

Abstract

Commercial allyl isothiocyanate (AIT) was examined for its ability to reduce numbers of *Escherichia coli* O157:H7 inoculated in fresh ground beef packaged under nitrogen and stored refrigerated or frozen. A five-strain cocktail of *E. coli* O157:H7 containing 3 or 6 log₁₀ cfu/g was inoculated into 100 g ground beef and formed into 10×1-cm patties. A 10-cm diameter filter paper disk treated with AIT suspended in sterile corn oil was placed on top of a single patty. One patty and paper disk were placed in a bag of Nylon/EVOH/PE with O₂ permeability of 2.3 cm³ m⁻² 24 h atm at 23 °C. The bags were back-flushed with 100% nitrogen, heat-sealed and stored at 10, 4 and -18 °C for 8, 21 or 35 days, respectively. During storage, the AIT levels in the package headspaces were determined by gas liquid chromatography, and mesophilic bacteria and *E. coli* O157:H7 were counted. The mesophilic aerobic bacteria in ground beef patties were largely unaffected by the addition of AIT. At an initial population of 3 log₁₀ cfu/g, *E. coli* O157:H7 was reduced by AIT to undetectable levels after 18 days at 4 °C or 10 days at -18 °C. In samples inoculated with 6 log₁₀ cfu/g, a >3 log₁₀ reduction of *E. coli* O157:H7 was observed after 21 days at 4 °C, while a 1 log₁₀ reduction was observed after 8 and 35 days at 10 and -18 °C, respectively. The final AIT concentrations in the headspaces after storage at 10, 4, and -18 °C were 444, 456, and 112 µg/ml at 8, 21, and 35 days, respectively. Results showed that AIT can substantially reduce numbers of *E. coli* O157:H7 in fresh ground beef during refrigerated or frozen storage.