

Drying of diluted egg white droplets using a drying-aid agent in a powder-particle spouted bed

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Abstract

Currently, Kagoshima Prefecture has maintained a top three domestic market share in chicken egg production. Manufacturing egg-processed food, especially where only egg yolk is necessary and separated, is often accompanied by the discharge of a large amount of egg white. Egg white separated from the production line can be reused as it is or as a powder after being sprayed for drying, but smaller companies cannot always afford to do so because post-processing of egg white needs extra cost. Imparting various added-values to egg white is desired [1] if we want to reuse it in other way.

From the chemical engineering point of view, egg white can be rapidly dried from its droplets without a spray by using a Powder-Particle Spouted Bed (PPSB), which has been proven to be effective to simultaneous drying and chemical reaction of slurry materials [2]. Furthermore, adding drying-aid agent to the raw material can make it possible to improve drying of egg white in the bed.

In this study, drying performance of a PPSB was investigated by changing the amount of SiO₂ added to an egg white solution diluted with water by 1:1 and then subjected to pH adjustment to 6-7 by adding 0.5M-HCl. Continuous operation for 60 min was chosen as a criterion for stable operation. Our study clarified that SiO₂ addition to diluted egg white solutions can realize stable operations of a PPSB even with higher feeding rates of raw liquid material.

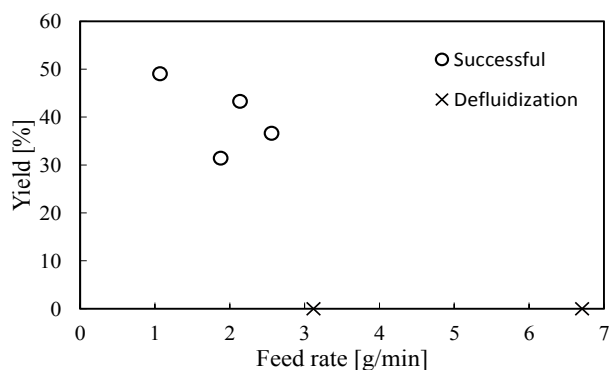


Figure 1. Relation between yield of egg white powder and feeding rate of raw liquid material (SiO₂: 0%)

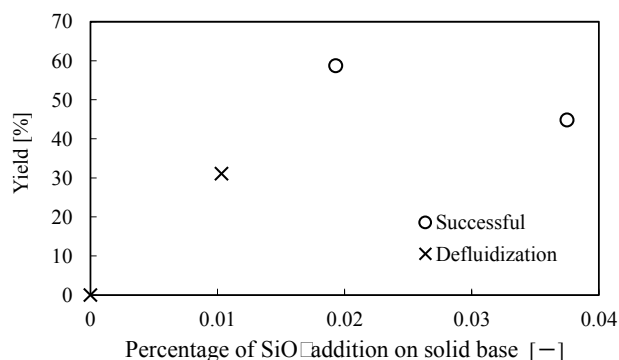


Fig. Relation between yield of egg white powder and percentage of SiO₂ addition on solid base to raw liquid material (Feeding rate: ~3.50 g/min)

References

1. Y. Mine: Effect of pH during the dry heating on the gelling properties of egg white proteins, *Food Res. Internat.*, **29**, 155-161 (1996)
2. T. Nakazato, Y. Liu, K. Sato and K. Kato: Semi-dry Process for Production of Very Fine Calcium Carbonate Powder by a Powder-Particle Spouted Bed, *J. Chem. Eng. Japan*, **35**, 409-414 (2002)

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