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MARINE NATURAL PRODUCTS AS ANTIVIRAL AGENTS

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Abstract
The great majority of the earth's surface is covered by marine environments, and the fate of the world's inhabitants depends on these environments for food and other miraculous medications that can save lives. Thus, the exploitation of the marine resource for developmental purposes has gained tremendous importance during recent years. Excellent interest has been generated towards the biotechnological potential of the micro seaweed largely due to the diverse bioactive compounds isolated from these marine resources. Sea is the origin of a varied group of organisms. The potential for shrimp defence response manipulation to maximize protection and resistance against disease infections can be of critical significance for the management of shrimp health. The adage "prevention is better than cure" emphasizes how crucial it is to implement proactive disease control techniques in order to lower the risk factors in aquaculture. At least in shrimp culture, an active disease management plan is an interdisciplinary topic that requires consideration of the organism's ecology, environment, nutrition, physiology, and genetics. To establish the foundation for shrimps' sensitivity and resistance to various infections, a greater comprehension of the crustacean immune system is essential.
Keywords: Marine, Natural Products, Antiviral Agents, detection.

1. INTRODUCTION

In the world, natural goods have been essential for both preventing and curing human illnesses. A vast array of source materials, including terrestrial invertebrates and vertebrates, marine creatures, land plants, and land microbes, have been used to make natural product medications. The oldest medical system, Ayurveda, is widely used in Sri Lanka, India, and other nations. The three main classics that provide in-depth descriptions of more than 700 herbs are the Atharvaveda (c. 1200 BC), Charak Samhita, and Sushrut Samhita (c. 1000–500 BC). Since Dioscorides produced "De Materia Medica" in 78 A.D., which detailed thousands of medicinally active plants, there has been evidence of the usage of natural goods for therapeutic reasons in the western world [1]. Many of the medicinal plants described in this monograph are still employed in current medicine, not because they are still used as crude drugs but rather because they are the source of key pure compounds that are now the cornerstones of contemporary treatment [2]. With more than 400,000 Ayurvedic practitioners currently registered, the Indian government has formal procedures in place to handle concerns about the efficacy, safety, and quality of herbal medicine. The topic of research in natural products chemistry is currently seeing waves of increased interest [9]. The remarkable diversity of chemical structure and biological activities of naturally occurring secondary metabolites, the application of novel bioactive natural products as biochemical probes, the development of new and sensitive tools to discover biologically active natural products, improved methods to isolate, purify, and

structurally elucidate these active constituents, breakthroughs in overcoming the need for supply of complex natural products, and unmatched therapeutic needs are some of the reasons for this level of interest [3]. Through the identification of leads from the conventional medical system, the drug industry's research and development project aims to generate novel, indigenous plant-derived drugs. The variety of topologies and complexity of natural products' carbon N skeletons have led to the massive number of natural products being found in medication development. Secondary metabolites from natural sources are generally thought to have more drug similarity and biocompatibility than fully synthesized compounds because they were created in living systems [4]. The use of herbal pharmaceuticals and medicines in traditional drug systems is becoming more popular in recently developed nations. Sixty-five percent of people worldwide have made using plants as therapeutic agents their main source of healthcare, according to the World Health Organization (WHO) [10]. Plant-based natural products will continue to play a crucial role in the development of novel medications [13]. Finding new lead compounds from plants using contemporary drug discovery techniques will undoubtedly be aided by the appropriate use of these tools and resources in bioprospecting. Recent classifications by the World Health Organization (WHO) have classified traditional medicine, including herbal medicines, as therapeutic methods that have existed for millennia prior to the development and dissemination of modern medicine and continue to this day. The traditional preparations include organic substances, minerals, and medicinal plants, among other things. Only traditional medicines that primarily employ medicinal plant extracts for treatment are included in the category of herbal pharmaceuticals [11].']

