

ABSTRACT

Cereals including maize generally have limiting amino acids particularly lysine. In most cases, spontaneous fermentation is used to improve the nutritional profiles of maize-based products. However, in such fermentation, biological risks including the presence of pathogenic microorganisms, chemical contaminants, and toxic compounds of microbial origin such as mycotoxins pose a health risk. The aim of this study was, therefore, to improve the nutritional properties of maize flour by reducing antinutritional factors through microbial fermentation by strains of *Lactobacillus plantarum* and *Saccharomyces cerevisiae* and their cocultures. A factorial experimental design was used to evaluate the effect of fermentation setups and time on proximate composition, antinutritional factors, and in vitro digestibility of proteins in maize flour. During 48 h of fermentation, protein content was improved by 38%, 55%, 49%, and 48%, whereas in vitro protein digestibility improved by 31%, 40%, 36%, and 34% for natural, *Lactobacillus plantarum*, *Saccharomyces cerevisiae*, and their coculture-fermented maize flour, respectively. The highest improvement in protein content and its digestibility was observed for *Lactobacillus plantarum* strain-fermented maize flour. Phytate, tannin and trypsin inhibitor activity were reduced significantly ($p < .05$) for natural, *Lactobacillus plantarum*, *Saccharomyces cerevisiae*, and coculture-fermented maize flour. The highest reduction of phytate (66%), tannin (75%), and trypsin inhibitor (64%) was observed for coculture-fermented maize flour. The two strains and their cocultures were found feasible for fermentation of maize flour to improve its nutritional profiles more than the conventional fermentation process