Extraction and Characterization of Flour and Starch Derived from Buthsarana (*Canna indica*), Raja ala (*Dioscoreaalata*), Hulankiriya (*Maranta arundinacea*) and Kiri ala (*Xanthosoma sagittifolium*) Grown in Sri Lanka

Madumali P.K.J.H., Samarakoon E.R.J.* and De Silva K.T.I.
Department of Food Science and Technology
Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka

Plants with edible underground organs are considered root and tuber crops. Although many varieties are grown in Sri Lanka, most are considered underutilized crops. Underutilized root and tuber flours and starches can be used in the food industry as a carbohydrate source as well as functional food ingredients. This study was conducted to characterize the flours and starches of Buthsarana (*Canna indica*), Raja ala (*Dioscorea alata*), Hulankiriya (*Maranta arundinacea*) and Kiri ala (*Xanthosoma sagittifolium*) by analyzing physicochemical and functional properties. Moisture content (dry basis), bulk density, yield and colour were determined using standard methods, and amylose content was determined using the colourimetric method. Centrifugation methods were used in determination of water holding capacity, oil holding capacity, solubility and swelling power. Flour colours were different, and *D. alata* showed a pink colour. Round or oval shaped starch granules were observed in *C. indica* and *M. arundinacea* starches and round or hemispherical shaped granules in *X. sagittifolium*. The largest granules were *C. indica* and smallest were *X. sagittifolium*. Moisture content of flours and starches varied in the range of 9.59 - 11.11% and 10.17 - 11.31%, respectively. There were no significant differences ($P>0.05$) between water holding capacities and oil holding capacities of flours and starches. Although solubility of flours were not significantly different ($P>0.05$), starch showed a significant difference ($P<0.05$) in terms of solubility. The highest yield and the lowest bulk density were recorded with the *X. sagittifolim* starch. Amylose content and swelling power of *C. indica* starch were significantly higher ($P<0.05$) than *M. arundinacea* and *X. sagittifolium* starches. Selected underutilized flours and starches have a potential to use in the food industry, as they have physicochemical and functional properties which are suitable for food applications.

Keywords: Flour, Physicochemical properties, Root and tuber crops, Starch, Underutilized crops

*rasanjalis@agri.pdn.ac.lk