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# Enhancing Nutrients Content of Mango Leaves By Solid-State Fermentation

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**Structured Abstract**

**Background:** Mango leaves are an underutilised agricultural leftover with considerable nutritional value, but their high crude fibre concentration restricts use and digestibility. Filamentous fungi-based solid-state fermentation (SSF) has been extensively documented as a successful biological method for enhancing the nutritional value of lignocellulosic materials. Thus, the purpose of this study was to assess how well SSF modified the crude protein and crude fibre content of mango leaves.

**Methods:** *Rhizopus oligosporus* was used as the fermenting microbe in solid-state fermentation. SSF was applied to mango leaves with regulated moisture content and fermentation times. Standard fibre analysis was used to determine the crude fibre content, and the conversion factor N × 6.25 was used to compute the crude protein from the nitrogen concentration acquired from CHNS elemental analysis. To assess the impact of SSF, the nutritional makeup of fermented and raw (unfermented) mango leaves was examined.

**Results:** The findings showed that crude fibre content significantly decreased after SSF. The crude fibre content of raw mango leaves was high at 23.4%, but fermented samples had much lower values, ranging from 2.81% to 10.44%, suggesting that structural carbs were effectively broken down. The enzymatic activity of *R. oligosporus*, specifically cellulase and hemicellulase, which degrade lignocellulosic components, is responsible for this decrease. On the other hand, after fermentation, the crude protein content rose, with fermented samples showing values between 14.38% and 16.63% higher than the raw material. The buildup of microbial protein and fungal biomass during fermentation is linked to the rise in crude protein. These results are in line with earlier research showing protein enrichment and fibre reduction in plant-based substrates exposed to SSF.

**Conclusion**: Mango leaves' nutritional value was successfully improved by solid-state fermentation with *Rhizopus oligosporus*. Following fermentation, a notable decrease in the amount of crude fibre was observed, suggesting that fungal enzymatic activity had broken down the lignocellulosic components. On the other hand, after fermentation, the amount of crude protein rose, which is explained by the accumulation of microbial and fungal protein. These findings show that solid-state fermentation is a viable biological method for turning mango leaves into valuable materials with enhanced nutritional qualities and possible use in the creation of feed or bioproducts.

**Keywords:** Solid-state fermentation, mango leaves, crude fibre, *Rhizopus oligosporus*

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