2. REVIEW OF LITERATURE

Microalgae provide unique nutritional benefits by bridging the plant and animal kingdoms. Protein, amino acids, beta-carotene, nucleic acids, colors, vitamins, polysaccharides, bioactive chemicals, biocatalysts, and biofertilizers are all present in optimal amounts when they are dehydrated. Compared to land vegetables, sea veggies provide ten to twenty times the minerals and vitamins required for normal metabolism [17]. Being one of the major primary producers, benthic microalgae play a crucial role in the food chain. Numerous tiny benthic animals, including copepods, polychaetes, nematode worms, and soldier crabs, are directly supported by microalgae [5]. There are many kinds of marine life in different parts of the sea, such as seagrasses, macroalgae, marine fungus, and microalgae or phytoplankton. The minute planktonic species are the most prevalent of all aquatic plants, passively "drifting" with water currents. A broad group of microscopic algae, known as phytoplankton or microalgae, includes the classes Rhodophyta, Pyrophyta, Cryptophyta, Prasinophyta, Phaeophyta, and Chrysophyta. Because they use carbon dioxide, nutrients, and trace elements in photosynthesis, phytoplankton creatures are autotrophs, meaning they absorb solar energy. Chlorophylls and carotenoids are examples of photosynthetic pigments found in all of these autotrophs. The size of plankton can be arbitrarily divided into several categories, including mesoplankton, macroplankton, megaplankton (cells greater than 200 gm), microplankton (20-200 jim), and nanoplankton (cells less than 20 gm).

3. MATERIALS AND METHODS

A remarkable variety of secondary metabolites are produced by marine microalgae. There are over a thousand distinct chemical entities in one species. Many creatures must struggle for scarce resources as a means of surviving and thriving in a challenging competitive environment. adaptation of the body to the bioactivity of this bioactive molecule. Among the vast variety of marine life, microalgae are also crucial for the synthesis of bioactive compounds. All classes of algae produce antimicrobial compounds. Chlorophyceae, Bonnemaisoniaceae, Rhodophyceae, and Phaeophyceae were shown to have extremely high concentrations of active species [6]. Lipophilic or hydrophilic solvents are used to extract and concentrate microalgal metabolites. By the middle of the 1960s, some examples had reached final purification and structural determination [18]. The culture media of different unicellular Chlorophyceae, especially Chiorella, were used in the first effective investigations on the identification of algal inhibitors [12]. Antibacterial and antialgal activity were higher in light-than-dark cultures and rose with culture expansion. Chiorellin, a growth-affecting component from such a culture, is known to inhibit both Gram-positive and Gram-negative bacteria [7]. Despite numerous attempts, no firm plan for a structure of one or more of the active principles has been published as of yet [14]. They have to be a mixture of fatty acids, with the more unsaturated ones being photo oxidized to produce molecules with antibiotic activity. Gerber was the first to propose the antiviral chemicals found in marine algae, pointing out that Chondrus crispus polysaccharides provided protection against influenza B and mumps virus embryos [16]. An inhibitor of kelp meal's neuraminidoise was discovered by Kathan, and it prevented influenza A from growing in embryonated eggs. A partially purified inhibitor's chemical analysis revealed the presence of polysaccharides and proteins.

4. RESULT AND DISCUSSION

Over the past thirty years, aquaculture has grown to be a significant industry and a global business [8]. To combat the anticipated dietary protein deficits in 2030, the UN Food and Agriculture Organization (FAO) recognizes that global fisheries production needs to be raised by at least 50%. Approximately 150 million tonnes are produced annually by conventional fisheries and aquaculture [15].

Figure 1: Experimental animal

About 94 million tonnes of fish are produced from this by both commercial and artisanal fishermen. Aquaculture is therefore the sole option to address anticipated fishery shortages because the vast majority of the world's fisheries are either fished at maximum permissible levels or fall below maximum sustainable yields. Worldwide, crustacean aquaculture is consistently rated as a value-high activity, has a greater financial value, and produces more than 8 million metric tonnes yearly (FAO, 2000).

