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Analysis of the Marine Biomedical Industry Development in China

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Abstract

In recent years, the country attaches more and more attention to the biomedical industry, and the Marine biomedical industry has developed rapidly. At the same time, people's excessive exploitation of Marine resources has caused excessive damage to the Marine ecology. This paper analyzes the development trend of the industry and provides feasible suggestions to promote the industrialization of the industry.

Keywords

Marine biology; Pharmaceutical industry; Development analysis

Introduction

With the development of the times, people are paying more and more attention to their own health. my country is a country with abundant natural and biological resources, and the marine biopharmaceutical industry has broad market prospects. In recent years, a number of new products have been launched. Among them, traditional drugs represented by "trichloroethylene" and "sodium alginate" have begun to be favored by consumers and are gradually being phased out. Meanwhile, drugs with high content of functional ingredients, such as antibiotics, have slowly entered people's field of vision and have become a new type of health product and green food. This makes the marine biopharmaceutical industry have huge development prospects in the pharmaceutical industry, and the demand for it is still very large.

1. Overview of the Development of the Marine Biopharmaceutical Industry

1.1 Basic Meaning of the Development of the Marine Biopharmaceutical Industry

The marine biopharmaceutical industry refers to the development of various pharmaceutical products with certain health-preserving or therapeutic effects through the deep processing of marine organisms using biotechnology and modern high-tech methods. It encompasses many aspects, including chemical drugs, pharmaceutical preparations, and traditional Chinese medicine extracts. The most important aspect is the combination of biochemistry and pharmaceutics to effectively protect human health and restore vital functions. These substances are then transformed into products that can directly or indirectly regulate physiological functions and exert their effects within the body.

1.2 The Relationship Between Marine Biomedicine Industry and Biodiversity

Marine life is incredibly diverse and abundant. Biodiversity refers to the quantity and forms of a particular species existing in various forms and properties. Different countries and regions possess their own unique biological resources. Because the pharmaceutical industry has significant development potential, the diversity of marine biomedicine has also received considerable attention. On one hand, it can be used to treat various diseases and prevent

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conditions such as cancer; on the other hand, it can be used to prepare drugs or for other purposes, such as as a chemical raw material for vaccine production, all of which demonstrate enormous potential and value.

2. Current Status of my Country's Marine Biopharmaceutical Industry

2.1 Development of my country's Marine Biopharmaceutical Industry

China's pharmaceutical industry is in a period of rapid growth. With the rapid development of China's economy, people's demand for marine biomedicine and health products is also increasing and has a year-on-year growth trend. However, there are still many problems in the development of China's pharmaceutical industry. On the one hand, the domestic market is huge and complex and volatile, and some developed countries, such as Japan, restrict exports to meet the needs of domestic consumers in order to protect their own interests and maintain their own interests. On the other hand, China's biomedicine started late, resulting in less research on biomedical technology knowledge and a lack of marine biological drug research and processing technology [1].

2.2 Obstacles to the Development of my country's Marine Biopharmaceutical Industry

China's marine biopharmaceutical industry started late and has a short development history, resulting in low international recognition and renown. However, factors such as large domestic market demand, high consumption capacity, and rising living standards necessitate continuous development and utilization of marine resources. Currently, research in marine biopharmaceuticals in China is still in its early stages, manifested in two main aspects: firstly, China places relatively low emphasis on new drug development and lacks experience in advanced technologies and processes, coupled with an underdeveloped research institution system, hindering effective promotion and application by some domestic enterprises; secondly, insufficient funding, equipment, and personnel have led to a significant gap between R&D investment and manufacturing, and a lack of corresponding supporting systems for product development .

2.3 Current Status of Marine Biopharmaceutical Industry Policies

The marine biopharmaceutical industry in my country has received significant government attention and policy support during its development, but several problems have also emerged. On the one hand, a comprehensive and sound marine drug research and development and management system has not been established, despite the national laws and regulations aimed at regulating corporate behavior and protecting consumer rights. On the other hand, the lack of unified standards has led to fragmented leadership and unclear responsibilities among various departments, including inconsistent policies regarding the development and utilization of marine biological resources across different regions, resulting in competition for these resources.

3. Advantages of the Development of the Marine Biopharmaceutical Industry

3.1 Technological Advantages

My country boasts abundant marine biological resources, widely distributed and diverse, including representative marine life such as seabed organisms, shoal reefs, and Himalayan prairie fish, as well as other marine species like the Donghai No.1 sea monster, which also have considerable scale. Technological advantages are twofold: firstly, strong technological innovation capabilities, possessing numerous large-scale deep-sea operating platforms and various equipment, instruments, production processes, and manufacturing methods within my country's territorial waters; secondly, high product quality, with marine organisms containing extremely high levels and rich diversity of active substances, including proteins, amino acids, vitamins, and many other important elements that play a vital role in human health.

