

Flour Properties of Selected Traditional Yam Varieties and Development of Gluten Free Muffins from “Maha angili ala” (*Dioscorea alata*) Flour

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In the present study, physico-chemical properties of flour obtained from four varieties of traditional and underutilized yams such as, *Dioscorea alata* (“Hingurala” and “Maha angili ala”), *Dioscorea esculenta* (“Kukulala”) and *Dioscorea bulbilifera* (“Udala”) were investigated. Moreover, a gluten-free muffin was developed from “Maha angili ala” flour incorporating pectin, guar gum and xanthan separately for the first time in Sri Lanka. Proximate analysis conducted according to the AOAC procedures revealed that the moisture contents of four varieties were in between $4.94 \pm 0.11\%$ to $5.89 \pm 0.11\%$, fat contents were ranged from $0.55 \pm 0.18\%$ to $0.84 \pm 0.45\%$, protein contents were in between $4.53 \pm 0.55\%$ to $4.99 \pm 0.29\%$ and ash content ranged from $2.39 \pm 0.18\%$ to $3.52 \pm 0.18\%$. The color values L^* , a^* , b^* obtained from colorimeter were ranged from 54.06 ± 1.56 to 85.19 ± 2.14 , 1.74 ± 0.33 to 10.92 ± 1.24 and 7.82 ± 0.33 to 28.33 ± 0.86 , respectively. Moisture, fat, protein and ash contents of pectin, guar gum and xanthan incorporated muffins were $77.67 \pm 0.53\%$, $82.91 \pm 0.24\%$, $81.23 \pm 0.78\%$, $12.25 \pm 1.11\%$, $17.54 \pm 1.93\%$, $11.99 \pm 2.24\%$, $6.13 \pm 0.17\%$, $5.72 \pm 0.05\%$, $16.75 \pm 0.19\%$, $2.75 \pm 0.12\%$, $3.65 \pm 0.06\%$ and $1.93 \pm 0.14\%$, respectively. L^* , a^* , b^* values of three type of muffins ranged from 27.69 ± 1.13 to 31.92 ± 0.65 , 12.22 ± 1.34 to 13.54 ± 1.16 and 12.11 ± 1.15 to 13.46 ± 2.32 , respectively. The microscopic observation of flours revealed that the granular shapes of four varieties, “Hingurala” and “Maha angili ala” had oval shaped granules. In addition, the granular shape of “Kukulala” was polygonal and “Udala” contained coma shaped granules. Smallest granular shape was observed from “Kukulala”. Collectively, this study suggested that “Maha angili ala” flour could be a potential source to develop gluten free muffins and analysis of the product quality parameters of the muffins are in progress.

Keywords: Muffins, *Dioscorea* spp., Gluten-free foods, Traditional yams, “Maha angili ala”