

**ANTIBACTERIAL ACTIVITY OF FRESH AND
DRIED SAMPLES OF *Allium sativum* Linn
AND *Zingiber officinale* Roscoe AGAINST
Salmonella enterica AND *Escherichia coli*
ON RAW CHICKEN MEAT**

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ABSTRACT

ANTIBACTERIAL ACTIVITY OF FRESH AND DRIED SAMPLE OF *Allium sativum* Linn AND *Zingiber officinale* Roscoe AGAINST *Salmonella enterica* AND *Escherichia coli* ON RAW CHICKEN MEAT

The study of the antimicrobial potency of the two aromatic vegetables *Allium sativum* Linn and *Zingiber officinale* Roscoe has been investigated against the two most common food spoilage bacteria, *Escherichia coli* and *Salmonella enterica*. The antibacterial activity was determined by the disc diffusion method. Kirby-Bauer method was used to determine the susceptibility of the bacteria toward the aqueous extract of *A.sativum* and *Z.officinale*. The average inhibition zone of 300 mg/ml fresh *A.sativum* aqueous extracts of against the *E.coli* is 14.2 mm ($\sigma=0.76$) and 15.3 mm ($\sigma=0.76$) for *S.enterica*. At 100 mg/ml dried *A.sativum* aqueous extract its recorded the average of the inhibition zone of against *E.coli* is 6.7 mm ($\sigma=0.29$) and 5.5 mm ($\sigma=1.32$) for *S.enterica*. The average inhibition zone of 300 mg/ml of fresh *Z.officinale* against *E.coli* is 6.8 mm ($\sigma=0.76$) and 6.0 mm ($\sigma=1.50$) for *S.enterica*. The average zone of inhibition of 100 mg/ml of dried *Z.officinale* against *E.coli* is 12.2 mm ($\sigma=0.29$) and 11.5 mm ($\sigma=0.50$) for *S.enterica*. The minimum inhibitory concentration (MIC) of fresh *A.sativum*, dried *A.sativum*, fresh *Z.officinale*, and dried *Z.officinale* was recorded at 9.37 mg/ml, 50.00 mg/ml, 12.50 mg/ml, and 75.00 mg/ml respectively. These concentrations were used to disinfect the chicken meat for 90 minutes of exposure. The enumeration of bacteria using pour plate method were performed every 30 minutes. The total colony count of untreated chicken meat were recorded at $\mu=67.25$ per gram. The average total colony count after 60 minutes of fresh *A.sativum*, dried *A.sativum*, fresh *Z.officinale*, and dried *Z.officinale* extracts exposures were 1.6, 30.3, 17.6 and 9.0 respectively. At 90th minutes, the average total plate count of fresh *A.sativum*, dried *A.sativum*, fresh *Z.officinale*, and dried *Z.officinale* extracts exposures were 18.6 CFU/ml, 23.3 CFU/ml, 36.3 CFU/ml and 55.6 CFU/ml respectively. Overall study stated fresh *A.sativum* aqueous extract has the potential as natural antibacteriocidal agent. From this comparative study of these natural preservative, it was conclude that the fresh *A.sativum* is more effective than the dried *A.sativum*, and dried *Z.officinale* were stronger antibacterial than the fresh *Z.officinale* extracts. This comparative showed the fresh *A.sativum* extract is most effective, which inhibit the bacterial growth at lowest concentration of 9.37 mg/ml. It is recommended to increase the concentration of the bioactive compound, for both aromatic vegetables to obtain the higher antibacterial activity, for a better control of the bacterial growth.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Spices and aromatic vegetable material have been used in preservatives, medicinal properties, marinate, and also used widely in culinary for centuries. Two most famous aromatic vegetable are *Allium sativum* Linn and *Zingiber officinale* Roscoe (Sethi *et al.*, 2012). *A.sativum* and *Z.officinale* both have the bioactive compounds, which are allicin and gingerols respectively that are capable to act as the antibacterial for both gram negative and gram positive bacteria (Baytop, 1999; Azian, *et al.*, 2014).

Spoilage of raw meats, especially chicken meat are the most common problems, that caused by poor food handling. In a research done by Von and Pichpol (2009), raw chicken meat remains as the important source of human infection with pathogenic microorganism. They concluded that, fresh meat is a suitable substrate for bacterial multiplication (Hinton, 2000). The main cause of the spoilage is determined to be microorganism (Sethi *et al.*, 2012). In the same study done by Von and Pichpol, they