

## Extraction of starch from *Solenostemon rotundifolius* (Chinese potato) yams, and characterizing by chemical and physical modifications: As novel alternative pharmaceutical excipients

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Modified starches are developed to decrease any undesirable properties of native starches. Thus, the different kinds of modified starches are used in many industries including the pharmaceutical industry. *Solenostemon rotundifolius* (Chinese potato), locally known as *Innala*, is a tuber crop cultivated in Sri Lanka. These tuber yams contain starch over 60% w/w. . This study aimed to characterize the physicochemical properties of modified starches developed from yams of *S. rotundifolius* to assess their suitability for use as pharmaceutical excipients when compared to maize starch BP. Yams of *S. rotundifolius* were peeled, sliced, air-dried, and powdered. Starches were extracted by mixing powdered yams with distilled water, filtering, and drying the precipitate at 40 °C. Extracted yam starch was modified chemically by acetylation and physically by pre-gelatinization. The physicochemical parameters, namely, the pH, granule size, bulk, tapped and true densities, Hausner's ratio, Carr's index, angle of repose, hydration capacity, moisture sorption capacity, clarity, viscosity, infrared (IR) spectra, X-ray diffraction (XRD) and scanning electron microscopic (SEM) analyses of modified *S. rotundifolius* starches were evaluated in comparison to maize starch BP. An independent T-test was done to compare data. Acetylated starch provided a characteristic peak in the IR spectrum at 1727.36 cm<sup>-1</sup> assigned to C=O assuring acetylation. No new peak formation was observed in pre-gelatinized starch. Maize starch BP and acetylated *S. rotundifolius* starch exhibited an A-type XRD pattern giving peaks at 2θ angles 15°, 17°, 18°, and 23°. Pre-gelatinization changed the XRD pattern. Acetylated starch granules had a dome shape while maize starch granules were polyhedral in shape. Pre-gelatinized starch granules had large flat-shaped granules. All the physicochemical parameters, except Hausner's ratio and Carr's index of both acetylated and pre-gelatinized *S. rotundifolius* starches, were significantly different showing improved physicochemical properties when compared to maize starch BP (p<0.05). Accordingly, these modified starches of *S. rotundifolius* showed a potential to be explored further as an alternative pharmaceutical excipient.

**Keywords:** *Solenostemon rotundifolius*, Acetylation of starch, Pharmaceutical excipient, Pre-gelatinization of starch, Modified starch

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