

## Effect of Cinnamaldehyde on survival of *E. coli* O<sub>157</sub>:H<sub>7</sub> in minced meat by using PMA- real time PCR

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### Abstract

The antimicrobial effect of cinnamaldehyde on *Escherichia coli* O<sub>157</sub>:H<sub>7</sub> in ground beef was investigated by inoculation of *Escherichia coli* O<sub>157</sub>:H<sub>7</sub> into ground beef at 6 logs CFU/g, followed by addition of cinnamaldehyde (0% v/v, 0.3% v/v and 0.6% v/v). The inoculated ground beef was stored at 4°C for 14 days, *Escherichia coli* O<sub>157</sub>:H<sub>7</sub> count was determined by both culturing on Sorbitol Mackonkey agar (SMAC) and propidium Monoazide (PMA) real time PCR on days 0, 3, 5, 7 and 14. Cinnamaldehyde reduced the pathogen count by 3 log CFU/g in 14 days at 0.6% v/v and by 2.5 log CFU/g in 14 days at 0.3%. There were no significant differences between measuring of *Escherichia coli* O<sub>157</sub>:H<sub>7</sub> count by both SMAC and PMA real time PCR. Cytotoxicity of Cinnamaldehyde were evaluated on BHK-21 cell line. Cinnamaldehyde can be best employed in the fight against *Escherichia coli* O<sub>157</sub>:H<sub>7</sub> in meat products without causing any hazards to the consumer.

### Introduction:-

*Escherichia coli* O<sub>157</sub>:H<sub>7</sub> is one of the most notorious food-borne pathogens, with an infectious dose as low as a few hundred cells (**Karmali, 2004**). Beef and dairy products, juices and fresh produce are foods that are often associated with *E. coli* O<sub>157</sub>:H<sub>7</sub> outbreaks. *E. coli* O<sub>157</sub>:H<sub>7</sub> infections can lead to nonspecific diarrhea, hemorrhagic colitis and even hemolytic uremic syndrome (HUS) (**Banatvala et al., 2001**). Majority of *E. coli* O<sub>157</sub>:H<sub>7</sub> outbreaks have been associated with the consumption of undercooked ground beef and raw milk (**Armstrong et al., 1996; Hancock et al., 1997 and Mao et al., 2001**), Plant-derived essential oils represent a group of natural antimicrobials that have been traditionally used to preserve foods as well as enhance food flavor. Cinnamaldehyde is an aldehyde present as a major component of bark extract of cinnamon (*Cinnamomum verum*) (**Holley and Patel, 2005**). Cinnamaldehyde is classified as a GRAS (generally regarded as safe) molecule by the United States Food and Drug Administration and is approved for use in foods (21 CFR 182.60) (**Adams et al., 2004**). Although Cinnamaldehyde has been reported to possess an antimicrobial property against food-borne pathogens (**Bilgrami et al., 1992; Burt, 2004; Holley and Patel, 2005**), its use for improving the safety of ground beef needs to be validated. The involvement of *E. coli* O<sub>157</sub>:H<sub>7</sub> with the consumption of ground beef and beef products