

Optimization of physical and mechanical properties of an active film of PLA/EEP by a full factorial design

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Abstract.

The objective of this work is to develop an active food packaging material based on PLA and ethanol propolis extract. PLA /EEP films were prepared by casting, using a three level full factorial design that allowed us to study the parameters influencing Young's modulus and water absorption. Many experiments were carried out, with a suitable choice of two variables, leading to a mathematical model in the form of a first degree polynomial. The films are subjected to several analyzes: physical and mechanical properties and antibacterial activity. The results showed that the optimal film is obtained when an amount of 14% w/w of EEP, giving an antimicrobial food packaging material with the following characteristics: amount of propolis extract: 0.14g, Young's modulus: 1594.16 N/mm², water absorption rate: 3%, breaking stress: 29.45% and elongation at break: 39.27%.