



Sustainable valorization approaches on crustacean wastes for the extraction of chitin, bioactive compounds and their applications - A review

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ABSTRACT

The unscientific disposal of the most abundant crustacean wastes, especially those derived from marine sources, affects both the economy and the environment. Strategic waste collection and management is the need of the hour. Sustainable valorization approaches have played a crucial role in solving those issues as well as generating wealth from waste. The shellfishery wastes are rich in valuable bioactive compounds such as chitin, chitosan, minerals, carotenoids, lipids, and other amino acid derivatives. These value-added components possessed pleiotropic applications in different sectors viz., food, nutraceutical, cosmeceutical, agro-industrial, healthcare, and pharmaceutical sectors. The manuscript covers the recent status, scope of shellfishery management, and different bioactive compounds obtained from crustacean wastes. In addition, both sustainable and conventional routes of valorization approaches were discussed with their merits and demerits along with their combinations. The utilization of nano and microtechnology was also included in the discussion, as they have become prominent research areas in recent years. More importantly, the future perspectives of crustacean waste management and other potential valorization approaches that can be implemented on a large scale.

1. Introduction

Crustaceans are the most numerous invertebrate animals found in the ocean, but their habitat also includes freshwater and land [1]. The popular of these invertebrate animals, such as lobsters, crabs, shrimp, and barnacles, are among the world's 52,000 species of crustaceans [2]. Crustaceans have a chitin-based exoskeleton that protects them from predators and prevents them from oxidative stress, dehydration, and toxic materials [3].

Recently, research into bioactive compounds obtained from renewable shellfishery has gained attention among researchers. According to Ozogul et al. [4], the shellfish processing business has grown dramatically in recent decades, with an annual production rate of several thousand tonnes. This is due to the increased demand for seafood products, as it has become one of the most important protein sources. Furthermore, seafood products contain essential fatty acids such as omega-3 and omega-6 fatty acids, vitamins, and minerals that are not found in many land-based protein sources [5]. However, the

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