Mini Review
Volume 15:01, 2024

Journal of Tissue Science & Engineering

ISSN: 2157-7552 Open Access

The Relationship between Preparation and Biological Activities of Animal-derived Polysaccharides

Ahmed Khan*
Department of Tissue Engineering, University of Helsinki, Helsinki, Finland

Abstract

Animal-Derived Polysaccharides (ADPs) have gained significant attention due to their diverse biological activities, including immunomodulatory, antitumor, antioxidant, and antimicrobial properties. However, the efficacy of ADPs greatly depends on their preparation methods, which influence their structural composition and biological functions. This article explores the relationship between the preparation techniques of ADPs and their resultant biological activities, highlighting the importance of understanding these relationships for the development of novel therapeutic agents.

Keywords: Polysaccharides • Structural • Biological

Introduction

Polysaccharides are complex carbohydrates found abundantly in nature, including plants, microorganisms, and animals. Animal-Derived Polysaccharides (ADPs) are extracted from various animal sources, such as fish, shellfish, insects, and mammals [1]. These polysaccharides exhibit a wide range of biological activities, making them promising candidates for pharmaceutical and biomedical applications. However, the biological activities of ADPs are closely linked to their preparation methods, which can significantly impact their structural characteristics and functional properties.

Literature Review

Preparation techniques of animal-derived polysaccharides

The preparation of ADPs involves several steps, including extraction, purification, and structural modification. Different extraction methods, such as hot water extraction, enzymatic hydrolysis, and chemical extraction, are employed depending on the source material and desired polysaccharide characteristics. Following extraction, purification techniques, such as precipitation, chromatography, and membrane filtration, are used to isolate and purify the polysaccharides from other components. Structural modification techniques, including sulfation, methylation, and acetylation, can further alter the physicochemical properties of ADPs [2].

Discussion

Impact of preparation methods on biological activities

The biological activities of ADPs are intricately linked to their structural features, such as molecular weight, monosaccharide composition, branching pattern, and glycosidic linkage. Therefore, the preparation methods employed can significantly influence these structural characteristics, subsequently affecting the biological activities of ADPs. For example, studies have shown that the molecular weight of ADPs influences their immunomodulatory and antitumor activities, with high molecular weight polysaccharides exhibiting enhanced efficacy. Similarly, the degree of sulfation or acetylation can affect the antioxidant and antimicrobial properties of ADPs [3].

Understanding structure-activity relationships

To optimize the biological activities of ADPs, it is essential to elucidate the structure-activity relationships underlying their functions. This requires a comprehensive analysis of the structural features of ADPs obtained through different preparation methods and their corresponding biological activities. Advanced analytical techniques, Including Nuclear Magnetic Resonance (NMR) spectroscopy, Fourier-Transform Infrared (FTIR) spectroscopy, and Size-Exclusion Chromatography (SEC), are invaluable tools for characterizing the structural properties of ADPs and correlating them with their biological functions.

Applications and future perspectives

The relationship between the preparation methods and biological activities of ADPs has significant implications for their applications in various fields, including pharmaceuticals, nutraceuticals, and biomedical materials. By optimizing the preparation techniques, researchers can tailor the properties of ADPs to meet specific therapeutic requirements, such as targeted drug delivery, wound healing, and immune modulation. Furthermore, ongoing research efforts are focused on developing innovative preparation methods, such as green extraction techniques and biotechnological approaches, to enhance the bioactivity and sustainability of ADPs [4-6].

Conclusion

In conclusion, the preparation methods of animal-derived polysaccharides play a crucial role in determining their biological activities. By understanding the structure-activity relationships of ADPs, researchers can design efficient extraction, purification, and modification strategies to enhance their therapeutic potential. Further studies investigating the impact of preparation techniques on the biological activities of ADPs are essential for advancing their applications in medicine and biotechnology.

Acknowledgement

None.

Conflict of Interest

None.

***Address for Correspondence:** Ahmed Khan, Department of Tissue Engineering, University of Helsinki, Helsinki, Finland; E-mail: ahmedkhan26@yahoo.com*

Received: 27 January 2024, Manuscript No: jtse-24-130141; **Editor Assigned**: 30 January 2024, Pre-QC No. 130141; **Reviewed**: 14 February 2024, QC No. Q-130141; **Revised**: 20 February 2024, Manuscript No. R-130141; **Published**: 27 February 2024, DOI: 10.37421/2157-7552.2024.15.348

References

1. Huang, Yuzhe, Hao Chen, Kunfeng Zhang and Yongming Lu, et al. "Extraction, purification, structural characterization, and gut microbiota relationship of polysaccharides: A review." *Int J Biol Macromol* 213 (2022): 967-986.
2. Chen, Ling and Gangliang Huang. "Antitumor activity of polysaccharides: An overview." *Curr Drug Targets* 19 (2018): 89-96.
3. Barbosa, Jhonatas Rodrigues and Raul Nunes de Carvalho Junior. "Polysaccharides obtained from natural edible sources and their role in modulating the immune system: Biologically active potential that can be exploited against COVID-19." *Trends Food Sci Technol* 108 (2021): 223-235.
4. Pomin, Vitor H. and Barbara Mulloy. "Glycosaminoglycans and proteoglycans." *Pharmaceuticals* 11 (2018): 27.
5. Zappe, Andreas, Rebecca L. Miller, Weston B. Struwe and Kevin Pagel. "State-of-the-art glycosaminoglycan characterization." *Mass Spectrom Rev* 41 (2022): 1040-1071.
6. Sheng, Kangjia, Cuiling Wang, Bitao Chen and Meijuan Kang, et al. "Recent advances in polysaccharides from *Lentinus edodes* (Berk.): Isolation, structures and bioactivities." *Food Chem* 358 (2021): 129883.

How to cite this article: Khan, Ahmed. "The Relationship between Preparation and Biological Activities of Animal-derived Polysaccharides." *J Tiss Sci Eng* 15 (2024): 348.