ENHANCING NUTRITIONAL VALUE OF SORGHUM SEED BY NATURAL FERMENTATION

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Sorghum contains significant amount of carbohydrate, protein, minerals and vitamins. However, its nutritional value is considerably low due to low starch and protein digestibilities, and the presence of antinutritional factors like tannin and phytate. Natural fermentation in sorghum flour has been found to increase in-vitro protein digestibility (IVPD) and in-vitro starch digestibility (IVSD), while reducing tannin. This study was aimed to investigate the change of microbes, IVSD, IVPD, tannin, pasting properties, and the color of sorghum seeds by natural fermentation. Sorghum seeds were naturally fermented by dipping in aquadest (1:2 w/v), and incubated at ambient and 37°C temperature for 48 h. Sampling was taken every 8 h from the medium and fermented seeds. Medium was analyzed for the total bacteria, lactic acid bacteria, proteolytic bacteria, pH and total acid content. Analyses of IVSD, IVPD, tannin, pasting properties, and color were done in fermented sorghum seeds. The number of total bacteria, lactic acid and proteolytic bacteria increased during incubation, and the higher growth was shown at 37°C. Total acid content increased in line with the decrease of pH. After 48 h of incubation at 37°C, IVSD increased by 87%, while at ambient temperature it increased by 59%. There was a little difference in an increase of IVPD between at ambient and 37°C, resulting in 17% and 19%, respectively. Fermentation reduced tannin by 35% and 46% after 48 h incubation at ambient and 37°C, respectively. Gelatinization temperature of the sorghum flour was reduced from 84.7°C (native) to 50.5°C and 51.7°C at ambient and 37°C, respectively. Fermentation led to an increase in final viscosity, shifting from 281 cP to 499 cP and 769 cP at ambient and 37°C, respectively. Fermentation at 37°C resulted in a brighter sorghum flour, indicated by the increase of L value from 77 to 79. It suggested that natural fermentation enhanced nutritional value of sorghum seed, and the greater increase was shown by incubation at 37°C.