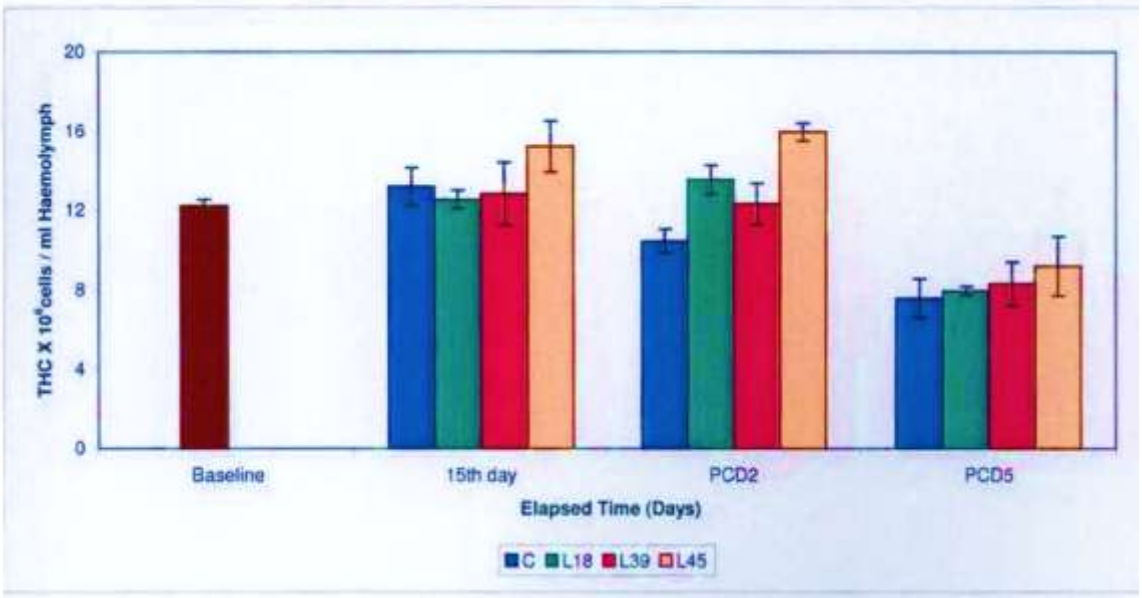

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Figure 2: MSE various actinomycete diets and then challenged with WSSV

More than half of this amount is made up of shrimp and prawns, and since the 1980s, the percentage of fanu output of this kind has grown significantly. According to more recent estimates, almost 40% of all marine shrimp are farmed. Asia is where most fanning takes place, especially in Thailand, which is followed by China, Indonesia, and India. Latin America produces shrimp to a lesser degree, with Ecuador being the top producer.

