Title Structure and targeting controlled-release property of resistant starch film

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Abstract

Introduction: Native starch may not be suitable in some controlled delivery systems, as many ingredients are released too fast from systems based on native starch. This is due to a rapid enzymatic degradation of native starch in biological systems. Resistant starch (RS) can escape enzymatic digestion in upper digestive tracts but is deragded by microorganism in colon. So RS was prepared and the RS film application as controlled and targeted releasing carrier materials in food processing. **Materials and Methods:** RS was prepared by starch acetyl esterification and the micrographic texture, crystal morphology, enzymatic degradation of RS films was studied by scanning electric microscopy (SEM), X-ray diffraction (XRD) and In-Vitro model, respectively. For in vitro drug release assays, the bovine serum albumin (BSA) release rate from RS films were incubated in simulated gastric fluid, simulated intestinal fluid and simulated colonic fluid, respectively. **Results and Discussion:** Increased acetylation of starch considerably retarded the enzymatic degradation. The RS content of the modified maize starch increased as the degree of modification increased. The digestibility of RS showed that the RS were digested little in the simulated upper digestive tracts. It concluded that RS have good colon-targeting properties. The X-ray diffraction spectra showed the crystal morphology of RS film changed from A-type to V-type compared with maize starch. The uncoated BSA tablet released almost all the drug after 4h of testing. When coated with RS film not mare than 10% of BSA was released from the tablet after 6 h of testing. This showed that BSA tablet coated with RS film could successfully pass through the upper gastrointestinal tract. RS prepared by the starch acetylation had good ability of colon-targeting and controlled-release. The RS shows a potential carrier material for biological active material delivery systems.