

ABSTRACT

Background: Food and nutrition security remain a major challenge facing the world and especially the developing world. This situation could be mitigated by utilization and blending locally available food crops.

Methods: In this study the nutritional contents of orange-fleshed sweet potato (OFSP), amaranth seed and soybean composite flours were optimized by Extreme Vertices Mixture Design using Minitab Software. The software generated 11 experimental runs from the flour blends. Each blend was analyzed for proximate, minerals and vitamin A contents.

Results and Discussion: Soybean flour had higher protein content (31.53%), ash content which could be an indication of total minerals was 5.98%, fiber (6.29%) and energy value (389.19 kcal/100g) than amaranth seed and OFSP flour but low in carbohydrate (33.09%) and energy-to-protein ratio (12.35 kcal/g of protein). On the other hand, OFSP had low protein content (2.95%), fat (3.05%), and fiber (3.66%), energy value (349.53 kcal/100 g) but produced high carbohydrate content(75.73%) and energy-to-protein ratio (118.37 kcal/g of protein) among others. The analysis of blends lead to some useful conclusions, most important of which yielded high protein content (15.83%) and fat (6.16%) for blend C1 (50:25:25 for OFSP, amaranth seed, and soybean flour, respectively), fiber (5.18%) for blend C11 (60:15:25 for OFSP, amaranth seed, and soybean flour, respectively), total minerals (4.83%) for blend C2 (54.5:24:21.5 for OFSP, amaranth seed, and soybean flour, respectively), energy value (359.75 kcal/100g) for C3 (50:30:20 for OFSP, amaranth seed, and soybean flour, respectively), while blend C6 (75:15:10 for OFSP, amaranth seed, and soybean flour, respectively) was higher in carbohydrate (66.60%), energy-to-protein ratio (37.98 Kcal/g of protein) and vitamin A content (890.03 RAE μ g/100g) than others. Generally, blend C1 was the highest in iron content (2.64 mg/100g), Zinc (0.56 mg/100g), magnesium (81.25 mg/100g) and calcium (58.10 mg/100g). The blend C6 was higher in sodium content (41.63 mg/100g) and potassium (65.18 mg/100g) than others, while blend C11 was high in manganese content (0.59 mg/100g) and the highest copper content (0.95 mg/100g) was observed in blend C8 (54.5: 26.5:19 for OFSP, amaranth seed, and soybean flour, respectively)

Conclusion and Recommendations: The most significant observation of this study is that the optimum blend was 57%, 24% and 19% of Orange-fleshed sweet potato, amaranth seed, and soybean flour, respectively, for the production of protein (14%), total minerals (4.7%) and vitamin A content (813.6 RAE μ g/100g). This is also an interesting finding, and it could be used for processing of nutritious foods for people in need in an economical way and promote the utilization of orange-fleshed sweet potatoes.