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Characterization and disintegrant potential of phosphorylated Tiger nut (*Cyperus esculentus*) starch in immediate release ibuprofen tablet formulation

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Statement of the Problem: There is a growing interest in continued explorations of novel pharmaceutical excipients with unique physicochemical and functional properties. This has resulted in the search of these excipients from different sources and modifications of existing ones. Moreover, attention is being shifted to excipients from natural sources. Native starch, starch isolated from its botanical source with minimal treatment, has limited industrial applications due to certain undesirable physicochemical properties. Studies have shown that a phosphate group in starch prevents crystallization, increases hydration capacity and improves the functional properties. The study was aimed at evaluating the physicochemical properties of Tiger nut phosphate starch (TNP) and its disintegrant properties in immediate release ibuprofen tablets.

Methodology & Theoretical Orientation: Tiger nut starch (TNS) was modified by phosphorylation with disodium hydrogen orthophosphate at 130°C and its physicochemical properties were evaluated. Ibuprofen tablets were formulated with TNP and sodium starch glycolate (SSG) at concentrations of 5, 7.5, 10 and 15% as disintegrants.

Conclusion & Significance: Phosphorylation of TNS led to improved flow properties and swelling and hydration capacities among other changes in the physicochemical properties. TNP had comparable properties with SSG. FTIR study confirmed modification and also showed that TNP is compatible with ibuprofen powder. Ibuprofen tablets produced with TNP as disintegrant had acceptable tablet properties comparable to those produced with SSG. The disintegrant potential improved with increase in the concentration of TNP. The results indicate that TNP has a promising disintegrant potential in tablet formulations.