

Wankawee Kluaymai 2007: Production of Submicron Silk Powder from Silk Yarn by Spray Pyrolysis Technique. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Paisan Kongkachuichay, Ph.D. 96 pages.

In this work, submicron silk powder was produced by a spray pyrolysis technique. Silk is an excellent substance for moisture absorption and is compatible with protein in human body. In addition, the moisture absorptivity of silk powder will be enhanced by its submicron size, therefore it can be used as cosmetic. The experiment was divided into two parts: fabrication of a spray pyrolysis set and production of silk powder from silk yarn. The spray pyrolysis set composed of three main sections: spraying section, heating section, and powder collecting section. The silk solution was prepared by dissolving chopped silk yarn with sodium hydroxide solution which was sprayed into 1.5-2 micron droplets by an ultrasonic nebulizer. Then they were dried by two consecutive heaters. Finally, the obtained dried powder was collected by a membrane filter. It was found that concentration of silk solution, flow rate of carrier gas, and drying temperature were the main factors that influenced on the obtained silk powder. Moreover, the concentration of silk solution had the most effect on the size of the powder. The condition of 0.03 %wt of silk solution, 20 l/min of carrier gas (nitrogen) and 80°C in low temperature zone, 175 °C in high temperature zone yielded the spherical silk powder having size in the range of 0.43-1.93 micron with mean particle size of 0.91 micron.

Wankawee Kluaymai

Student's signature



Thesis Advisor's signature

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