Dungruthai Rattanasuwan 2008: Synthesis of Nanosize Silk Powder from Silk-cocoon 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. 100 pages.

This research aimed to synthesis of nanosized silk powder from silk cocoon by a spray pyrolysis technique. The optimum condition for preparation silk solution by hydrolysis of silk cocoon with DI water under sub-critical condition was determined. The effects of pressure, temperature, and time of hydrolysis were investigated. It was found that temperature and time strongly effect to the solubility and the protein content of the obtained solution while the starting pressure had an insignificant effect. The results showed that the solubility and protein content were increased with increasing of temperature and time. However, at too high temperature and time the silk protein was denatured. Consequently, the condition at 200 °C and 30 minutes was selected for further preparation of silk solution. Subsequently, the starting silk solution was converted to nanosized powder via a spray pyrolysis (SP) reactor. The ethanol was used as a co-solvent in order to reduce the size of the synthesized powder. The corresponding variables: feed composition, flow rate of carrier gas, and processing temperature, were examined their effects to the morphology of the obtained silk powder. The results showed that the silk powder having smaller size with narrower size distribution was achieved when the higher amount of ethanol was used. Finally, the optimum condition for producing silk powder was concluded as follows: the concentration of silk-cocoon 1 %weight by vol. and 60 % vol. ethanol was used for dilute the solution, temperature in SP process was 130 and 200°C as first and second period and flow rate of carrier gas 10 l/min.. The average diameter of the obtained powder was 254 nm. The remained protein after complete SP process drop down 53.62**%**

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