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Effect Of Fermentation on the Quality of Canned Bambara Groundnuts (Vigna subterranea (L.) Verdc.) with Spaghetti in Tomato Sauce

Bonervanch Shiburi[1], Belinda Meiring[2], Thiery Regnier[2]

[1]Tshwane University of Technology, Pretoria, South Africa. [2]Tshwane university of Technology, Pretoria, South Africa

Abstract

Bambara groundnut is an underutilized highly nutritious pulse that can make a positive contribution to food and nutritional security at a regional and global level. The study aimed to determine the effect of fermentation compared to other pre-processing methods (soaking and blanching) on the physical, chemical, microbial, and consumer acceptability of canned Bambara groundnuts and spaghetti in tomato sauce. The effect of different ratios of Bambara groundnuts to spaghetti was also studied. Different thermal processing (retort vs cooker) affected the physical characteristics of canned Bambara groundnuts with spaghetti in tomato sauce, especially on the drained mass and texture of the product. Samples cooked in retort showed a high drained mass percentage and starch cookout, this affected the appearance of the product. Different thermal processing methods did not result in significant changes in the chemical/nutritional properties, microbial, and consumer acceptability of canned Bambara groundnuts with spaghetti in tomato sauce. Varying the formulation (ratio of Bambara groundnut to spaghetti) affected the physical characteristics of the product where an increase in spaghetti resulted in an increase in water absorption percentage (drained mass) and a decrease in the percentage of defective Bambara groundnuts in the final product. An increase in spaghetti also caused an increase in L* values (lightness) of the product which is characterized by the white colour of spaghetti. There was a significant increase in ash, fibre, and protein with an increase in the addition of Bambara groundnuts. Fermentation also increased ash, fibre and protein significantly compared to soaked and blanched samples. Based on the sensory evaluation results, the recommended products were the blanched and fermented samples with 80% Bambara groundnut and 20% spaghetti, processed in the cooker. For these treatments, fermentation increased the protein (9.07-14.47) and fibre (5.79-8.16) contents significantly. Fermentation also improved the texture of the products. In conclusion, one of the most positive outcomes of this product development is that the final canned Bambara groundnuts-based spaghetti products were more nutritious than canned legumes currently available on the market.