

Case ID:M21-221P

Published: 11/29/2023

## Inventors

**Hanqing Jiang**

**Junchao Huang**

## Contact

Shen Yan  
shen.yan@skysonginnovations.  
com

# Aerogel Preparation Based on Squid Pen Extracts and Use as Superabsorbent for Acid Solution

## Background

Natural polymer extracted from squid pen, specifically beta-chitin, has been proven to be biocompatible, biosafe and biodegradable for use in fields of medicine, cosmetics, food, agriculture, and biomaterials. As one of the most abundant natural polymers that has these advantages, chitin and its derivatives are the optimal primary materials in a number of applications. However, chitin is a polymer with nearly neutral electric conductivity, and in use as a superabsorbent, its swelling capacity is always lower than the synthetic polymers (e.g., sodium polyacrylate). Also, the high chain stiffness of chitin molecules always prevents further swelling in water.

One efficient method to increase the swelling capacity of chitin materials is the chemical derivatization on chitin molecules (e.g., carboxylation, sulfonation, etc.) to increase the osmotic pressure by ionized functional groups and decrease the chain stiffness by reducing the hydrogen bonding interactions between the chitin molecules. However, these methods provide high density of negative charge on chitin molecules, which only allow the high swelling in water or alkaline solutions, but show significant shrinkage in acid solutions.

## Invention Description

Researchers at Arizona State University have developed a method for preparing a biosafety aerogel based on a natural polymer extracted from squid pen used for acid solution superabsorbent. The use of chitin as the natural polymer ensures biosafety to the human body, and the introduction of guanidine salts and epoxy crosslinker enables a high swelling capacity of the chitin-based aerogel superabsorbent in acid and neutral solution. The degree of deacetylation of chitin can be controlled, which increases the absorption of acid solution.

## Potential Applications

- Biosafe hydrogel for use in:
- Medical (e.g., hyperchlorhydria treatment)
- Diet (e.g., obesity control)

## Benefits and Advantages

- High swelling capacity
- Biosafe (e.g., safe for human applications)
- Increased absorption of acid solution
- Natural & biodegradable materials

