ABSTRACT
Dietary deficiencies of iron and zinc are high. Underutilized crops are rich in micronutrients but are cultivated at subsistence level due to high perishability and poor processing of products. These crops are potential sources of iron and zinc but there is no documentation that reveals if they can be processed into safe, acceptable and nutritious food products that can improve their exploitation. An informal experimental study design was used to evaluate preparation of safe, acceptable, and micronutrient rich food products (crackers, noodles and cookies) from cassava (Manihot esculenta), finger millet (Eleusine coracana), simsim (Sesamum orientale L.), and slenderleaf (Crotalaria ochroleuca and Crotalaria brevidens). Iron recommended dietary allowance (RDA) was used to calculate selected crops quantities used to modify crackers, noodles and cookies. Iron and zinc levels in raw crops, processed crops, and modified food products were analyzed using Atomic Absorption Spectrophotometer (AAS). Product safety was assessed using total plate count, total coliform, Escherichia coli, Staphylococcus aureus, and moulds; and moisture content. Product acceptability was assessed using organoleptic tests. Paired-samples t-test was used to compare iron and zinc levels; microbiological load; and moisture content, between raw and processed crops. Contributions of the food products to iron and zinc percentage RDA for six population sub-groups were determined. Microbiological load levels in food products were compared with recommended maximum intake levels using one sample t-test. Chi-square analysis was performed to assess product acceptability. Selected underutilized crops are good sources of iron and zinc with iron levels ranging between 1.6-4mg/g in raw, and 1.5-3mg/g in processed crops. Zinc levels range between 0.9-2.8mg/g in raw and 0.8-2.7mg/g in processed crops. Acceptable quality crackers, noodles and cookies, from cassava, finger millet, simsim and slenderleaf were prepared. Crackers, noodles and cookies recorded iron levels of 1.5mg/g, 1.6mg/g and 1.6mg/g with zinc levels of 1.2mg/g, 1.0mg/g and 1.5mg/g respectively. These products contribute 66%, 88% and 53%RDA for iron per serving of 8g, 10g and 6g respectively. They also contribute 64%, 66% and 60%RDA for zinc per serving respectively. Blanching increased moisture content of vegetables while grilling reduced moisture content of other selected crops and microbial load in all selected crops. Modified products recorded microbiological load levels within acceptable maximum consumption limits therefore safe for consumption. The products were highly accepted as over 50% of participants liked all modified products. The products contributed over 100%RDA to various population sub-groups aged between 6months to over 70years. This study brings fourth safe, acceptable and nutritious products prepared from underutilized crops. Promotion could lead to increased consumption and marketability of these products which could increase iron and zinc intakes thus reduce micronutrient deficiencies. Modified crackers, noodles and cookies should be promoted and marketed in order to increase consumption thus increase utilization of underutilized crops and also reduce micronutrient deficiencies in populations.