Preliminary Study on the Extraction and Immune Activity of Polysaccharide from Bamboo-Sun

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Abstract: In this paper, based on the understanding of the research materials of bamboo-sun, according to the selected materials and methods, the final experimental results were deeply discussed, and the immunoactivity of bamboo-sun has been clarified.

1. Introduction

As a kind of precious edible and medicinal fungi, Dictyophora indusiata belongs to this class of treasures and has great advantages in the development of practice. Combined with project the analysis found that in recent years, the red bamboo-sun has many kinds of amino acids, polysaccharides and vitamin content, in be used actually not only has good nutritional value, also have a certain disease prevention health care effect, long-term use of bamboo-sun can be used in the treatment of chronic bronchitis, can also control the human body blood pressure and blood cholesterol levels, etc[1-4].

In the process of processing the products of bamboo-sun, the production staff often use its sub-layer handles to remove the fungiculi cap and fungiculi holder. At this time, the proportion of sublayer fungicularis to fungicularis and fungicularis can reach 1:1.3, which not only causes serious resource loss, but also contains very negative amino acids, polysaccharides, proteins and other elements in combination with experimental analysis. Until now, there have been few studies and analyses on polysaccharides from Dictyophora sinensis. This research was first proposed in Japan on the anti-tumor analysis of polysaccharides from Dictyophora sinensis. Combined with this content in-depth discussion, we can know that this product has the ability to resist tumor, and can improve the immunity of the human body. Therefore, in this study, the relationship between bioactive substances and pharmacological activity was analyzed by targeting the fungus shell of bamboo-sun[5].

2. Materials and Methods

2.1 Material

The prepared waste fungus tubers of Dendrocalama sinensis were provided by an enterprise, which needed to be dried in an oven at 60°C before formal experimental analysis, and then crushed by a shredder for later use. Also, prepare DEAE- cellulose and 98 percent edible alcohol.

2.2 Methods

This study mainly from the following points: first, for the extraction of polysaccharides proposed orthogonal test; Secondly, the protein content was determined and analyzed. Thirdly, the content of polysaccharide was studied and analyzed. Fourthly, carry out ultraviolet spectrum study; Fifth, column separation of polysaccharides; Sixth, the purity and molecular weight of polysaccharides were measured. Seventh, the implementation of infrared spectrum research; Eighth, in vitro cytotoxicity test and analysis.

Taking the orthogonal experiment of polysaccharide extraction as an example, the specific operation steps are as follows: First, prepare 5 grams of Dendrovolvata Rhizophora powder, and put

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forward a clear orthogonal test steps; Second, add an appropriate amount of distilled water, and at the specified temperature in accordance with different times for two extraction; Third, after the completion of the extraction work, to filtration and fusion centrifugation; Fourthly, 95% ethanol was added after the supernatant was concentrated, so as to reach the saturation concentration and then precipitated again, and combined with distilled water for comprehensive dissolution; Fifth, deproteinize for three to four hours with a double volume of Sevage reagent. After concentration, precipitate with 95% ethanol. Sixth, using 65°C dryer for drying, finally obtains the polysaccharide crude product DRVP. After the above operation, it is necessary to use sulfuric acid - phenol method to determine the amount of polysaccharide extracted, each experiment should be carried out three times, and find the best extraction conditions.

In UV spectrum analysis, a certain amount of DRVP1 should be prepared and blended into distilled water to make a solution with a mass concentration of 1mg/mL. In this way, the wavelength can reach 200 to 400nm under the scanning of UV and visible light. At the same time, the phenol-sulfuric acid method can be used for color rendering, which can be effectively scanned at a wavelength of 200 to 400nm[6-8].

3. Results and Analysis

Taking the condition of polysaccharide body of mycorrhiza as an example, in the process of experimental operation and screening, the staff should be clear that there are many factors that affect the extraction efficiency, such as alcohol analysis, water quantity and extraction time. Based on the analysis of polysaccharide extraction results from other edible fungi, the influence of material ratio, extraction time and alcohol concentration was mainly considered in this study. As shown in the table below, it is the effect of extraction time on polysaccharide extraction:

Table 1 the Effect Of Extraction Time on Polysaccharide Extraction

Extracting duration	Ratio of volva dust(g) to water volume(mL)		
	1:15	1:20	1:25
3h	8.17%±0.27%	9.14%±0.56%	9.99%±0.49%
4h	12.03%±0.23%	8.19%±0.09%	8.11%±0.20%
5h	10.86%±0.37%	10.14%±0.40%	10.56%±0.05%

According to the analysis of data changes in the above table, when the material ratio was 1:15 and the extraction time was 4 hours, the highest extraction rate was obtained. However, if too little water is added, the polysaccharide is difficult to be completely extracted, and it is easy to appear the phenomenon of pasting the pot in the process of experimental operation. If too much water is added, the extraction rate of polysaccharide will decrease, and it is difficult to achieve the final experimental analysis effect.

