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The development of medical devices faces the challenge of balancing biocompatibility with adequate mechanical performance. Polylactic acid (PLA) emerges as a promising alternative due to its renewable origin and biocompatibility, but it presents limitations related to its brittleness and mechanical variability.

With the advance of additive manufacturing (3D printing), it has become possible to fabricate personalized medical devices, adjusting printing parameters that directly influence the mechanical properties of polymeric materials. Thus, 3D printing goes beyond a prototyping tool to become a viable production route for functional biomedical applications.

In this context, the present research investigates the influence of printing parameters — such as number of perimeters, layer height, and infill angle — on the mechanical behavior of PLA. For this purpose, specimens were manufactured and subjected to tensile tests, enabling the analysis of process variables on properties such as elastic modulus and tensile strength.

Beyond experimental characterization, this study aims to establish correlations that allow predicting material performance under different printing conditions, providing a basis for structural and dynamic simulations of PLA-printed components, with potential applications in medical devices and other engineering fields.