Anti-aflatoxigenic effect of organic acids produced by *Lactobacillus plantarum*

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ABSTRACT

Molds play an important role in food spoilage, being estimated that 5 to 10% of the world food's production is lost due to fungal contamination. Further, certain fungal species produce highly toxic metabolites, designated as mycotoxins. Biopreservation, defined as the control of one organism by another, has received much attention in recent years. Also, some strains of lactic acid bacteria (LAB) that demonstrated antifungal and antimycotoxin properties gained interest to be used as natural biopreservatives. In this work, it is shown that the cell free supernatant (CFS) of Lactobacillus plantarum UM55 inhibited the growth of aflatoxigenic fungi, *Aspergillus flavus*, by 32% and the production of aflatoxins (AFs) by 91%. These inhibitions were lost when the CFS pH was neutralized. Additionally, it was observed an increase of the inhibitions with increasing concentration of CFS. Other aflatoxigenic strains, such as *A. parasiticus*, *A. arachidicola*, *A. nomius* and *A. minisclerotigenes* were inhibited by the CFS of the bacterium in different extents. Organic acids present in CFS were quantified, with main differences between CFS and control found in the levels of lactic acid, phenyllactic acid (PLA), hydroxyphenyllactic acid (OH-PLA) and indole lactic acid (ILA). When tested, individually against *A. flavus*, all the compounds were able to inhibit fungal growth and AFs production. PLA showed the stronger effects and the 90% inhibitory concentration (IC90) for fungal growth and AFs was of 11.9 and 0.87 mg/mL, respectively. AFLs IC90 for ILA, OH-PLA and lactic acid were of 1.47, 1.80, and 3.92 mg/mL, respectively. Inhibitory effects of *L. plantarum* UM55 seems to be related to the production of lactic acid, PLA, OH-PLA and ILA.

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Keywords: Lactic acid bacteria, aflatoxin, organic acids, Lactobacillus plantarum*, biopreservation*

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