In the ultraviolet spectrum analysis, the results shown in Figure 1 below can be obtained. During the experimental operation, the DRVP1 polysaccharide component was scanned by UV-Vis spectrophotometer, and no absorption peak was found in the region of 260nm, which proved that the DRVP1 polysaccharide component did not contain nucleic acid. At 280nm, the curve is almost smooth, indicating no protein inside.

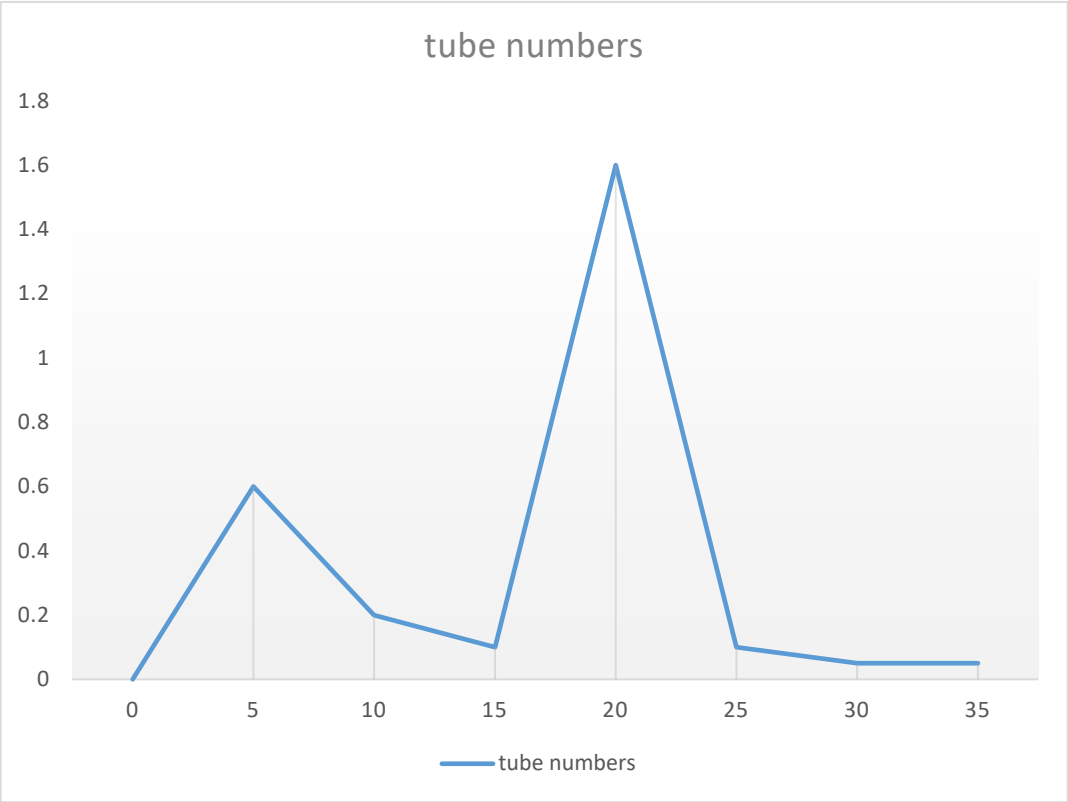

Fig.1 Deae-Cellulose Column Separation Spectrum of Drvp (Excel)

In addition to the two experimental results proposed above, there are other contents. Figure 2 below shows the results of the column separation experiment of polysaccharides, in which crude polysaccharide DRVP was prepared into 12mg/mL aqueous solution, and two components, DRVP1 and DRVP2, were obtained after separation. Then, in the experimental analysis, it was found that the former had anti-gravity immunoactivity[9].

