ABSTRACT

The design of animal feed drying systems is essential to maintain nutritional quality and extend product shelf life. This study aims to design an LPG-fueled air heater for use in a 10 kg capacity cabinet dryer. The research method includes literature review, conceptual design, thermal calculations, material selection, and design development. The air heater system was designed in a shell-and-tube configuration with 1 shell pass and 3 tube passes, using a total of 12 pipes with a diameter of 25.4 mm and a thickness of 2 mm. The calculation results indicate that, to achieve an air temperature increase from 30 °C to 70 °C with hot gas input at 300 °C, a tube length of approximately 166 mm is required. Stainless steel was selected as the primary material due to its resistance to heat and corrosion. The design provides a heating system with more uniform temperature distribution, relatively efficient energy consumption, and practical applicability for small-scale livestock farming. Therefore, the LPG-fueled air heater design can serve as an effective and economical drying technology alternative to support feed security.

Keyword: Air Heater, LPG, Cabinet Dryer, Animal Feed, Heat Exchanger, Thermal Design