

**Title** Biocontrol of *Aspergillus flavus* on peanut kernels by use of a strain of marine *Bacillus megaterium*

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### Abstract

A strain of marine *Bacillus megaterium* isolated from the Yellow Sea of East China was evaluated for its activity in reducing postharvest decay of peanut kernels caused by *Aspergillus flavus* in *in vitro* and *in vivo* tests. The results showed that the concentrations of antagonist had a significant effect on biocontrol effectiveness *in vivo*: when the concentration of the washed bacteria cell suspension was used at  $1 \times 10^9$  CFU/ml, the percentage rate of rot of peanut kernels was  $31.67\% \pm 2.89\%$ , which was markedly lower than that treated with water (the control) after 7 days of incubation at 28 °C. The results also showed that unwashed cell culture of *B. megaterium* was as effective as the washed cell suspension, and better biocontrol was obtained when longer incubation time of *B. megaterium* was applied. When the incubation time of *B. megaterium* was 60-h, the rate of decay declined to  $41.67\% \pm 2.89\%$ . Furthermore, relative to the expression of 18S rRNA, the mRNA abundances of *aflR* gene and *aflS* gene in the experiment group were  $0.28 \pm 0.03$  and  $0.024 \pm 0.005$  respectively, indicating that this strain of *B. megaterium* could significantly reduce the biosynthesis of aflatoxins and expression of *aflR* gene and *aflS* gene ( $p < 0.01$ ). To the best of our knowledge, this is a first report demonstrating that the marine bacterium *B. megaterium* could be used as a biocontrol agent against postharvest fungal disease caused by *A. flavus*.