

PREPARATION AND CHARACTERIZATION OF ANNEALED-ENZYMATIC HYDROLYZED TAPIOCA STARCH AND THE UTILIZATION IN TABLETING AND STUDIES ON THE RETROGRADATION OF SUCCINATE RICE STARCH AND RICE STARCHES OF VARIOUS CULTIVARS THROUGH THE RHEOLOGICAL PROPERTY CHARACTERIZATIONS

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ABSTRACT

This research is divided into three sections. The first section is about the preparation and characterization of annealed-enzymatically hydrolyzed tapioca starch and its utilization in tableting. Annealing of tapioca starch close to the onset temperature of gelatinization combined with the addition of α -amylase increased the relative crystallinity of starch. The process was confirmed by a significant decrease in amylose content after prolonged hydrolysis. Molecular weight distribution of spray dried annealed enzymatic tapioca starch observed by High-Performance Size-exclusion Chromatography showed a decrease in degree of polymerization of the amylose fraction. The improvement of crushing strength in tablet fillers prepared from spray dried annealed enzymatic tapioca starch was evidenced by the increasing of relative crystallinity. It could be introduced as a directly compressible excipient in competition with other commercial fillers already available in the market. The second section is on the influence of octenyl succinate rice starch on rheological properties of gelatinized rice starch before and after retrogradation. Steady-shear rheological properties including consistency index from Power law, yield stress and Casson plastic viscosity from Casson model were employed to study the retrogradation of native rice starch, octenyl succinate (OSA) rice starch and blends containing up to 80% OSA rice starch. After cold storage at 4 °C for 24 h, the presence of OSA rice starch reduced retrogradation of rice starch mixtures as indicated by the reduction of measured retrogradation parameters based on the three abovementioned rheological properties. The last section is on the classification of rice starch amylose content from rheological changes of starch paste after cold recrystallization. Rice starch paste with low and medium amylose content demonstrated a lower increase in the consistency index, yield stress and Casson plastic viscosities than pastes with high amylose content.

KEY WORDS: ANNEALING/ α -AMYLASE/ RELATIVE CRYSTALLINITY/
OCTENYL SUCCINATE STARCH/ RHEOLOGICAL PROPERTIES
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