421/D

Protein nutritional quality of processed and un-processed flour of Madu (*Cycas circinalis*)

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Cycas circinalis is a dioecious plant (Madu) of which the seeds and plant are used for nutritional, medicinal and recreational purposes. The aim of the present work was to study the protein nutritional quality of rotti (*C.circinalis* + wheat flour + coconut), pittu (*C.circinalis* + rice flour + coconut), soaked, un-boiled seed flour and soaked, boiled seed flour of *Cycas circinalis* using an animal bioassay (Albino ICR mice). Digestible carbohydrates, proteins, soluble and insoluble dietary fibre contents in samples were evaluated by standard AOAC methods. Protein quality was measured using Protein Efficiency Ratio (PER) and the calculated parameters, Food Efficiency Ratio (FER), Protein Retention Efficiency (PRE) and Net Protein Retention (NPR). Trypsin inhibitor activity was measured by Kakade method. At the end of 28 days, random blood glucose levels of mice were measured.

The digestible carbohydrate contents in the un-boiled and boiled seed flour, rotti and pittu were 46.3%, 38.9%, 34.4% and 29.6% respectively. Insoluble dietary fibre was highest in boiled seed flour (14.1%) followed by un-boiled seed flour (9.9%) and rotti (4.9%) with pittu (3.8%) containing the lowest. Un-boiled flour contained 4.3% of soluble dietary fibre and boiled flour, rotti and pittu contained 3.3%, 2.5% and 1.7% respectively. Boiled flour (3.7%) had significantly low protein content ($P<0.05$) with rotti (9.8%) containing the highest due to the addition of wheat flour. Soaked un-boiled seed flour and pittu contained 9.3% and 8.7% of proteins respectively. Comparatively low digestible carbohydrate, protein and soluble dietary fibre contents in boiled seed flour might be attributed to the loss during boiling and decanting. PER of un-boiled and boiled seed flour, rotti and pittu were 0.6 ± 0.1, 0.4±0.3, 0.5±0.7 and 0.4±0.2 respectively. According to PER and other parameters (FER, NPR, PRE), protein quality of processed and un-processed flour of *C. circinalis* were significantly low ($P<0.05$) compared to the reference group (PER = 1.6±0.24) fed with 10 % casein diet. PER of un-boiled flour (0.6 ± 0.1) and roti was higher than the PER of common maize (0.48±0.28) reported earlier. FER, NPR and PRE values of test samples varied between 0.04 -0.06, 1.0-1.4 and 5.8-8.5 respectively. Trypsin inhibitor activity was absent. Groups fed with boiled flour (120±20.5), pittu (132±18.4) and rotti (140±18.8) had significantly low ($P<0.05$) random blood glucose levels compared to un-boiled seed flour (164 ± 3.9) and reference diets (163±12.7) fed group.

Keywords: Protein Efficiency ratio, Protein Retention Efficiency, Food Efficiency Ratio, Net Protein Retention

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