

Natthanan Subpuch 2014: Encapsulation of Tocopheryl Acetate Using Hydrolyzed and Heat Moisture Treatment Rice Starch. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Prisana Suwannaporn, Ph.D. 68 pages.

High amylose rice starch was modified using a controlled pyrodextrinization process under conditions designed to avoid gelatinization of starch. Rice starch was hydrolyzed with 5% HCl and 5% citric acid solution at 130 °C for 1, 2 and 3 hours (H1, H2, H3). Hydrolyzed starch was hydro-thermal treated (HMT) at 25% mc 115°C for 1 h. Pasting properties, swelling power, solubility, crystallinity and *in vitro* starch digestibility were investigated. Hydrolyzed-HMT rice starch was then used as wall material for tocopheryl acetate encapsulation by spray drying. The encapsulation efficiency, microstructure, *in vitro* releasing property under simulated gastric (SGF), simulated intestinal fluid (SIF) and *in vivo* blood glucose responses were measured. Results show a decrease in rapid digestible starch (RDS) and slow digestible starch (SDS) but an increase in resistant starch (RS). Blood glucose responses in Wistar rat feed with hydrolyzed-HMT rice starch were much lower than native starch. The X-ray diffraction pattern was remain unchanged. Encapsulation efficiency ranked from high to low as H1 > H2 > H3. The encapsulated microcapsule showed a better resistance to *in vitro* digestibility and control release property in SGF and SIF. Hydrolyzed-HMT rice starch with plasticizers gave lower protection and % core material release either as a wall material or protect against environment. H1 showed the highest % release of tocopheryl acetate under SGF and SIF even after one year storage.

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Thesis Advisor's signature