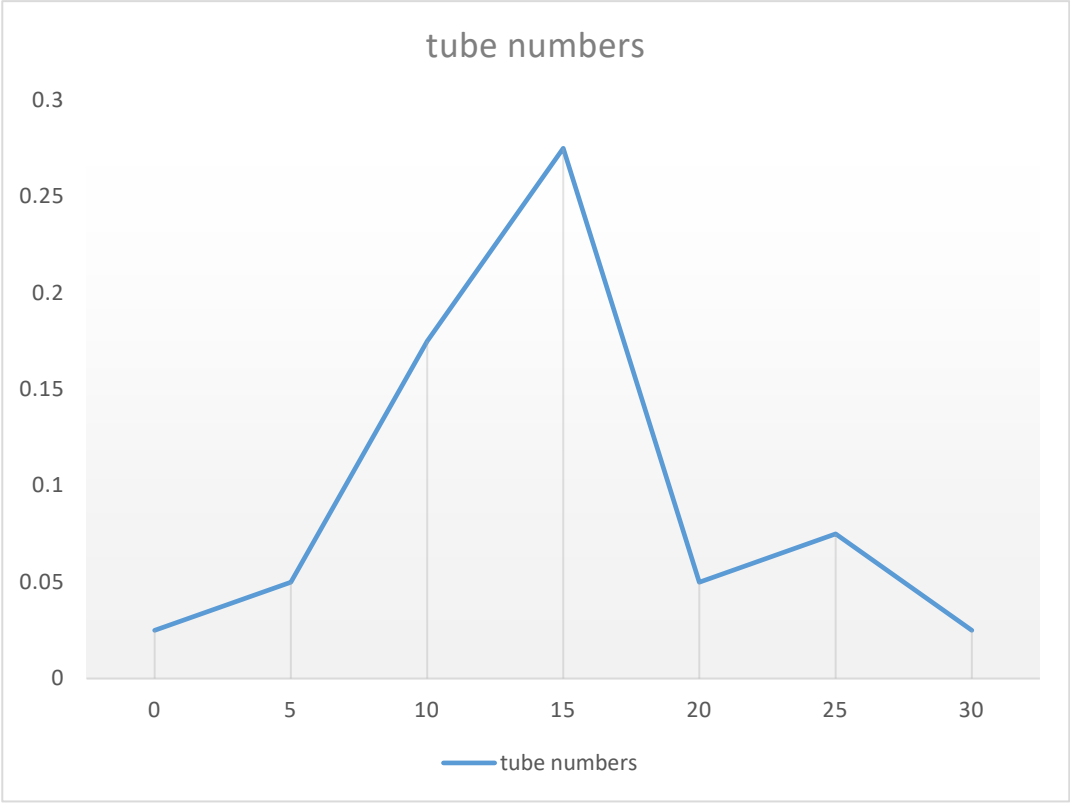

Fig.2 Separation Map of Drvp1 on Sephadex g-75 (Excel)

4. Conclusion

To sum up, polysaccharides, as an important substance needed by human body, have shown strong biological activity in the development, so it is very necessary for researchers to continue to explore and innovate on them, and obtain more achievements in functional food or health products. Fungal polysaccharide is now recognized as a funny immune enhancer. Some fungal polysaccharide reagents have been used in clinical medicine, mainly for the treatment of immune decline and tumor detection and treatment. Combined with the analysis of common fungal polysaccharides in the market, such as poria cocos polysaccharide, lentinan and porcine cocos polysaccharide, they all showed positive effects in the medical research. As a rare and precious food and drug product in the market, China is the origin of this content and also the first country in the world to develop and artificially cultivate it. Strengthening the development and research on its waste fungus can further control the production cost of the product and improve the benefits obtained from the practical development.

References

[1] Zxa B, Qiang Z, Jing D A, et al. Structural characterization, antioxidant and antimicrobial activity of water-soluble polysaccharides from bamboo (Phyllostachys pubescens Mazel) leaves[J]. International Journal of Biological Macromolecules, 2020, 142:432-442.

[2] Gualtiero M, Francesca C, Maddalena C M, et al. Optimization of Microwave-Assisted Extraction of Antioxidants from Bamboo Shoots of Phyllostachys pubescens[J]. Molecules (Basel, Switzerland), 2020, 2020 , Volume 25 , Issue 1 .

[3] Chen H, Xiao R, X Zhou. Study on the extraction, purification, partial chemical characterization and anti-alcohol liver injury activity of Mori Fructus polysaccharides[J]. New Journal of Chemistry, 2020, 44.

[4] Yang N, Zhang Y. The Study On Extraction,Purification and Antioxidative Activity of Polysaccharides From Allium Macrosttemon Bge. Guangdong Chemical Industry, 2019.

[5] Oh K N, Y Kim, Choi E J , et al. Laxative Activity of the Hot-Water Extract Mixture of Hovenia dulcis Thunb. and Phyllostachys pubescens Mazel in Chronic Constipation Model SD Rats[J]. Journal of Microbiology and Biotechnology, 2020.

[6] Gao Q, Shi Y, Liao M , et al. Laboratory and field evaluation of the aphidicidal activity of moso bamboo (Phyllostachys pubescens) leaf extract and identification of the active components[J]. Pest Management Science, 2019, 75.

[7] Jin L X, Chen L, Gao R J, et al. Study on Extraction and Antioxidant Activity of Polysaccharides from Nereis succinea. Food Research and Development, 2020.

[8] Guangfan, Jin, Vu, et al. Chemical Characteristics of Bamboo (Phyllostachys pubescens) Fiber Fractions Produced by a Laboratory Thermomechanical Refiner[J]. Mokuzai Gakkaishi, 2020, 66(1):16-22.

[9] Liao M, Ren X, Gao Q, et al. Anti-fungal activity of moso bamboo (Phyllostachys pubescens) leaf extract and its development into a botanical fungicide to control pepper phytophthora blight[J]. Scientific Reports, 2021, 11(1).