolster immune system efficiency. The consumption of omega-3 fatty acids, in particular, is beneficial for reducing inflammation and lowering the risk of chronic diseases. However, the review also addresses potential risks related to the consumption of bivalve molluscs, including concerns about contaminants such as heavy metals, microplastics, and harmful algal blooms, as well as the possibility of allergic reactions and foodborne illnesses. It emphasizes the importance of adopting safe harvesting, storage, and preparation practices to minimize these risks. By understanding both the health benefits and potential hazards, consumers can make informed decisions regarding the safe and beneficial consumption of bivalve molluscs.

Keywords: *Bivalve molluscs, nutrients, vitamins, minerals, proteins, health benefits, contaminants, food safety.*

Introduction

Bivalve molluscs, such as clams, oysters, mussels, and scallops, are vital part of the nutrition in many nations. They are renowned for their rich nutrient profile and are considered a delicacy in various cuisines worldwide. This review targets to deliver a complete analysis of the nutritional value of marine bivalve molluscs, their health profits, and probable hazards linked with their ingestion.

Nutritional Profile of Marine Bivalve Molluscs:

Marine bivalve molluscs are nutrient-dense, providing a variety of essential nutrients.

1. **Proteins:** Bivalves are good source of excellent protein. For example, a 100 gram serving of boiled mussels delivers approximately 24 grams of protein (Smith & Jones, 2021; Raut et al., 2023).
2. **Vitamins:**

- **Vitamin B12:** Bivalves are particularly high in B12 vitamin, which is essential for nerve role and production of the red blood cells. A 100-gram serving of clams can provide more than 1,000% of the daily recommended intake of B12 vitamin (O'Leary and Samman, 2010).
- **Vitamin D:** Oysters, in particular, contain significant amounts of D vitamin, essential for bone strength and healthiness (Wang & Li, 2020).
- **Other B Vitamins:** Bivalves also contain other B vitamins like riboflavin, niacin, and folate, plays several vital roles in energy absorption and cellular utilities (Hanna et al., 2022).

3. **Minerals:**

- **Iron:** Clams are rich in iron, providing up to 24 mg per 100 grams, which covers more than the daily requirement for most individuals (Patel & Singh, 2022).
- **Zinc:** Oysters are principally more in zinc, which is crucial for immune functions and wound healing (Lin et al., 2017).
- **Other Minerals:** Bivalves also contain significant amounts of magnesium, selenium, and calcium, contributing to overall mineral intake (Ozcan et al., 2019).

4. **Omega-3 Fatty Acids:** Bivalves are a good source of docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), and particularly omega-3 fatty acids known for their anti-inflammatory possessions and profits to cardiovascular health (KarSoon et al., 2019).

Health Benefits

1. **Cardiovascular Health:** It has been demonstrated that the omega-3 fatty acids in bivalves lower blood pressure, lipid levels, and prevent arrhythmias, therefore lessening the risk of heart disease (Kromhout et al., 2012).
2. **Cognitive Function:** Bivalves' high omega-3 fatty acid and vitamin B12 content promotes brain function and may help stave against neurodegenerative illnesses like Alzheimer's and cognitive decline (Liu et al., 2022).
3. **Bone Health:** Bivalves' mix of calcium, magnesium, and vitamin D helps to maintain strong, healthy bones and lowers the risk of osteoporosis (Voulgaridou et al., 2023).
4. **Immune Function:** Zinc and selenium found in bivalves increase the immune function, which helps the body to combat off contagions and infections more efficiently (Wintergerst et al., 2007).

Potential Risks and Considerations

1. **Contaminants:** Bivalves can accumulate harmful substances such as heavy metals, polychlorinated biphenyls (PCBs), and microplastics from their environment. It is essential to source bivalves from clean, uncontaminated waters (Sami Abdalla, 2024).
2. **Allergies:** Shellfish allergies are relatively common and can cause severe reactions in sensitive individuals. Proper diagnosis and avoidance of bivalves are crucial for those with shellfish allergies (Sicherer & Sampson, 2014).
3. **Foodborne Illnesses:** Bivalves can harbor pathogens *like Vibrio vulnificus*, which can cause serious infections, especially in immunocompromised individuals. Ensuring proper cooking and handling is essential to minimize this risk (Bintsis, 2017).

Conclusion

Marine bivalve molluscs are a nutrient-rich diet offers a wide variety of health benefits due to their ironic content of vitamins, proteins, minerals, and omega-3 fatty acids. However, potential risks such as contaminants and allergens need to be considered. Overall, when sourced and prepared safely, bivalves can be an exceptional addition to balanced nourishment.

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Conflicts of Interest
The authors declare that there are no conflicts of interest regarding the publication of this paper.

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