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Assessment of Composition and Functional Properties of Traditional Yam Varieties and Development of Value Added Muffins

G.D.M. Gunasekara, D.L.S. Kalhari, I. Wickramasinghe and I. Wijesekara

*Department of Food Science and Technology, University of Sri Jayewardenepura,
Nugegoda, Sri Lanka*

Sri Lanka has many underutilized yams with high nutritional potential. With the urbanization and changing food habits most of these underutilized yams have lost their significance. The objective of this study was to evaluate the composition and functional properties of five selected underutilized yam varieties in Sri Lanka; "Raja ala" (*Dioscorea alata*), "Kidaran ala" (*Amorphophallus campanulatus*), "Buthsarana-green" (*Canna indica*), "Buthsarana - red" (*Canna indica*), and "Katu ala" (*Dioscorea pentaphylla*). Moreover, their value addition was carried out with the development of gluten free muffins using "Raja ala" flour with food gums including pectin at the rate of 0.3% (w/w based on flour). The composition analysis was carried out to calculate the moisture content, crude protein content, total fat content and total ash content of the yam samples. Then, the texture profile of muffins were analyzed through the parameters hardness, deformation, adhesiveness, cohesiveness and springiness. The moisture content of "Raja ala" was the highest ($7.75 \pm 0.09\%$) and the lowest was recorded in "Buthsarana-red" ($6.41 \pm 0.04\%$). All five varieties were low in fat content and highest was recorded in "Raja ala" ($1.09 \pm 0.01\%$). The crude protein content of "Rala ala" and "Kidaran ala" were $4.28 \pm 0.13\%$, $5.70 \pm 0.11\%$, respectively. The highest ash content was recorded in "Kidaran ala" ($4.711 \pm 0.36\%$). Functional properties of the five varieties were illustrated by the water holding capacity and oil holding capacity. The highest oil holding capacity and the highest water holding capacity were recorded in "Kidaran ala" with values $77.04 \pm 2.95\%$ and $243.08 \pm 2.56\%$, respectively. By incorporating pectin, gluten free muffins were prepared with "Raja ala" flour. According to the results, the hardness at cycle 1 and cycle 2 were 6065 g and 4335 g, respectively. Also the stringiness length, cohesiveness, adhesiveness and springiness were 14.63 mm, 0.31, 11.30 mJ and 36.46 mm, respectively.

Keywords: Underutilized yam, Composition, Functional properties, Muffins