ABSTRACT

Mucuna bean (Mucuna pruriens L.) is grown in many parts of Kenya as a green manure/cover crop. The bean contains a high content of crude protein. However, it remains a minor food crop due to the presence of anti-nutritional compounds such as 3,4-dihydroxy-L-phenylalanine (L-Dopa). The potential for utilization of mucuna bean as an alternative source of protein was evaluated by assessing the effect of various processing methods on its protein quality. Mucuna bean was processed to remove L-Dopa and other anti-nutritional compounds by different methods such as soaking, autoclaving, roasting, germination, and alkaline fermentation. Protein quality was determined by amino acid composition, in vitro and in vivo rat balance methodologies. All processing methods except roasting improved in vitro protein digestibility (IVPD). Soaking in acidic medium (pH 3.2) at 60ï¿½C for 48 hrs significantly improved IVPD (80.5%) and biological value (80.8) of mucuna bean protein. The content of essential amino acids met the recommended FAO/WHO reference requirements for 2-5 yr old except for tryptophan. However, true digestibility for processed bean diet was poor (58%) and protein digestibilitycorrected amino acid score (PDCAAS) low (0.4) compared to that of reference casein (1.0). This was attributed to both low sulphur amino acids content and possible presence of factors that affect protein hydrolysis such as phenolic compounds. Mucuna protein diet did not support growth of weanling rats indicating amino acids pattern incompatible with the needs of weanling rats. Histological examination of liver and kidney tissues revealed that consumption of processed mucuna bean as the only source of protein caused inflammation of the organs. This suggests possible presence of other antitoxins in processed bean even though mucuna bean diet contained the recommended safe level of residual L-Dopa (<0.1%). Processing mucuna bean by soaking in acidic medium (pH 3.2) at 60ï¿½C for 48 hrs improved protein quality. However, mucuna bean is not recommended as a sole protein in human diet.