

DEVELOPMENT OF RICE NOODLES BY INCORPORATING *MORINGA OLEIFERA* (DRUMSTICK) LEAVES FOR CALCIUM ENRICHMENT

V.T. Wijesiri¹, C.K. Illeperuma^{1*} and K.H. Sarananda²

¹*Department of Food Science and Technology, Faculty of Agriculture,
University of Peradeniya, Sri Lanka*

²*Food Research Unit, Department of Agriculture, Gannoruwa, Sri Lanka
chamarai@pdn.ac.lk

The dietary intake of calcium by an average Sri Lankan is 528.3 mg/day although the recommended daily allowance is 1000-1300 mg. As supplements are not the major source of calcium for Sri Lankans, the possibility of incorporating *Moringa oleifera* (drumstick) leaves, a rich source of calcium and micronutrients like iron and zinc, into rice noodle for calcium enrichment was investigated.

Fresh leaves were dried at 55 °C in a cross-flow air cabinet drier to a moisture content of less than 10%, and the drumstick leaf powder (DLP) was added at 1, 3, 5 and 7% (w/w) levels into rice flour. The four cooked samples were evaluated based on preference for colour, overall appearance, aroma, texture and overall flavour using 38 panellists and a ranking test. The results revealed that the DLP content significantly ($P < 0.05$) affected the preference for all sensory attributes. As most preferable colour, overall appearance, aroma and overall flavour were evident in the sample with 3% DLP, it was selected for further developing the product. The 3% DLP incorporated sample (3% DLPIS) was compared with the control (without DLP) based on degree of liking for sensory attributes using 35 panellists, cooking time, cooking loss and swelling index, and moisture and total ash contents. Calcium contents of the 3% DLPIS, the control and a commercially available calcium enriched noodles were determined by igniting the samples at 550 °C for 5-6 min in a muffle furnace followed by acid digestion and atomic absorption spectrophotometry at 422.7 nm wave length. The 3% DLPIS was not significantly different ($P > 0.05$) from the control in degree of liking for overall flavour and overall acceptability. Cooking time (4.7 ± 1.0 min) was significantly lower ($P < 0.05$) and swelling index ($2.5 \pm 0.3\%$) and cooking loss ($2.1 \pm 0.1\%$) were significantly higher ($P < 0.05$) in the 3% DLPIS than in the control. Non-significant and significant difference ($P < 0.05$) in the moisture ($7.9 \pm 0.1\%$) and total ash contents ($0.8 \pm 0.1\%$), respectively, of 3% DLPIS from the control was evident. Cooking loss, and moisture and total ash contents were within the limits specified by the Sri Lankan Standards Institute. The calcium contents of the 3% DLPIS, the control and the commercial sample were 381 ± 9 , 3.7 ± 1.2 and 274 ± 3 mg/100g respectively.

Drying drumstick leaves to a moisture content of 7.6% for incorporating into rice flour at 3% can be recommended for manufacturing noodles having higher amount of calcium than the commercially available calcium enriched noodles and also possessing sound sensory properties and cooking characteristics.