

Study of Technological Properties of Mucilage Based on Chia Seeds (*Salvia hispanica L.*) Polysaccharides

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Abstract

There has been an increasing interest in natural polysaccharides as biomedical platforms. Chia seeds polysaccharides are very promising candidates since they are natural, biodegradable and also can be used in both food and medical fields. Chia seeds (*Salvia hispanica L.*) can create a natural mucilage that is rich in polysaccharides due to their high hydration and gel-forming properties [1]. Most previous studies have been focusing on the chemical composition of chia seeds polysaccharides while there is limited research work that link between rheological properties and final film performance, which creates a clear research gap that we aim to address in our work by using rheology guided film design. Ongoing studies have been conducted to show the effect of holding time after centrifugation on the film rheological properties; while the temperature and particle size were stabilized. Preliminary observations suggest that increasing the holding time has a direct impact on increasing the viscosity value and producing more stable mucilage. These tendencies show the holding time as a key parameter for mucilage design in order to be used in both food and medical applications.

Keywords

Chia seeds mucilage, polysaccharides, technological properties, rheology, holding time.

Исследование Технологических Свойств Муцилажа На Основе Полисахаридов Семян Чиа (*Salvia hispanica L.*)

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Аннотация

В последнее время наблюдается растущий интерес к природным полисахаридам в качестве биомедицинских платформ. Полисахариды семян чиа являются очень перспективными кандидатами, поскольку они являются природными, биоразлагаемыми и могут использоваться как в пищевой, так и в медицинской областях. Семена чиа (*Salvia hispanica L.*) могут создавать природный муцилаж, богатый полисахаридами, благодаря своим высоким гидратационным и гелеобразующим свойствам [1]. Большинство предыдущих исследований были сосредоточены на химическом составе полисахаридов семян чиа, в то время как исследований, связывающих реологические свойства и конечные характеристики пленки, крайне мало, что создает явный пробел в исследованиях, который мы стремимся восполнить в нашей работе, используя реологически обоснованное проектирование пленок. В настоящее время проводятся исследования, показывающие влияние времени выдержки после центрифугирования на реологические свойства пленки; при этом температура и размер частиц стабилизируются. Предварительные наблюдения показывают, что увеличение времени выдержки оказывает прямое влияние на увеличение значения вязкости и получение более стабильной слизи. Эти тенденции показывают, что время выдержки является ключевым параметром для проектирования муцилажа, используемого как в пищевой, так и в медицинской сферах.

Ключевые слова

Муцилаж, полисахариды, технологические свойства семян чиа, реология, время выдержки.

Seeds based mucilages are natural physiological compounds that have many technological properties including high-water/fat holding capacity, gel-forming, viscosity and viscoelasticity properties [2]. The mucilage generated from chia seeds is a highly anionic heteropolysaccharide, with content of soluble fibers of (6 %) which is the major component of the total carbohydrates [1]. Chia seeds polysaccharides are commonly used in food industry; due to its moisture-retention ability, and medical applications; due to its ability to form hydrogels that can be used in burn dressing [3]. Most previous studies, indicated the impact of polysaccharides chemical composition on the film functional properties; while there is lack in the studies that consider the rheological properties as key parameters that influence the film performance [4].

We aim in our research to study different rheological properties; to achieve this goal, the following objectives were formulated:

1. Based on an analytical review of the information, design a film coating model using chia seeds polysaccharides for use in the food and medical applications.
2. To investigate the functional and technological properties of chia seeds polysaccharides depending on some factors of the extraction process (particle size; temperature and holding time).
3. Development of biopolymer films from chia seeds polysaccharides with tailored properties for specific food and medical applications.

First observations introduce that increasing holding time can significantly increase the viscosity value, which is very important for further applications in both food and medical fields [5]. These findings will be used as key parameters in tailoring films for specific targeted functions in further studies.

In conclusion, the investigation of technological properties of chia seeds film represents an important step in material design. The preliminary observations of holding time impact on viscosity, shows the importance of technological parameters on the film performance. These findings establish a rheology-guided approach for developing functional biopolymer films with specific properties to be applied in food preservation and medical applications, including burn treatment [3,4].

References

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