Impact of Fermentation Time and Microbial Source on Physicochemical Properties, Total Phenols and Antioxidant Activity of Finger Millet Malt Beverage

Authors : Henry O. Udeha, Kwaku G. Duodub, Afam I. O. Jideanic

Abstract : Finger millet (FM) [Eleusine coracana] is considered as a potential ‘‘super grain’’ by the United States National Academies as one of the most nutritious among all the major cereals. The regular consumption of FM-based diets has been associated with reduced risk of diabetes, cataract and gastrointestinal tract disorder. Hyperglycaemic, hypocholesterolaemic and anticataractogenic, and other health improvement properties have been reported. This study examined the effect of fermentation time and microbial source on physicochemical properties, phenolic compounds and antioxidant activity of two finger millet (FM) malt flours. Sorghum was used as an external reference. The grains were malted, mashed and fermented using the grain microflora and Lactobacillus fermentum. The phenolic compounds of the resulting beverage were identified and quantified using ultra-performance liquid chromatography (UPLC) and mass spectrometer system (MS). A fermentation-time dependent decrease in pH and viscosities of the beverages, with a corresponding increase in sugar content were noted. The phenolic compounds found in the FM beverages were protocatechuic acid, catechin and epicatechin. Decrease in total phenolics of the beverages was observed with increased fermentation time. The beverages exhibited 2, 2-diphenyl-1-picrylhydrazyl, 2, 2′-azinobis-3-ethylbenzthiazoline-6-sulfonic acid radical scavenging action and iron reducing activities, which were significantly ($p < 0.05$) reduced at 96 h fermentation for both microbial sources. The 24 h fermented beverages retained a higher amount of total phenolics and had higher antioxidant activity compared to other fermentation periods. The study demonstrates that FM could be utilised as a functional grain in the production of non-alcoholic beverage with important phenolic compounds for health promotion and wellness.

Keywords : antioxidant activity, eleusine coracana, fermentation, phenolic compounds
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