

Thesis Title	Effect of Bed-Particle on Starch Slurry Drying in a Jet Spouted Bed
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Candidate	Miss Kritsna Siripon
Supervisors	Assoc. Prof. Dr. Suwit Tia Dr. Sailom Sampanvetsopa
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Abstract

The effects of density, shape and size of bed-particles on the thermal efficiency of starch slurry drying in a jet spouted bed (JSB) were investigated. The particles used in this study made from ceramic and metal in a varied size and shape such as sphere, cylinder, bevelled cylinder and prism.

The hydrodynamic characteristics of bed-particles moving in a jet spouted bed dryer were conducted to determine the minimum spouting air velocity (U_{ms}) and minimum jet spouting air velocity. The obtained data was then used for slurry drying experiment. Flow patterns of the bed-particles found in this study could be divided into 2 categories. The cylindrical and bevelled cylindrical ceramic showed stability spouting motion with no fluctuation in the bed pressure drop, while the others exhibited unstability spouting motion of slugging flow which occurred in the range of $1-1.7U_{ms}$ of spouting air velocity. However, the flow pattern of the prism-liked ceramic particle depended on the static bed height. The particle had stability spouting motion at low static bed height, but showed unstability at higher static bed height.

The important factor affecting the starch slurry drying found in this study were the flow pattern of particle and area of heat and mass transfer. These two factors were directly influenced by the density, size and shape of bed-particles used. When the static bed height was fixed, particles with smaller which has higher bed surface area were found to give higher

system thermal efficiency and product with lower moisture content. Particle with lower density had higher particle circulation path, so the drying period of starch coated on their surface would be longer. This gave the product with low moisture content and high system thermal efficiency. The results found in this study demonstrate that to achieve highest system thermal efficiency and product with low moisture content, the 3 mm spherical ceramic should be used in starch slurry drying in the JSB. The results from mathematical model that based on material and energy balance showed good agreement with the experiment.

Keywords : Jet Spouted Bed / Starch Slurry Drying / Spouting Stability / Jet Spouted Bed Drying