Antimicrobial Clove Bud Oil for Inhibiting *Salmonella* sp. Isolated from Broiler Carcass Samples

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ABSTRACT

The aim of this study was to determine the inhibition effect of clove bud oil against the growth of *Salmonella* sp. isolated by in vitro method. Three isolates of *Salmonella* sp. I, II and III were obtained from the broiler carcasses in Central Java used in this study. Every isolates was tested against several concentrations (25, 20, 15, 10 and 6% of c*love bud oil.* The results indicated that the higher of oil concentration the higher the growth inhibition of *Salmonella enteritidis* obtained (P<05). The growth inhibition produced by 25, 20, 15, 10 and 5% oil concentrations respectively were 18.7, 15.7, 14.3, 9.3 and 6.7 mm. The most sensitive *Salmonella* sp. isolate to clove bud oil was *Salmonella* sp. isolate II (P<05). Growth inhibitions of *Salmonella* sp. I and III and I respectively were 7.2, 11.6 and 13.4 mm respectively. It was concluded that clove bud oil could inhibit the growth of *Salmonella* sp.isolated from broiler carcass samples.

Key words: *antimicrobial, clove, Salmonella sp.*

INTRODUCTION

Clove bud oils have biological activities, such as antibacterial, antifungal, insecticidal and antioxidant properties, and are used traditionally as flavoring agent and antimicrobial material in food (Huang *et al*., 2002, Lee and Shibamoto, 2001 and Velluti *et al*., 2003). For example, clove oil was effective against *L. monocytogenes* and *S. enteritidis* in tryptone soya broth (TSB) and cheese (Smith-Palmer *et al.*, 1998; Smith-Palmer *et al.*, 2001). The high levels of eugenol contained in clove essential oil give it strong biological activity and antimicrobial activity. This phenolic compound can denature proteins and reacts with cell membrane phospholipids changing their permeability (Briozzo, 1989; Deans and Ritchie, 1987).

The development of antimicrobial resistance among pathogenic bacteria has emerged as a major public health concern, which has led to an intensification of discussion about the prudent use of antimicrobial agents, especially in veterinary medicine, nutrition and agriculture (Caprioli *et al.*, 2000).

The utilization of antimicrobial drugs has played an important role in animal husbandry, since they are used in prophylaxis, treatment and growth promotion. Overall, there are largest quantities of antimicrobials that are used as regular supplements for prophylaxis or growth promotion in the feed of animal herds and poultry flocks. This result in the exposure of a large number of animals, irrespective of their health, has shown frequently sub therapeutic concentrations of antimicrobials (Dupont and Steele, 1987 and Franco *et al.*, 1990). Furthermore, antibiotics given to animals and closely related compounds used in human therapy have been exerting selective pressure on their target bacteria for decades (Witte, 1998), and can generate a reservoir of antimicrobial resistant bacteria (Endtz *et al.*, 1991 and Smith *et al.*, 1999).

Antimicrobial-resistant bacteria in food animals threaten the efficacy of human drugs if antimicrobial-resistant bacteria or antimicrobial-resistance genes become incorporated into human bacterial populations (Smith *et al.*, 2002). Agricultural antibiotic use increases the frequency of antibiotic resistant zoonotic pathogens such as Salmonella (Smith *et al*., 2002). Most antimicrobial-resistant Salmonella infections are acquired from eating contaminated foods of animal origin (Angulo *et al.*, 2000). The husbandry practices used in poultry industry and the widespread use of medicated feeds in broiler and layer operations made poultry a major reservoir of antimicrobial-resistant Salmonella (D'Aoust *et al*., *1992*). Resistance in Salmonella limits the therapeutic options available to veterinarians and physicians in the treatment of