PRODUCTION OF BIOACTIVE PHENOLIC COMPOUNDS FROM MANGO RESIDUES

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There is growing interest for application of phenolic antioxidants as natural additives in functional foods. Mango peel residues contain such phytochemicals; however, these phenolic antioxidants mostly occur in conjugated forms with sugar residues, which reduce their bioavailability. Carbohydrate-cleaving enzymes, i.e. cellulases and pectinases, can hydrolyze these glycosides releasing the phenolic aglycones. Foodborne pathogens and spoilage bacteria cause serious problems in the food industry and severe infections in humans. Because synthetic preservatives in foods provoke serious concern in consumers, there is a need to develop new bioprocesses to produce natural antioxidative molecules able to control diseases. The abovementioned phenolic compounds can enhance the stability and shelf life of food products, increase their antioxidative capacity, and inhibit the growth of a range of bacteria and fungi.

Therefore, our goal was to mobilize bioactive phenolic compounds from mango byproducts via *in vivo* solid-state fermentation (SSF) with the cellulolytic fungus *Rhizomucor miehei* NRRL 5282, or *in vitro* substrate treatment using *R. miehei* cellulase and *Aspergillus niger* pectinase enzyme cocktails. We expect that the obtained phenolic rich extracts can be used as sources of natural food additives.

After SSF, the beta-glucosidase activity increased and reached a maximum at the 18th day, but negative association between beta-glucosidase activity and antioxidant potential was found. However, the enzymatic treatments significantly increased the antioxidant activity of the samples. In addition, the cellulase and cellulase/pectinase treatments increased the antimicrobial activity of the extracts as well. The treated extracts efficiently inhibited the growth of

Listeria monocytogenes, *Staphylococcus aureus*, *Escherichia coli*, *Salmonella enterica* and *Bacillus subtilis.* Moreover, anti-biofilm forming activity of the extracts was also examined using the abovementioned bacteria, in which the biofilm formation inhibition was enhanced about 60% to 80% after the enzymatic treatments.

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