

Effect of Modification on the Properties of Blighia sapida (Ackee) Seed Starch

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Abstract : Blighia sapida (Ackee) seed is a neglected and under-utilised crop. The fruit is cultivated for the aril which is used as meat substitute in soup while the seed is discarded. The seed is toxic due to the presence of hypoglycin which causes vomiting and death. The seed is shining black and bigger than the legume seeds. The seed contains high starch content which could serve as a cheap source of starch hereby reducing wastage of the crop during its season. Native starch had limitation in their use; therefore, modification of starch had been reported to improve the functional properties of starches. Therefore, this work determined the effect of modification on the properties of Blighia sapida seed starch. Blighia sapida seed was dehulled manually, milled and the starch extracted using standard method. The starch was subjected to modification using four methods (acid, alkaline, oxidized and acetylated methods). The morphological structure, form factor, granule size, amylose, swelling power, hypoglycin and pasting properties of the starches were determined. The structure of Blighia sapida using light microscope showed that the seed starch demonstrated an oval, round, elliptical, dome-shaped and also irregular shape. The form factors of the starch ranged from 0.32-0.64. Blighia sapida seed starches were smaller in granule sizes ranging from 2-6 μm . Acid modified starch had the highest amylose content (24.83%) and was significantly different ($p < 0.05$) from other starches. Blighia sapida seed starches showed a progressive increase in swelling power as temperature increased in native, acidified, alkalized, oxidized and acetylated starches but reduced with increasing temperature in pregelatinized starch. Hypoglycin A ranged from 3.89 to 5.74 mg/100 g with pregelatinized starch having the lowest value and alkalized starch having the highest value. Hypoglycin B ranged from 7.17 to 8.47 mg/100 g. Alkali-treated starch had higher peak viscosity (3973 cP) which was not significantly different ($p > 0.05$) from the native starch. Alkali-treated starch also was significantly different ($p > 0.05$) from other starches in holding strength value while acetylated starch had higher breakdown viscosity (1161.50 cP). Native starch was significantly different ($p > 0.05$) from other starches in final and setback viscosities. Properties of Blighia sapida modified starches showed that it could be used as a source of starch in food and other non-food industries and the toxic compound found in the starch was very low when compared to lethal dosage.

Keywords : Blighia sapida seed, modification, starch, hypoglycin

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