Design And Development Of A Tray Dryer For Lempuyang Chili Using Autodesk Inventor

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ABSTRACT

Lempuyang chili (Piper retrofractum Vahl.) is one of the spice crops with high economic value and is widely used as a raw material in the traditional herbal medicine industry. The drying process, which still relies on direct sunlight, has several limitations, including dependency on weather conditions, relatively long drying time, and the potential to reduce the quality of the dried product. This study aimed to design and develop a lempuyang chili tray dryer using Autodesk Inventor as an alternative drying system that is more effective and efficient. The research method consisted of problem identification, component design using Autodesk Inventor, design integration, and functional testing of the dryer. The design resulted in a three-dimensional (3D) assembly model consisting of a perforated angle steel frame, a drying chamber constructed with aluminum sheet, aluminum bubble insulation, and plywood, tray supports, drying trays, a drying chamber door, a waste-oil-fired burner, a hot air duct, a waste oil storage tank, a hot air circulation system using a blower, and a control panel. The functional test results showed that the drying chamber was capable of supporting proper hot air circulation, the heating system effectively distributed and circulated hot air throughout the drying chamber, and the waste oil storage tank along with its fuel delivery system operated without leakage while regulating the fuel flow according to combustion requirements. Based on these results, the designed tray dryer functioned as intended and has the potential to serve as an effective and efficient alternative drying system for lempuyang chili that is independent of weather conditions.

Keywords: *Autodesk Inventor, lempuyang chili, tray dryer, waste oil, design and development.*