

Application of biomass materials in improving the performance of biodegradable mulching films

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Biodegradable mulching films are considered green agricultural inputs, which are expected to partially replace traditional polyethylene films and effectively alleviate agricultural “white pollution”. However, their insufficient weatherability and barrier properties, along with high costs, limit their widespread application. In recent years, research addressing these two key technological bottlenecks and cost control has increased. Unlike traditional polyethylene films, biodegradable ones degrade in situ in agricultural soil environments during and after use. Therefore, modifying with biomass materials to enhance their performance is undoubtedly a greener and more sustainable approach among various techniques.

This study provides examples of modifying and preparing biodegradable mulching films using materials such as cellulose, lignin, as well as agricultural and forestry waste. Through testing and characterization, the impact of these biomass materials on the biodegradability, mechanical properties, barrier properties, and weatherability of biodegradable mulching films was investigated. Additionally, standardized testing methods and field evaluation experiments are also summarized for studying the performance and mulching effectiveness of the films, as well as their impact on crop yields. These efforts effectively enhance the performance of biodegradable films and will strongly promote their green development and widespread application [1-4].

References

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Dr. Qi Liu received her Ph.D. from the University of Liège (Belgium) in 2017. She is working as an associate professor at the Institute of the Chinese Academy of Agricultural Sciences (IEDA)-Chinese Academy of Agricultural Sciences (CAAS). Her research now mainly focuses on the modification, characterization, testing techniques, and environmental safety evaluation of biodegradable mulching films. She has led more than 10 projects and sub-projects, including the National Natural Science Foundation project, the “14th Five-Year Plan” National Key Research and Development Program sub-project, and others. She has published over 50 academic papers, with more than 10 as the first or corresponding author in journals such as *ACS Sustainable Chemistry & Engineering*, *Carbohydrate Polymers*, and *Journal of Hazardous Materials*. Additionally, she has been granted five Chinese invention patents as the first inventor. Her research achievements have won her a Chinese Agricultural Science and Technology Award (second prize), a Shennong Chinese Agricultural Science and Technology Award (innovative team prize), and a Great Technological Innovation Award from the Chinese Academy of Agricultural Sciences (first prize). Based on her research results and academic contributions, she has been granted the title of Agricultural Science Talent at IEDA-CAAS since 2022.