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Effect of Formulated Insect Enriched Sprouted Soybean /Millet Based Food on Gut Health Markers in Albino Wistar Rats

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Abstract : Background: Edible insects such as grasshopper are important sources of food for humans, and have been consumed as traditional foods by many indigenous communities especially in Africa, Asia, and Latin America. These communities have developed their skills and techniques in harvesting, preparing, consuming, and preserving edible insects, widely contributing to the role played by the use of insects in human nutrition. Aim/ objective: This study was aimed at determining the effect of insect enriched sprouted soyabean /millet based food on some gut health markers in albino rats. Methods. Four different formulations of Complementary foods (i.e Complementary Food B (CFB): sprouted millet (SM), Complementary Food C (CFC): sprouted soyabean (SSB), Complementary Food D (CFD): sprouted soybean and millet (SSBM) in a ratio of (50:50) and Complementary Food E (CFE): insect (grasshopper) enriched sprouted soybean and millet (SSBMI) in a ratio of (50:25:25)) were prepared. Proximate composition and short chain fatty acid contents were determined. Thirty albino rats were divided into5 groups of six rats each. Group 1(CDA) were fed with basal diet and served as a control group, while groups 2,3,4 and 5 were fed with the corresponding complimentary foods CFB, CFC, CFD and CFE respectively daily for four weeks. Concentrations of fecal protein, serum total carotenoids and nitric oxide were determined. DNA extraction for molecular isolation and characterization were carried out followed by PCR, the use of mega 11 software and NCBI blast for construction of the phylogenetic tree and organism identification respectively. Results: Significant increase ($P<0.05$) in percentage ash, fat, protein and moisture contents, as well as short chain fatty acid (acetate, butyrate and propionate) concentrations were recorded in the insect enriched sprouted composite food (CFE) when compared with the CFA, CFB, CFC and CFD composite food. Faecal protein, carotenoid and nitric oxide concentrations were significantly lower ($P>0.05$) in group 5 in comparison to groups 1to 4. Ruminococcus bromii and Bacteroidetes were molecularly isolated and characterized by 16s rRNA from the sprouted millet/sprouted soybean and the insect enriched sprouted soybean/sprouted millet based food respectively. The presence of these bacterial strains in the feaces of the treated rats is an indication that the gut of the treated rats is colonized by good gut bacteria, hence, an improved gut health. Conclusion: Insect enriched sprouted soya bean/sprouted millet based complementary diet showed a high composition of ash, fat, protein and fiber. Thus, could increase the availability of short chain fatty acids whose role to the host organism cannot be overemphasized. It was also found to have decrease the level of faecal protein, carotenoid and nitric oxide in the serum which is an indication of an improvement in the immune system function.

Keywords : gut-health, insect, millet, soybean, sprouted
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