



A biodegradable hydrogel extracted from okara: Potential in application as wearable sensor

Xi Cui

Nanyang Technological University, Interdisciplinary Graduate School, S 637335, Singapore

Abstract

A biodegradable and non-toxicity hydrogel derived from the extracted okara cellulose and its potential application as wearable sensor were evaluated. Physical properties, biodegradability, and cytotoxicity were determined to characterize the okara cellulose and okara cellulose hydrogels. Fourier-transform infrared spectroscopy shows the extracted cellulose is pure without protein, lipids, hemicellulose, and lignin. Porous structure can be found on the fracture surface of okara cellulose hydrogels from scanning electron microscope. The tensile strain at fracture of the okara cellulose hydrogel can reach to 98.2% in the case of 0.7 molar ratio of epichlorohydrin (ECH) to anhydroglucose units (AGU). No hydrogel residue can be found after burying in the soil for 28 days, indicating its good biodegradability. Three different dilutions of hydrogel extract expressed no cytotoxicity on NIH3T3 cells according to MTT assay. Application test shows that the resistance change ratio of okara cellulose hydrogel can be 20% when the finger and wrist bending to 90 degree as a wearable sensor, which implies the feasibility of new material made from okara. This research discloses its enlightenment to the comprehensive utilization of food by-products.



Biography:

Xi Cui is a year four Ph.D. candidate from Nanyang Technological University, Singapore. She is studying in turning food waste into biodegradable materials. She has already published one research paper during her Ph.D. study.



Speaker Publications:

1. Ge, Yicen & Cui, Xi-Yang & Tan, Siu & Jiang, Huan & Ren, Jingyun & Lee, Nicholas & Lee, Richmond & Tan, Choon-Hong. (2019). Guanidine-Copper Complex Catalyzed Allylic Borylation for the Enantioconvergent Synthesis of Tertiary Cyclic Allylboronates.
2. Tan, Choon & Ge, Yicen & Cui, Xi-Yang & Tan, Siu & Jiang, Huan & Ren, Jingyun & Lee, Nicholas & Lee, Richmond. (2019). Enantioconvergent Synthesis of Tertiary Cyclic Allylboronates Using (Guanidine)copper Complex-Catalyzed Allylic Borylation. *Angewandte Chemie International Edition*. 58. 10.1002/anie.201813490.

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