

Complementary Foods from Quality Protein Maize Supplemented with Beans (*Phaseolus vulgaris*) and Carrot: Nutritional Effect on Animal Model

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Abstract

Background: In most developing countries the prevalence of under nutrition and micronutrient deficiencies is high among infants and young children aged 6 to 23 months. Ideally, breast feeding is universal in this age range. As they get older the energy and nutrient contribution from complementary food becomes increasingly vital to attain daily requirements. Provision of adequate nutrition during infancy and early child hood is essential to the development of each child's full human potential. Therefore this study focused on development of nutritious, acceptable and affordable complementary food from locally available food items.

Methods: Two complementary foods (Diet1 and Diet2) were formulated based on the recommended daily allowance (RDA) to fulfill the nutrient requirement of infant and young child from composite blends of Quality protein maize (QPM), common beans (Gofta and Roba1 variety) and carrot using design expert software version 8.0.4. The formulated diet composition were **Diet 1:** 61.48% QPM, 27.04% Bean (Roba1) and 11.49% carrot flour and **Diet 2:** 62.50% QPM, 26.84% Bean (Gofta) and 10.84% carrot flour. Effects of some commonly applied traditional processing methods (Soaking, germination and roasting) on the proximate, vitamin, minerals and anti-nutrient values were examined.

Result and discussion: Roasting reduce tannin and phytate content of QPM by 19.20 and 54.05% respectively. Similarly soaking significantly ($P < 0.05$) decreased tannin content of the beans about 47 and 54% and germination remove tannin content by 50 and 55% from Roba1 and Gofta variety respectively. As noted in the study, soaking decreased the tannin content by 26 and 28% and germination also reduced the phytate content from the two bean variety by 29 and 34% respectively. Crude protein, carbohydrate, energy and the mineral content were improved. Proximate composition of diet1 was moisture 4.36, protein 13.86, fat 4.04, CHO 75.7g/100g and gross energy of 395.13kcal/100g. Diet 2; moisture 4.84, protein 14.21, fat 4.09, fiber 4.29, CHO 75.39g/100g and gross energy of 392.72 kcal/100g. Mineral and vitamin content of diet1 was Fe 6.79, Zn 2.62, Ca 80.93 and P 247.57mg/100g and Vitamin A (RE) 360.27 ug/100g; and diet 2 contained Fe 7.07, Zn 2.71, Ca 81.18 and P 229.81mg/100g and vitamin A (RE) of 410.35ug/100g. Wistar albino rat of 4 to 5 weeks old were fed with diet 1 and 2, with no adverse

or clinical sign and symptom of illness except relatively low weight gain for group of rat fed diet1. Serum retinol level in both groups of Albino rats were significantly increased after supplementation of formulated diets for 4 weeks compared with the baseline data.

Conclusion and Recommendation: Traditional processing methods are effective in reducing anti-nutritional factors and consequently improve the bioavailability of nutrients. Proper formulation and supplementation of locally available diets with nutrient rich foods can provide nutritious foods that are suitable not only for infants and child, but also as rehabilitation diet to malnourished children that can be more cost effective. This is believed to be a practical food-based approach aimed at combating the problem of malnutrition among infants and children in resource limited countries in general.