3.2 Talent Advantages

China is a populous country in the world and has a certain number of talents in the pharmaceutical industry. Among these talents are many researchers with strong medical knowledge and scientific research capabilities, rich medical experience, and mastery of international advanced technology, as well as rich experience and resource advantages. With the continuous progress and innovation of science and technology, medical device and drug R&D personnel

need a large number of compound application talents who are proficient in both medicine and technology development. At the same time, they also need to master modern advanced scientific knowledge to cope with the challenges brought about by various complex environmental changes in the new era. At present, China has a large number of high-quality medical graduates and reserve experts and scholars with strong medical engineering technology research capabilities and a certain scientific research level to meet the needs of the industry [2].

3.3 Environmental Advantages

China possesses abundant marine resources, particularly in its coastal areas, which rank second in the world in terms of sea area. Jiayuguan Pass and coastal islands account for over 95% of the country's total area, and these waters possess unique geographical advantages. Marine organisms contain many organic substances, such as proteins and amino acids, and are rich in minerals like calcium carbonate, phosphates, and selenium compounds. These organisms have unique biological value, economic benefits, and other health-promoting effects, playing an important role in medicine and serving as a valuable source of adjunctive therapies and pharmaceuticals.

4. Disadvantages in the Development of the Marine Biopharmaceutical Industry

4.1 The industry lacks scale, and enterprises have not yet established their leading role in innovation

My country's pharmaceutical industry has historically been dominated by small and medium-sized enterprises (SMEs). Biopharmaceutical companies, in particular, are small in scale and lack leading enterprises and financial support, resulting in weak competition within the industry. Although the government has increased investment in marine drug research and development in recent years and introduced policies to encourage domestic pharmaceutical companies to develop new marine biological products, research novel compound anti-gels, and apply for patents, these measures aim to accelerate the development of my country's pharmaceutical industry. However, most of these biopharmaceutical companies lack their own core technologies or have weak independent innovation capabilities.

4.2 The industrial development mechanism needs improvement, and a robust investment and financing system to support innovation has not yet been established

Currently, China's marine biopharmaceutical industry development mechanism lacks a complete and systematic policy framework and legal framework to support it. Firstly, regarding market access, the lack of effective regulatory measures and corresponding institutional deficiencies prevent many companies from entering or exiting the market. Secondly, insufficient government investment in new product research and development is a significant factor affecting the overall industry's development and innovation capabilities. Finally, compared to some foreign biopharmaceutical manufacturers, their advanced, comprehensive, and rigorously regulated management and financial systems enable them to better attract foreign investment and thus hinder the development of China's industry.

4.3 The advantages of marine science and technology have not been fully utilized, and the service system supporting innovation is relatively lagging behind

At present, China's pharmaceutical industry is undergoing a transformation from traditional to innovative, and this transformation requires continuous progress in technology and management. However, overall, there is still a significant gap compared with developed countries. There are obvious deficiencies in the three aspects of innovation capability, R&D of new products and marketing model. First, most Chinese companies lack awareness of independent intellectual property protection; second, the industry lacks relevant laws and regulations on patents; and finally, a complete pharmaceutical industry science and technology system has not been established, which has led to a series of problems such as slow and unstable development of the entire industry [3].

5. Policy Recommendations for Improving the Development of my country's Marine Biopharmaceutical Industry

5.1 Establish a special fund for industrialization and create a diversified funding system

According to convention, a country's industrialization special fund should be funded by at least two different industries and departments, following the principle of "whoever invests, benefits." Firstly, establishing diversified funding

sources is essential for the development of my country's pharmaceutical companies and is a necessary path to improve product quality and market competitiveness. Secondly, we can learn from advanced international experiences to address our own shortcomings and continuously improve our national industrialization special fund system to adapt to economic globalization and free competition under a market economy. Finally, my country should fully utilize its government policy advantages.

5.2 Strengthen the construction of marine biomedicine innovation platforms and build an industrial development system

Strengthen the construction of innovation platforms to provide a good foundation for the development of the marine biopharmaceutical industry. First, we should establish and improve marine biopharmaceutical research institutions and improve and integrate existing research. Second, we should increase the cooperation and exchange between Chinese enterprises and advanced foreign technologies, and work hard to improve innovation capabilities and R&D levels to accelerate the development of Chinese biopharmaceutical products. Finally, we should encourage the introduction of leading foreign talents with certain conditions and cultivate outstanding domestic technical and management talents. This will provide a good platform for promoting the healthy, stable and sustainable development of the marine biopharmaceutical industry [4].

