

Use of Agro-based Materials to Reduce Plastic Pollution

H. N. Cheng

ACS Past President and Retired Scientist at USDA Agricultural Research Service, Southern Regional Research Center, New Orleans, LA, 70124, USA

Abstract

Most of the chemical materials today are derived from nonrenewable sources such as petroleum and natural gas, which are problematical because of their finite supply, fluctuating prices, and contribution to greenhouse gas emissions and climate change. Thus, there is a growing interest in using agro-based materials and capitalizing on their sustainability, eco-friendliness, enhanced recyclability, and non-toxic nature. Furthermore, many agricultural materials are underutilized and undervalued, and farmers can benefit from new, value-added products derived from agro-based materials. An important opportunity lies in the use of agro-based materials to reduce plastic pollution and microplastics. Indeed, plastic pollution, including the vast amounts of plastic waste and accumulation in landfills, has become an increasingly urgent problem. Microplastics are ubiquitous and have been shown to pose potential risks to human health. In this talk, several types of agro-based waste and byproducts, such as wheat straw, barley straw, cashew shells, and cotton byproducts, will be shown as examples of the conversion of agro-based materials and potential microplastics into value-added materials. Given the large amount of available waste and byproducts in agriculture and the food industry, these resources present a significant opportunity for innovation. By leveraging them, we can help reduce the plastic pollution problem in the future.

Biography

H. N. Cheng (B.S., UCLA; Ph.D., University of Illinois) retired in May 2022 from Southern Regional Research Center (SRRC) of the U.S. Department of Agriculture in New Orleans. Currently, he serves as a collaborator at SRRC, where he continues his research in green polymer chemistry, agro-based materials, biocatalysis, and polymer analysis. He has authored or co-authored over 320 papers, 26 patent publications, edited or co-edited 25 books, and organized or co-organized over 47 symposia since 2000. Recognition of his contributions includes ACS Fellow (2009), POLY Fellow (2010), AGFD Fellow (2018), ACS Volunteer Service Award (2016), Herty Medal (2022), Spencer Award (2022), and SRRC Outstanding Scientist of the Year (2014, 2019). He is active in ACS and has completed a three-year term in the ACS presidential succession (2020-2022); his presidential theme was “Growth, Collaboration, and Advocacy”, whereby he advocated for innovation, disciplinary growth, sustainability, digitization, industrial engagement and entrepreneurship. He also helped organize events, symposia, and webinars to benefit ACS members and the chemistry enterprise.