

Abstract

Physicochemical, morphological, rheological properties of starches biodegradable film, isolated from Ahu rice (dormant, *Oryza sativa ssp. Indica*) grown in Assam were studied. The crystalline structure and pasting properties of starches were investigated using X-ray diffraction and a Rapid Visco Analyzer (RVA). The amylose content of modified starch sample ranged from 23.08, 25.01 and 28.03% (M1-M3), whereas in case of dual modified starch sample varied from 20.9, 22.4 and 27.6% (M4-M6) respectively. Degree of substitution ranges between 0.03-0.25% and 0.69-2.04% for acetylated and dual-modified starch samples, respectively. There was significant increase in water binding, solubility, swelling, and paste clarity and sedimentation volume in both acetylated and dual modified starch sample. Analysis of scanning electron microscopy (SEM) revealed that there was significant difference between native, acetylated and dual modified starches. X-ray diffraction scans confirmed that the amylose was mainly present in the amorphous domain of the granule and was highly substituted after epichlorohydrin and propylene oxide treatment. The RVA profiles demonstrated that the dual modified starch sample were higher viscosity as compared to native and acetylated sample. Rice flour is a starchy material with low-cost, because it can be produced from rice that is broken during processing. To develop a biodegradable films based on rice starch were prepared by casting, with glycerol or sorbitol as plasticizer. The average film thickness was measured by Vernier Callipers which is found in 0.104 mm whereas tensile strength of recorded as 6.975 MPa.

Keywords: Rice starch; Acetylation; Dual modification; SEM; XDR; Biodegradable film.