

**DESIGN AND CONSTRUCTION OF A CHILI PEPPER (*Capsicum frutescens*
L.) DRYING AND GRINDING MACHINE BASED ON THE
PLC OUTSEAL NANO**

Salsabila Liandra Putri, S.K.M., M.K.K.K. *As a Thesis Supervisor*

Moh. Alfian Azwar Anas

Mechatronics Engineering Technology Study Program

Engineering Department

anasazwar376@gmail.com

ABSTRACT

*Cayenne pepper (*Capsicum frutescens* L.) is a horticultural commodity with high moisture content, making it highly susceptible to quality deterioration after harvest. Conventional drying methods, which rely on direct sunlight, require a relatively long processing time and often result in inconsistent product quality. This study aimed to design and develop a PLC Outseal Nano-based cayenne pepper drying and grinding machine capable of integrating the drying and grinding processes into a single system. The research method consisted of a literature review, machine design using Autodesk Inventor, manufacturing and assembly processes, structural strength analysis using stress analysis, and system functionality testing. The structural analysis results showed that the machine frame had a maximum Von Mises stress of 26.34 MPa, a maximum displacement of 0.3605 mm, and a factor of safety of 7.86 from the simulation and 9.49 based on theoretical calculations, indicating that the frame structure was safe for operational use. The functionality test demonstrated that the stirring motor, blower, heater, transition system, grinding motor, grinding blades, control panel, and LCD operated according to the design specifications. The power window-based stirring motor was able to mix cayenne pepper effectively up to a capacity of 2 kg; however, its performance decreased at loads of 3–5 kg due to limited motor torque. Overall, the proposed cayenne pepper drying and grinding machine was successfully developed and demonstrated its capability to support a more effective and integrated post-harvest processing system.*

Keywords: *cayenne pepper dryer, cayenne pepper grinder, PLC Outseal Nano, stress analysis, Autodesk Inventor.*