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Development of bio-based polymers based on agroforestry waste extractions of lignins cured and reinforced with antimicrobial agents delaying fungal and bacterial activity by increasing the period of life of a food on the shelf

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In this work we evaluated the characteristics of a new material made of lignin with different molecular weights (high, medium and low molecular weight) in the development of films made of lignin by incorporating essential oils and functional extracts such as peppermint *(Mentha piperita),* oregano *(Oreganum vulgare L.) Garlic (Allium sativum) and cinnamon (Cinnamomun zeylanicum)* as antimicrobial agents that were previously analyzed. The main goal is to limit the production of hydrocarbon-based polymers in Mexico in order to decrease the burning of these and take advantage of the agroforestry waste as the main source of raw material for extraction of lignin: water hyacinth, wheat, maize, walnut shells, coconut fiber and wood (sawdust) of Alamo. These raw materials demonstrated as having 20-45% lignin where in the future we create in order to remove any residue both forestry and industrial. The antimicrobial activity of the essential oils and functional extracts was evaluated through the determination of the minimum inhibitory concentration and minimum bactericidal concentrations (CMB) against: Escherichia coli O157:H7 (ATCC 43888), *Salmonella typhimurium* (ATCC 14028), *Staphylococcus aureus* (ATCC 25923), the essential oils and functional extracts. Based on the microbiological results these were incorporated in a polymer matrix of lignin of different molecular weights, and the antimicrobial activity of the films was evaluated by the diffusion technique in Mueller-Hinton agar and blood agar. The molecular weights were characterized by infrared through different processes of removal of lignin, thus obtaining various types of lignin. However, the methodology being a bit orthodox, organosolv processes of drag in fractions and retention of oxidant gases. It is a material with such characteristics that has a high temperature degradation that was determined by a termogavimetrico TGA analysis, with antimicrobial and antifungal agent that slows down this growth.

Recent Publications

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4. TOQ 2010 541,393 Dr Raúl Hernández Ochoa

Biography

Luis E González is currently a student at the Autonomous University of Chihuahua and has been working on different research projects within the scope of developing innovative projects based in the environment and its improvement. He began to study the effect of the land within molecular arrays that help inhibit a very large proportion of micro-organisms, as well as polymer matrices. He has a number of achievements at global and national levels.

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