

Title Growth and mycotoxin production by fungi in atmospheres containing 80% carbon dioxide and 20% oxygen

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Citation International Journal of Food Microbiology, Volume 143, Issue 3, 15 October 2010, Pages 218-225

Keywords Fungi; Mycotoxins; Modified atmospheres; High CO₂; Low O₂; Food

Abstract

The effect of atmosphere containing 80% CO₂ and 20% O₂ on growth of *Mucor plumbeus*, *Fusarium oxysporum*, *Byssochlamys fulva*, *Byssochlamys nivea*, *Penicillium commune*, *Penicillium roqueforti*, *Aspergillus flavus*, *Eurotium chevalieri* and *Xeromyces bisporus* was investigated. Production of aflatoxin by *A. flavus*, patulin by *B. nivea*, roquefortine C by *P. roqueforti*, and cyclopiazonic acid by *P. commune* was also studied. Fungal growth was evaluated by three methods: colony diameter, hyphal length or mycelium dry weight and ergosterol content. Among the nine fungal species examined, two *E. chevalieri* and *X. bisporus*, did not grow under these conditions. In this study, fungi differed in their response to modified atmospheres in biomass, ergosterol content, mycotoxin production and morphology. Reductions of 57.8–96.9%, 73.7–99.6% and 91.5–99.9% were obtained in colony diameter, hyphal length and ergosterol content, respectively, under this atmosphere compared to air. Ergosterol content was more affected in most species than other measurements. Patulin, cyclopiazonic acid and roquefortine C were produced in this atmosphere, although levels were very low and aflatoxin was not produced at all. Growth was quite extensive as measured by colony diameters, but hyphal lengths were low and ergosterol production was also affected in all species of this study.