

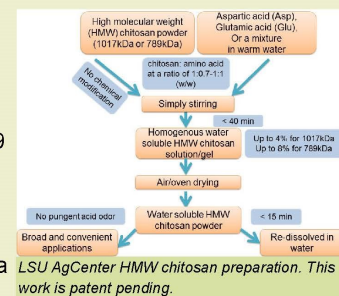
Water Soluble High Molecular Weight Chitosan Products

Background

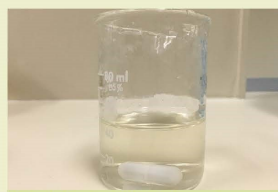
Chitosan is derived from chitin, which is mainly produced from crustacean (such as crab and shrimp) shell wastes. It has broad applications in food and beverage products, post-harvest treatments, cosmetic and pharmaceutical products, medical treatments, and environmental pollution treatments. Generally, the molecular weight of commonly used chitosan ranges from 3-1000 kDa, and it affects the functionality and end usage of chitosans. For example, compared with low molecular weight (LMW) chitosan, the high molecular weight (HMW) chitosan exhibits better tensile strength and elongation properties as a functional film. However, the poor water solubility of HMW chitosan limits its applications.

Invention

LSU AgCenter scientists have discovered a method to quickly solubilize high molecular weight chitosans. These chitosan products can be prepared with various concentrations/ viscosities and dried into powders, allowing a wide range of potential applications. In experiments, chitosan solutions of 789 kDa and 1017 kDa were prepared in only 40 minutes and powder forms could be re-dissolved in water in less than 15 minutes. Both the initial solution and re-dissolved solution had very high HMW chitosan concentrations of up to 8% for 789kDa chitosan and 4% for 1017kDa chitosan, respectively.



Advantages



LSU AgCenter HMW chitosan in solution.

The developed technique provides simple preparation procedure for dissolving the HMW chitosan without any chemical modifications. It eliminates the acid pungent odor of the HMW chitosan solution and makes it more biocompatible. Also, the fast dissolving and re-dissolving time for the freshly prepared HMW chitosan solution or the dried HMW chitosan powder will reduce the cost of production. Additionally, much higher concentrations of water soluble HMW chitosan solutions can be obtained using this technique.

Market

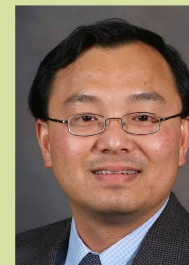


LSU AgCenter HMW chitosan in powder form.

The four largest applications for chitosan are water treatment, cosmetics, biomedicine, and foods and beverages. Transparency Market Research placed the global chitosan market at \$1.35 billion in 2013 with a compound annual growth rate of 17.7% from 2014 to 2020¹. An example application for HMW chitosan would be a natural food antimicrobial. According to Frost & Sullivan, the North American segment for natural food antimicrobials was \$20 Million in 2012².

1. (2014). Chitosan Market is Expected to Reach USD 4.22 Billion in 2020. *Transparency Market Research*.
2. (2012). Strategic Analysis of the Global Natural Food Ingredients Market. *Frost & Sullivan*, 9833-88, 32.

Inventors



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products from Louisiana agricultural, seafood, and aquacultural byproducts and analyzes functional and sensory properties of raw materials and products.

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