5.3 Increase support for small and medium-sized enterprises in the marine biopharmaceutical industry and enhance their independent innovation capabilities

China's pharmaceutical industry is a sunrise industry, and with the support of national policies, it promotes the development of domestic enterprises by introducing advanced technologies and independent innovation capabilities. However, since most small and medium-sized biopharmaceutical companies in China are small in scale and weak in strength, the government needs to increase its support for small and medium-sized enterprises in the industry and provide appropriate subsidies to attract more outstanding talents to join this large market. At the same time, government funds can also be used to establish funds that are conducive to the healthy and orderly development of the pharmaceutical industry.

5.4 Strengthen talent cultivation and recruitment to form a sustainable marine biomedical innovation team

My country's pharmaceutical development has long faced challenges such as talent shortages, a lack of innovation, and fierce competition among enterprises. In this environment, there is a need for a group of creative and pioneering talents who are adept at learning and researching marine science and can adapt to the demands of the times to develop the industry. Marine biomedical research and development is a complex and arduous task, requiring continuous exploratory work to successfully realize its value. Therefore, increasing investment in the training of marine pharmaceutical talent and establishing a sound talent introduction mechanism are of profound significance for improving the quality of personnel and promoting cooperation among enterprises.

5.5 Establish and improve policies and regulations for the development of the biopharmaceutical industry

My country should formulate relevant policies and regulations to support and encourage the development of the pharmaceutical industry, ensuring its healthy and orderly growth. On the one hand, the state should establish a comprehensive legal and regulatory system to provide strong support for the biopharmaceutical industry, while also regulating the behavior of market entities and addressing problems in transaction processes. On the other hand, specialized departments should be established to supervise and inspect the production, transportation, and sales of pharmaceuticals. For matters involving life and health, strict standards and regulations should be established to restrict companies from using substandard or unreasonable products.

5.6 Vigorously promote the cultural development of the biopharmaceutical industry

The pharmaceutical industry is a major part of cultural construction and an indispensable part of the development and improvement of China's medical security system. Therefore, in order to make China's biopharmaceutical industry move forward rapidly and steadily, it is necessary to vigorously promote its humanistic spirit, national traditions, and regional characteristics, and increase investment to promote the industrialization process of the

biopharmaceutical industry in the whole country and even the world to a higher and farther direction. On the one hand, it is necessary to strengthen the importance of cultural construction, combine the traditional Chinese medicine industry with the modern Chinese medicine industry, drive the development of medicine, and make it a Chinese cultural heritage industry with national characteristics and regional features; on the other hand, it is necessary to increase publicity efforts to improve people's understanding and awareness of the development, utilization and promotion of China's biological resources, strengthen the understanding and awareness of traditional Chinese culture through television media, the Internet and other channels, face up to the current situation and future trend of the development of the Chinese medicine industry, and make it an industry that people aspire to and develop [5].

5.7 Strengthen industrial development

To strengthen industrial development and enhance the competitiveness of China's marine biopharmaceutical industry in the international market, continuous research and innovation are essential, along with increased investment in R&D for new varieties, new technologies, and bioactive ingredients. Firstly, we must accelerate the structural adjustment of the domestic pharmaceutical industry by introducing advanced foreign production processes and equipment, as well as attracting outstanding domestic and international talent. While learning from and drawing on advanced international experiences, we must also adapt them to China's national conditions and formulate strategic plans that align with the development needs of socialism with Chinese characteristics. Secondly, we must develop new pharmaceutical formulation processes based on traditional Chinese medicine, actively promote the "green and natural" concept, and coordinate it with China's medical and health undertakings. This will enable the development of products with Chinese characteristics and enhance the added value and international competitiveness of the marine biopharmaceutical industry.

6. Conclusion

While my country's marine biopharmaceutical industry has made significant progress in recent years, it still lags behind developed countries in Europe and America. With the world's aging population and increasing health awareness, the demand for the biopharmaceutical industry is growing. Therefore, we must focus more on developing new products and strengthening technological innovation to meet consumer needs, increase investment, expand production and operations, and establish a sound and effective legal and regulatory framework to provide a favorable environment for the development of my country's marine biopharmaceutical industry, thereby better promoting its sustained, stable, rapid, and sustainable development.

References

[1] Dai K, Han L. Analysis of influencing factors on the development of China's marine biopharmaceutical industry based on interpretive structural model. Mar Dev Manag. 2017.

[2] Liu L, Yue Q. Research on the development of China's marine biopharmaceutical industry and marine use management policies. Mar Dev Manag. 2012:18-21.

[3] Huang X. An analysis of the current situation and development trend of China's marine biopharmaceutical industry. Bus Econ. 2016:51-53.

[4] Li Y. Analysis of the current status of the marine biopharmaceutical industry and development strategies of Chinese enterprises. Biochem Eng. 2017.

[5] Li Y, Gao S. Analysis of the current development status of China's marine biopharmaceutical industry—based on statistical data from 1995 to 2015. Chin Sci Technol Forum. 2016.