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Isolation, characterization and evaluation of disintegrant properties of taro Boloso-I (Colocasia esculenta cultivar) starch

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Background: Starch, as a natural polymer, is sought preferentially after either to semi-synthetic or synthetic ones in drug delivery. Taro Boloso-I is a new variety of *Colocasia esculenta* officially released from Areka Agricultural Research Center, Areka, Ethiopia; its cultivation out yields the other varieties in Ethiopia by 67%. It contains 85.65±0.07% of carbohydrate on dry basis.

Aim: The aim of this study was to isolate and characterize the starch from this plant and also to evaluate its potential tablet disintegrant properties.

Methods: Starch was extracted from taro Boloso-I using saline solution and sodium hydroxide. Various experimental methods were applied for its characterizations. Central composite design was used for optimization of concentration of the starch used as disintegrant and compression force as factors and hardness, friability and disintegration time of the tablets as responses of the study.

Results: Yield of starch from taro Boloso-I on dry weight basis was 83.5±1.6%. The native taro Boloso-I starch (NTB1S) was characterized by lower amylose to amylopectin ratio (20.7±1.8% to 77.3±2.1%, w/w) higher onset, peak and end set temperatures of gelatinization than potato starch. Its granules were found to exhibit polyhedral/angular shape and A-type polymorphism comprising powder of poor flow. In all of these properties, taro Boloso-I starch not only significantly differs from the previously reported taro varieties in Ethiopia but also shares more of properties of rice (cereal) starch. Paracetamol tablet (350 mg) prepared by wet granulation using NTB1S (9.80%) as disintegrant and compression force of 15kN had hardness of 117.1±4.93N, friability of 0.159±0.02%, disintegration time of 1.31±0.02 min and hardness to friability to disintegration time ratio of 583 N%-1min-1. The hardness, friability and also hardness to friability to disintegration time ratio were better than that of the tablets in which the potato starch was used, 58.1±2.57 N, 1.01±0.06% and 46.4 N%-1min-1, respectively. Moreover, the tablets disintegrate as fast as criteria set for fast dissolving tablets.

Conclusions: If used as a disintegrant for fast dissolving tablets, NTB1S can result in better hardness and friability. It is a novel native starch in both its physicochemical properties and its potential disintegration effects.

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