

Title Interaction of water activity and bicarbonate salts in the inhibition of growth and mycotoxin production by *Fusarium* and *Aspergillus* species of importance to corn

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Citation International Journal of Food Microbiology, Volume 116, Issue 2, 10 May 2007, Pages 266-274

Keywords *Fusarium*; *Aspergillus*; Corn; Bicarbonates; Aflatoxin B₁; Fumonisin B₁

Abstract

The combined effects of water activity (a_w) and ammonium/sodium bicarbonate on growth and mycotoxin production in corn by *Fusarium* and *Aspergillus* species were investigated. Interaction was observed between the salts and a_w on the colony growth rates and lag phase durations of all isolates. Growth stimulation at low salt levels was observed only for the *Fusarium* isolates as the fastest growth of *F. verticillioides* and *F. proliferatum* occurred at levels of 0.1–0.2 and 0.5% ammonium and sodium bicarbonate, respectively. Although the complete inhibition of the growth of the *Fusarium* and *Aspergillus* isolates investigated took place at a level of 1% ammonium bicarbonate as much as 4% sodium bicarbonate failed to completely inhibit the growth of the *Aspergillus* isolates. Increase in concentration of either salt generally resulted in large reductions of both fumonisin B₁ and aflatoxin B₁ production. According to the sensorial analysis performed, corn treated with up to 1% ammonium bicarbonate was still acceptable for consumption, whereas corn treated with at least 2% sodium bicarbonate was determined to be sensorially unsuitable. Ammonium bicarbonate can be concluded to be more suitable for protecting stored corn from fungal contamination as it was capable of completely inhibiting both growth and mycotoxin production of the *Fusarium* and *Aspergillus* isolates of most importance to corn at levels that were still sensorially acceptable. Therefore ammonium bicarbonate could possibly be applied as a cheap and easy to apply treatment for use in resource limited developing countries.