

AEROBIC FERMENTATION OF SORGHUM BY *LACTOBACILLUS ACIDOPHILUS*: IMPACT ON BACTERIAL GROWTH, PHENOLIC COMPOSITION, AND ENZYMATIC ACTIVITY

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Sorghum (*Sorghum bicolor* L. Moench) grain is a gluten-free cereal with a rich phenolic profile, including flavonoids and tannins. Fermentation with lactic acid bacteria (LAB) is a traditional method to adjust the nutritional and functional properties of various grains. Our aim was to characterise extracts obtained after LAB fermentation of sorghum samples. In this study, we investigated the growth of *Lactobacillus acidophilus* in finely ground sorghum material under aerobic fermentation at 37 °C. Sprouted and non-sprouted sorghum samples were inoculated with *L. acidophilus* and compared to control media (MRS broth and distilled water). Bacterial viability and pH were monitored during the 24-h fermentation, and the total phenolic and flavonoid content, antioxidant activity, and cellulolytic and esterolytic activities were analyzed from the extracted cell-free supernatant (CFS) obtained after cultivation. Sprouted sorghum supported the highest bacterial growth, with CFU increasing from 5.5 to 8.4 log CFU/ml up to the 24-h incubation. However, no significant increase in phenolic or flavonoid content was observed post-fermentation. Notably, fermented non-sprouted sorghum showed elevated cellobiohydrolase and lipase activities, while sprouted sorghum fermentation led to a marked reduction in all tested enzymes. These findings highlight the complex biochemical interactions during LAB fermentation, warranting further investigation to elucidate the underlying mechanisms. The probiotic-enriched sorghum ferment obtained can be used as a bioactive additive in functional food development .

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