

## **Sustainable green poly(lactic acid) (PLA)/eggshell powder (ESP) biocomposites**

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### **ABSTRACT**

Poly(lactic acid), which is most commonly referred to by its acronym PLA, is a polymer that may be recycled and naturally deteriorated. It is also inherently fragile and has a low impact strength. PLA, when mixed with eggshells powder, can produce a PLA/ESP composites. The purpose of this study was to investigate the physical characteristics of PLA composites that contained ESP or calcium carbonate (CaCO<sub>3</sub>). Extrusion melt mixing in a twin-screw extruder was used in conjunction with PLA with different ESP concentrations to develop this eco-friendly and sustainable nanocomposite material. The blended compounds were allowed to reach room temperature before being formed into thin films with dimensions of 20 mm in width, 100 mm in length, and 5 mm in thickness. These films were put through a series of tests to determine their mechanical, thermal, and chemical properties. Tests including stress-strain properties, FTIR, thermogravimetric analysis (TGA), and scanning electron microscopy were performed on the films (SEM).

### **KEYWORDS**

Biocomposites; Calcium carbonate; Eggshell powder; Poly(lactic acid); Sustainable materials

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