

Title Reduction of *Escherichia coli* 0157:H7 from Refrigerated Nitrogen Packed Ground Beef Using Microencapsulated Allyl Isothiocyanate (AIT)

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Abstract

Allyl isothiocyanate (AIT) is an effective inhibitor of various pathogens but its use in the food industry has been curtailed by its volatility and pungency. To overcome these problems AIT was microencapsulated in gum acacia and tested for antimicrobial potency against *Escherichia coli* 0157:H7 in refrigerated ground beef. Twenty-five grams of aseptically ground beef were inoculated with a five-strain cocktail of *E. coli* 0157:H7 to yield 4 or 8 log CFU/g. AIT at four levels was microencapsulated in gum acacia and freeze dried at a ratio of 1:4 (wall: AIT). Microcapsules were mixed with the meat samples, nitrogen packed, and stored at 4 °C for 18 d. Samples were analyzed for *E. coli* 0157:H7 and the total aerobic count (TAC) every 3d. AIT concentrations of 4980 ppm eliminated both low and high levels of inoculated *E. coli* 0157:H7 after 15 and 18 d of storage, respectively. AIT at 2828 ppm reduced *E. coli* 0157:H7 ≤ 2.7 log CFU/g after 18 d storage. AIT levels < 1000 ppm were not effective in reducing *E. coli* 0157:H7 viability. AIT levels of 170 to 1480 ppm had negligible effects on TAC, while 4980 ppm kept the TAC < 3 log CFU/g during 18 d storage compared with 7.25 log CFU/g in control samples. Work showed that AIT microencapsulated in gum acacia could be used in refrigerated ground beef to eliminate large numbers of *E. coli* 0157:H7.