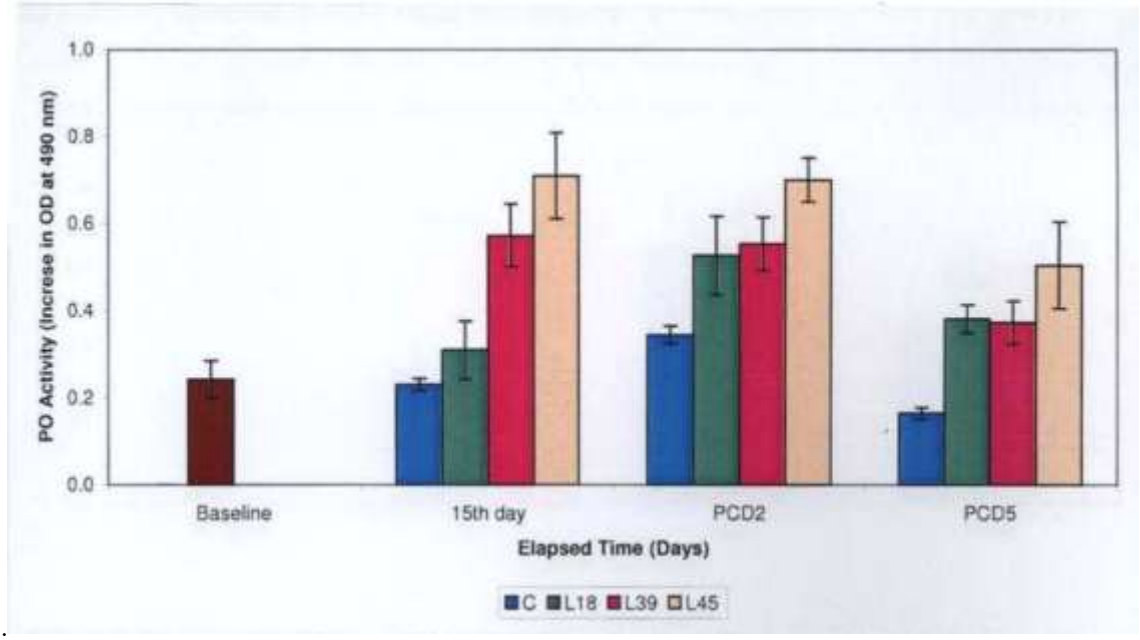

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Figure 3: NBT value

Marsupenaeus japonicus, Penaeus monodon, Penaeus chinensis, Penaeus merguiensis, Fenneropenaeus indicus, and Litopenaeus vannamei are the principal species that are cultivated. The majority of shrimp produced worldwide are still produced through substantial cultivation.

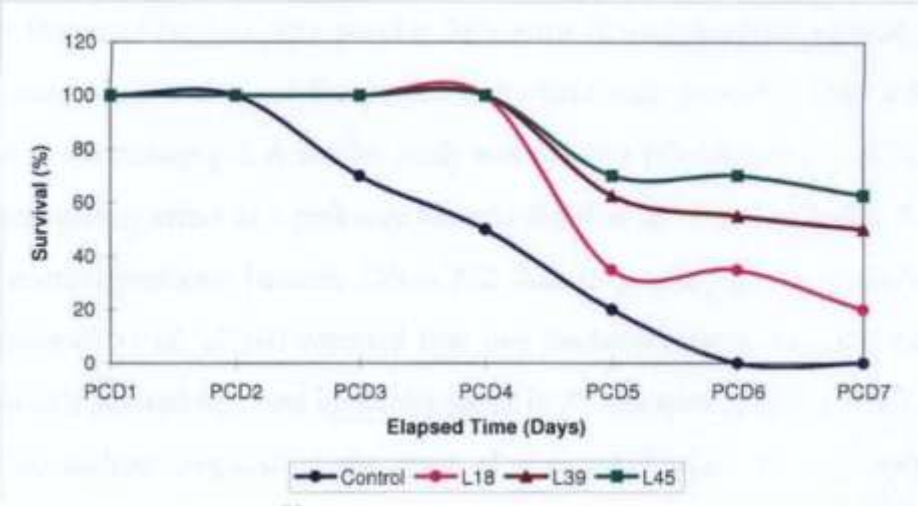

Figure 4: Post challenge survival (%)

Diseases have significantly impacted shrimp agriculture worldwide over the last 20 years. The majority of the illnesses have resulted from stress brought on by the increase of shrimp production and environmental deterioration. Due to stock mortality, these diseases mostly reduce larval production and cause issues with profitability. Additionally, they result in overfishing of shrimp larvae and overuse of broodstock.

5. CONCLUSION

The compounds utilized to treat illness are the most valuable ones discovered in nature. Many of the most often prescribed medications are natural products, which are naturally occurring chemicals that are either synthetic analogues of terrestrial plants or microbes that may be cultivated on vast industrial volumes. These compounds have been a focus of medical advancements, and the pursuit of new medications and better treatments has not only persisted but has taken precedence. It is now evident that the majority of infectious diseases can be managed using natural or chemically manufactured pharmaceutical treatments; but, as human longevity has increased, new medical issues in the treatment of degenerative diseases have taken precedence. We still urgently need effective medications that will assist restore normal function in the senile nervous system, encourage regeneration, help treat cardiovascular degenerative processes, and reduce viral infections and neoplastic growth. Consequently, it is crucial to look for safe and efficient medications from other sources.

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