

Abstract

Control of fungal spoilage is a major concern in food industry. Such corruption, in addition to the significant economic damage caused by contaminants caused by mycotoxins, causes serious problems for human and animal health. The aim of this study was to use *Lactobacillus plantarum* MT.ZH193 and *Lactobacillus fermentum* MT.ZH893, isolated from dairy products, against to *Aspergillus flavus* PTCC-5006 and *Aspergillus parasiticus* PTCC-5286. The effects of four factors including pH (5.5, 6, 6.5, 7 and 7.5), temperature (30, 35, 40, 45 and 50⁰c), time (0, 24, 48, 72 and 96h) and Supernatant volume (150, 500, 850, 1200 and 1550 μ l) on inhibition of *A. flavus* PTCC-5006 and *A. parasiticus* PTCC-5286 growth were tested by response surface methodology. The optimization of supernatant production conditions, as the novel source of antifungal compounds was performed. The optimization value for pH, temperature, time and Supernatant volume for *L. plantarum* MT.ZH193 and *L. fermentum* MT.ZH893 against to *A. flavus* PTCC-5006 and *A. parasiticus* PTCC-5286 was 6.73, 35⁰c, 24h, 1200 μ l ; 6.63, 37.77⁰c, 24h, 1200 μ l and 6.79, 35⁰c, 24h, 1200 μ l ; 6.87, 35⁰c, 24h, 1200 μ l respectively. The ability of cell free supernatant, from the optimization step, in inhibition of *A. flavus* PTCC-5006 and *A. parasiticus* PTCC-5286 Spore germination and aflatoxin (B₁, B₂, G₁, G₂) production has been investigated. The highest percentage of spore germination inhibition belonged to *L. plantarum* MT.ZH193 against to *A. flavus* PTCC-5006 (84%). Also the highest percentage reduction in aflatoxin B₁, produced by *A. parasiticus* PTCC-5286 was due to the supernatant from *L. plantarum* MT.ZH193 (39.87%). volatility test was performed to investigate the synergistic effects of *L. plantarum* MT.ZH193 and *L. fermentum* MT.ZH893 on radial growth inhibition of *A. flavus* PTCC-5006 and *A. parasiticus* PTCC- 5286. Also the effect of three factors in five levels including time (4, 5, 6, 7 and 8 day), temperature (21.59, 25, 30, 35 and 38.4⁰c), inoculation size (0, 25, 50, 75 and 100) on the radial growth inhibition of *A. flavus* PTCC-5006 and *A. parasiticus* PTCC-5286 has been investigated. The optimization value for time, temperature and inoculation size for *L. plantarum* MT.ZH193 and *L. fermentum* MT.ZH893 against to *A. flavus* PTCC-5006 and *A. parasiticus* PTCC-5286 were 6 days, 30.93⁰c, 58% and 6 days, 31.95⁰c, 58% respectively. Model evaluation under the predicted optimal conditions confirms the validity of the model in predicting the experimental results.

Kay words: *Lactobacillus*, *Aspergillus*, Supernatant, Aflatoxin, Volatile compounds, Antifungal, GC-MS



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