

Effect of Adding *Moringa oleifera* Leaf Powder on the Nutritional Properties, Microbial Properties, Physicochemical and Polyphenolic Compounds on Sorghum Based Mahewu

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Abstract

In terms of human dietary resources, cereals and cereal products are significant, and they are a staple in many, if not most, countries and cultures. However, they contain insufficient protein, have a low level of protein digestibility, and are deficient in the amino acid lysine. Mahewu is a traditional non-alcoholic drink from southern Africa that is created from fermented grains like sorghum and maize. *Moringa oleifera* is a rich source for Protein, fats, vitamins, and minerals. Thus, the purpose of this study is to determine how adding *Moringa oleifera* leaf powder (MOLP) affects the nutritional value, microbiological characteristics, and polyphenolic components of mahewu made from sorghum. Mahewu was produced in a lab by fermenting cooked, soft porridge for 36 hours in a closed container. *Moringa* was dried for 24 hours at 45 °C in an oven dryer, ground into a fine powder, and then added to sorghum Mahewu at levels of 1, 2, and 4% (v/v). The nutritional composition (carbs, protein, ash, moisture, and lipids) was examined using the procedures specified in the AOAC Standard Methods of Analysis 2000 and 2001. The pH meter, refractometer, and titration by NaOH were used to analyse the physicochemical parameters of pH, Brix, and TTA, respectively. The bioactive substances were measured by total phenolic and total flavonoid compounds, and the antioxidant activity was determined by FRAP and DPPH. When MOLP was added, the proximate composition of the sorghum mahewu increased significantly ($p < 0.05$), but the physicochemical qualities did not change much (PH, TSS, TTA). The amount of chlorophyll in the moringa significantly decreased the a^* value of the sorghum mahewu, it was found that the green colour control's a^* value was 12.34 while the mahewu with 4% of MOLP had 8.92. The total phenolic content (TPC) and total flavonoids content (TFC) of sorghum mahewu increased from 306.94 to 748 and from 30.15 μg to 80.03 μg , respectively. The dpph value increased, ranging from 41.24% to 64.84%. MOLP has a great potential in complementing food with low nutritional quality, furthermore it is suitable for people with cardiovascular diseases and children suffering from malnutrition.