Ozone Inactivation of Fungi Associated with Barley Grain

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Abstract

The use of ozone as a fungicide for barley storage was studied. The effects of ozone on the inactivation of natural and inoculated fungi on barley were evaluated at different water activities and temperatures. Results indicated that higher ozone doses were better at inactivating the natural fungi on barley than lower ozone doses. An ozone dose of 0.98mg/g • min was able to reduce the natural fungi counts on the barley at 0.98aw by over 97% after 45 minutes of ozone contact time. The inactivation of the natural fungi and Aspergillus flavus on the barley was favoured by higher temperatures. Ozone consumption of the barley was higher at higher temperatures. Tests on A. flavus spores inoculated on barley indicated that they were resistant to ozone doses up to 4.90mg/g while Penicillium verrucosum spores showed no resistance to any ozone doses that were tested. Inactivation of A. flavus (vegetative state) and P. verrucosum spores were favoured by higher water activities. The effect of ozone on barley germination was also examined. By 15 minutes of treatment at an ozone dose of 0.98mg/g • min, all the fungi tested were inactivated by over 90%, while germination was only reduced by 6%. Different water activities had no effect on the germination of barley. The findings show that ozone may be applied as a fumigant against fungi attacking high moisture content barley and provide the possibility of using it as an alternative to current chemicals for preserving stored barley.