Physicochemical characteristics and thermal properties of chemically modified jack bean (*Canavalia ensiformis*) starch

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**Abstract**

Starch isolated from jack bean was subjected to chemical modification through oxidation, acetylation and acid thinning. Moisture content, ash, protein, fat, fibre, amylose and pH reduced after chemical modifications. Wide angle X-ray diffractograms showed conventional ‘C’ pattern, characteristic of legume starches. Except increase in intensity observed in acid thinned starch (Ajs), no significant differences were observed between the X-ray pattern of native starch and modified derivatives. Scanning electron microscopy and light microscopy revealed that starch granules were oval and round shape with heterogeneous sizes. The range of the granule size for width was 12–30 μm and 12–34 μm for length. Both swelling power and solubility increased with increase in temperature. And swelling power increased after acetylation but reduced following acid thinning and oxidation. All chemical modifications increased solubility of native starch. Both water and oil absorption capacities improved following acetylation and oxidation, but reduced following acid thinning. The result obtained indicates that LGC (least gelation concentration) increased following oxidation but reduced after acid thinning while both acetylated starch and native starch had LGC value of 8%w/v. Gelatinization enthalpy reduced from 0.75 J/g in native starch to 0.54 and 0.56 J/g in Ojs (Oxidised jack bean starch) and Ajs (Acetylated jack bean starch), respectively. However, enthalpy of gelatinization increased in acid thinned starch compared with native starch. Retrogradation tendency reduced following acetylation and oxidation but increased in acid thinned starch derivative.