

Thesis Title	Improvement of the Tapioca Starch Drying Process
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### Abstract

The tapioca starch industry is one of an important agro-industry in Thailand. The production process of the tapioca starch consumes a large amount of thermal energy in the drying process. The aim of this study is therefore to improve the drying system in order to reduce the production cost related to energy and raw material. Energy audits were conducted in 2 middle-scale tapioca starch factories. Their average electrical and thermal specific energy consumption were found to be 0.109 and 0.057 MJ/kg dry starch and 3.42 and 1.74 MJ/kg dry starch, respectively. The overall thermal efficiency of drying system of the first plant was 38.67 percent, while the second was 70.25 percent.

In addition, the proposed mathematical model of pneumatic dryer as reported in literature was modified to obtain better performance prediction of industrial scale dryer for tapioca starch. Using this model and performance data of other equipments used in the drying system as well as the related cost data, the optimization for minimum operating cost was carried out. The simulation results showed that with optimum operating condition the saving in operating cost for the first and second plant were 15 and 1 million Baht per year When the air flow rate was kept constant, and 12 and 1.4 million Baht per year when the solid flow rate was kept constant, respectively.

Keywords : Pneumatic Conveying Dryer / Tapioca Starch / Thermal Efficiency /  
Mathematical Modeling / Optimization