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Toward the Shell Biorefinery: Processing Crustacean Shell Waste Using Hot Water and Carbonic Acid (Article)

Yang, H., Gözaydln, G., Nasaruddin, R.R., Har, J.R.G., Chen, X., Wang, X., Yan, N.

Department of Chemical and Biomolecular Engineering, National University of Singapore, 4 Engineering Drive 4, 117585, Singapore

Abstract

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Biomass fractionation is a prerequisite for almost any biorefinery process. Yet, a cost-effective and environmentally benign approach to separate biomass feedstock into valuable fractions remain a challenge. Herein we introduce a new fractionation method to extract high value chitin from crustacean shell (e.g., shrimp shell) using hot water for deproteinization and carbonic acid for demineralization (termed as the HOW-CA process). This method features high deproteinization and demineralization efficiencies (>90%), and the whole process is accomplished within hours. The desired final product chitin exhibits a high purity. This work addresses the major problems associated with the current industrial practice including the employment of corrosive reagents, the destructive removal of a useful component, and the generation of a large amount of waste. Economic and life-cycle analyses imply that the HOW-CA process is superior to the conventional method, offering both economic and environmental benefits. © Copyright © 2019 American Chemical Society.

SciVal Topic Prominence

Topic: Chitosan | Chitin | shrimp shells

Prominence percentile: 98.012

Reaxys Database Information

View Compounds

Author keywords

Chitin | Demineralization | Deproteinization | Hot water treatment | Life-cycle analysis | Shrimp shell

Indexed keywords

Engineering controlled terms: Carbon dioxide | Chitin | Cost effectiveness | Life cycle | Organic acids | Refining | Shellfish | Water | Water treatment

Engineering uncontrolled terms: Demineralization | Deproteinization | Hot water treatment | Life cycle analysis | Shrimp shells

Engineering main heading: Shells (structures)

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Ministry of Education - Singapore	Tier-2,R-279-000-462-112	

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