

## QUINCE BIOWASTE FOR PRODUCTION OF GRAPHENE-BASED NANOMATERIALS USED FOR ELECTROMAGNETIC SHIELDING

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### Abstract

This paper investigates the potential of using fruit biowaste as a starting material for producing new, environmentally friendly electromagnetic interference (EMI) shielding materials. Specifically, we selected distillery stillage, a by-product of fruit schnapps distillation, which distilleries discharged in large quantities [1]. For every liter of alcohol produced, between 8 and 15 liters of stillage are generated. Due to the high levels of nitrogen compounds and various organic molecules, these waste materials require proper management, leading to additional disposal or treatment costs. One common solution for stillage management is converting it into low-value products such as fertilizer or livestock feed. Our research explores graphene fabrication from biomass-derived sources obtained by the pyrolysis of quince biowaste under inert atmosphere.

In this study, we utilized stillage collected after the distillation of quince schnapps, which was then pyrolyzed at 850°C. We analyzed the resulting graphene-based materials' structural and morphological properties of the and their ability to block electromagnetic waves (EMWs) in the X-band frequency region [2]. Previous studies have shown that biochar produced from lignin can increase the shielding efficiency of cement [3], while sewage sludge biochar has demonstrated shielding effectiveness (SE) values greater than 10 dB [4]. By exploring the possibility of converting quince stillage into value-added, highly demanded materials, this study addresses the need for new sustainable products and provides a novel approach to reducing the environmental burden of stillage discharge.

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