

## Chemical, Biochemical and Sensory Evaluation of a Quadrimix Complementary Food Developed from Sorghum, Groundnut, Crayfish and Pawpaw Blends

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**Abstract :** Malnutrition in infants due to poverty, poor feeding practices, and high cost of commercial complementary foods among others is a concern in developing countries. The study evaluated the proximate, vitamin and mineral compositions, antinutrients and functional properties, biochemical, haematological and sensory evaluation of complementary food made from sorghum, groundnut, crayfish and paw-paw flour blends using standard procedures. The blends were formulated on protein requirement of infants (18 g/day) using Nutrisurvey linear programming software in ratio of sorghum(S), groundnut(G), crayfish(C) and pawpaw(P) flours as 50:25:10:15(SGCP1), 60:20:10:10 (SGCP2), 60:15:15:10 (SGCP3) and 60:10:20:10 (SGCP4). Plain-pap (fermented maize flour)(TCF) and cerelac (commercial complementary food) served as basal and control diets. Thirty weanling male albino rats aged 28-35 days weighing 33-60 g were purchased and used for the study. The rats after acclimatization were fed with gruel produced with the experimental diets and the control with water ad libitum daily for 35days. Effect of the blends on lipid profile, blood glucose, haematological (RBC, HB, PCV, MCV), liver and kidney function and weight gain of the rats were assessed. Acceptability of the gruel was conducted at the end of rat feeding on forty mothers of infants'  $\geq 6$  months who gave their informed consent to participate using a 9 point hedonic scale. Data was analyzed for means and standard deviation, analysis of variance and means were separated using Duncan multiple range test and significance judged at 0.05, all using SPSS version 22.0. The results indicated that crude protein, fibre, ash and carbohydrate of the formulated diets were either comparable or higher than values in cerelac. The formulated diets (SGCP1- SGCP4) were significantly ( $P>0.05$ ) higher in vitamin A and thiamin compared to cerelac. The iron content of the formulated diets SGCP1-SGCP4 (4.23-6.36 mg/100) were within the recommended iron intake of infants (0.55 mg/day). Phytate (1.56-2.55 mg/100g) and oxalate (0.23-0.35 mg/100g) contents of the formulated diets were within the permissible limits of 0-5%. In functional properties, bulk density, swelling index, % dispersibility and water absorption capacity significantly ( $P<0.05$ ) increased and compared favourably with cerelac. The essential amino acids of the formulated blends were within the amino acid profile of the FAO/WHO/UNU reference protein for children 0.5 -2 years of age. Urea concentration of rats fed with SGCP1-SGCP4 (19.48 mmol/L),(23.76 mmol/L),(24.07 mmol/L),(23.65 mmol/L) respectively was significantly higher than that of rat fed cerelac (16.98 mmol/L); however, plain pap had the least value (9.15 mmol/L). Rats fed with SGCP1-SGCP4 (116 mg/dl), (119 mg/dl), (115 mg/dl), (117 mg/dl) respectively had significantly higher glucose levels those fed with cerelac (108 mg/dl). Liver function parameters (AST, ALP and ALT), lipid profile (triglyceride, HDL, LDL, VLDL) and hematological parameters of rats fed with formulated diets were within normal range. Rats fed SGCP1 gained more weight (90.45 g) than other rats fed with SGCP2-SGCP4 (71.65 g, 79.76 g, 75.68 g), TCF (20.13 g) and cerelac (59.06 g). In all the sensory attributes, the control was preferred with respect to the formulated diets. The formulated diets were generally adequate and may likely have potentials to meet nutrient requirements of infants as complementary food.

**Keywords :** biochemical, chemical evaluation, complementary food, quadrimix

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