

## NEW BIODEGRADABLE POLYMER FABRICATED USING GUAR GUM, AND CHITOSAN HAS HIGH POTENTIAL FOR PACKAGING MATERIAL

Relevant for: Science & Technology | Topic: Indigenization of technology and developing new technology

A team of Indian scientists have developed an environmentally friendly, non-toxic, biodegradable polymer using guar gum and chitosan, both of which are polysaccharides extracted from guar beans and shells of crab and shrimps. The fabricated guar gum-chitosan film having high water stability, high mechanical strength, and excellent resistance to harsh environmental conditions can potentially be used in packaging applications.

Polysaccharide is one of the biopolymers with high potential for use in synthesis of packaging material. However, due to some drawbacks of polysaccharides, such as low mechanical properties, high water-solubility, and low barrier properties, they are not preferred.

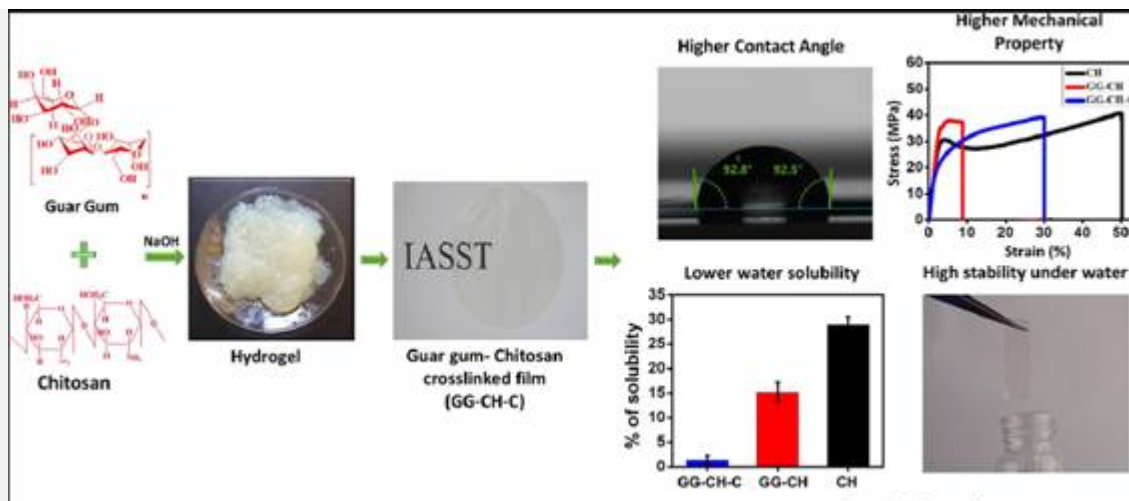
In order to overcome these challenges of polysaccharide, Dr. Devasish Chowdhury, Associate Professor, and Sazzadur Rahman, Inspire Junior Research Fellow, fabricated a guar gum-chitosan composite film which is a cross-linked polysaccharide without using any plasticizer with the help of a method called the solution casting method (a simple technique to make polymer films). The fabricated biopolymer composite film had high water stability, high mechanical strength, and excellent resistance to harsh environmental conditions. This work has been published recently in the journal 'Carbohydrate Polymer Technologies and Applications'.

The researchers found that the fabricated crosslinked film did not dissolve in water even after 240 hours. In addition, the mechanical strength of crosslinked guar gum-chitosan composite film was higher compared to general biopolymer (Biopolymer are known to possess poor strength). The cross-linked guar gum-chitosan composite film was also highly water repellent or hydrophobic due to its high contact angle of 92.8°. It had low water vapor permeability when compared with the film made only from chitosan.

The superior mechanical strength, water repellent properties, and resistance to harsh environmental conditions of the fabricated cross-linked guar gum-chitosan increase its potential of being used in packaging applications.

Publication link: <https://doi.org/10.1016/j.carpta.2021.100158>.

*For more details, Dr. Devasish Chowdhury IASST ([devasish@iasst.gov.in](mailto:devasish@iasst.gov.in)) can be contacted.*



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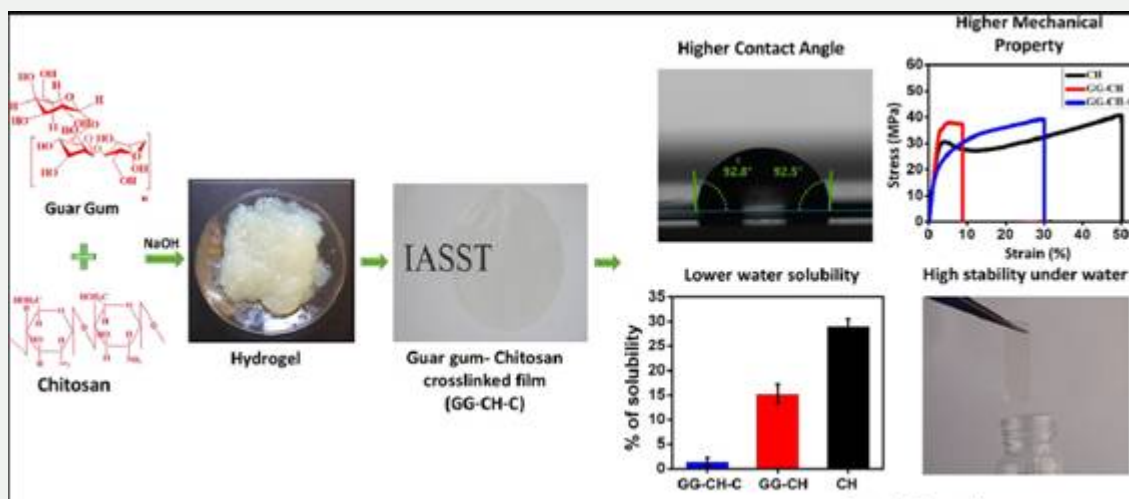
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