

PAPER • OPEN ACCESS

The potential of curry leaves (*Muraya koenigii*) as *Enterobacteriaceae* inhibitor on fresh meat

To cite this article: Z Hanum *et al* 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **425** 012048

View the [article online](#) for updates and enhancements.

You may also like

- [Process hygiene of pig carcasses in one large-scale slaughterhouse in the west of Serbia during 48 months](#)
N Betic, T Baltic, J Ciric et al.
- [Identification of carbapenemases enterobacteriaceae producing gene blaVIM in clinical isolates](#)
Ella Amalia, Tia Sabrina, Yuwono et al.
- [Comprehensive volatile metabolic fingerprinting of bacterial and fungal pathogen groups](#)
Christiaan A Rees, Alison Burklund, Pierre-Hugues Stefanuto et al.



ECS
The
Electrochemical
Society
Advancing solid state &
electrochemical science & technology

DISCOVER
how sustainability
intersects with
electrochemistry & solid
state science research

The potential of curry leaves (*Muraya koenigii*) as *Enterobacteriaceae* inhibitor on fresh meat

Z Hanum^{1*}, Yurliasni¹, CA Fitri², Z Maulina², Herawati³, F Akmal¹

¹Milk Science Technology Laboratory, Animal Science Department, Faculty of Agriculture, Universitas Syiah Kuala. Jl. Tgk. Hasan Krueng Kalee No. 3 Darussalam, Banda Aceh, Indonesia 23111

²Meat Science Technology Laboratory, Animal Science Department, Faculty of Agriculture, Universitas Syiah Kuala. Jl. Tgk. Hasan Krueng Kalee No. 3 Darussalam, Banda Aceh, Indonesia 23111

³Animal Science Department, Faculty of Agriculture, Universitas Syiah Kuala. Jl. Tgk. Hasan Krueng Kalee No. 3 Darussalam, Banda Aceh, Indonesia 23111

* Corresponding author's e-mail: zuraidahanum@gmail.com

Abstract. The aim of this study was to determine the potential of curry leaves powder as *Enterobacteriaceae* inhibitor on fresh meat. Fresh meat was obtained from Lambaro Traditional Market in Banda Aceh. Curry leaves powder was produced by heating at 50°C for 8 hours then ground through 3 mesh. The inhibitor test using agar diffusion method. Parameters observed were total plate count (TPC) and total of *Escherichia coli* and *Salmonella* counts in fresh meat. Completely Randomized Design Factorial with two factorials was used. The first factor was concentration of curry leaves powder (0%, 25% dan 50%). The second factor was duration of storage (0 day, 2 days, 4 days and 6 days). Data obtained were analyzed by Analysis of variance (ANOVA) followed by Duncan's test. The result showed that addition of 25% and 50% curry leaves powder were able to inhibit *E.coli*. Addition of 50% curry leaves powder was effective to inhibit *E.coli* and *Salmonella* sp. The inhibition occurred in *E.coli* and *Salmonella* sp. proves that curry leaves contain active compounds acting as antibacterial.

1. Introduction

Beef cattle is one of animal-source food types consumed because it contains high level of nutrient and tasty. It contains water, fat and protein. This composition exposes beef to contamination by spoilage and pathogenic bacteria. In addition, the high content of water during storage provide a good environment for microorganism growth.

Microbiological contamination on animal-source food and its product is one the problems that is the main concern of costumers. There are many potential critical points for microorganism to contaminate the fresh meat. Therefore, it is necessary to identify microbial contamination and antibiotic residual in maintaining food safety from farm to table.

Indonesia has various types of plants used as a source of food and medicine. These plants are found as antioxidant and antibacterial, such as curry leaves (*Muraya Koenigii*) [1]. Curry leaves are mostly found and very popular in Aceh province, Indonesia. The leaves are used traditionally as a spice in curry and other eatables. According to [1], the use of curry leaves powder in fresh meat can inhibit



thiobarbituric acid, lipid peroxidation and free fatty acid formation, maintain water holding capacity and pH. Curry leaves powder also can extend the shelf life of food up to five days. Therefore, this study was conducted to determine the potential of curry leaves (*Muraya koenigii*) as *Enterobacteria* inhibitor on Fresh meat.

2. Methods

2.1. Preparation of Curry Leaves Powder

Curry leaves powder was produced by selecting the green and young leaves as much as 100 gr. The leaves were air dried for one day then the leaves were kept in oven at 50°C for 8 hours. Dried leaves were ground and sieved through 3 mesh.

2.2. The Presence of Enterobacteriaceae Test

Curry leaves powder were used on fresh meat with various concentration (0%, 25% dan 50%). Every storage handling period treatment (0 day, 2 days, 4 days and 6 days) in refrigerator temperature. samples were collected Samples (10 g) was dissolved in 90 ml sterile dH₂O was homogenised using vortex. Total of 1 ml suspension, into suspension 10² and planted on Mc Conkey agar. Parameters observed were Total Plate Count (10⁶ cfu/ml) and *Enterobacteriaceae* counts (*E. coli* and *Salmonella* sp.)

2.3 Statistical Analysis

Completely randomized design factorial pattern was applied in this study. Data were analyzed by analysis of variance (ANOVA) followed Duncan's test.

3. Results and Discussion

3.1 Total Plate Count (cfu/ml)

Analysis of variance showed the effect of storage period (Factor B) on fresh meat was significantly ($P < 0.01$) on total plate count. According to Figure 1, the addition of 25% curry leaves showed a good microbial growth phase. The number of total bacteria in Day-0 was 5.78 cfu/ml and in the lag phase or adaptation phase. The number of total bacteria in Day-2 was 5.83 cfu/ml and in the log phase, where a time of exponential growth. The number of total bacteria in Day-4 was 6.29 cfu/ml and in the stationary phase, growth reaches a plate as the number of dying cells equal the number dividing cells. Then in Day-6, the number of total bacteria was 6.16 cfu/ml and in death phase characterized by an exponential decrease in the number of living cell.

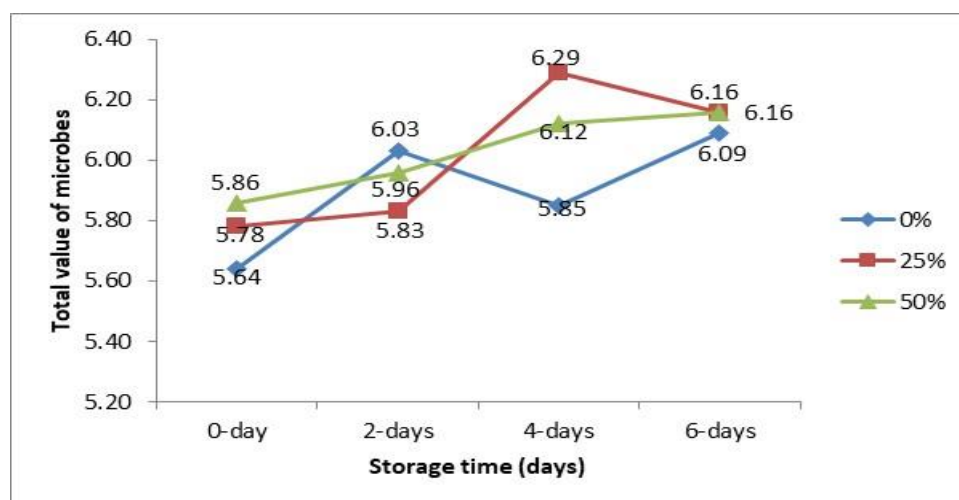


Figure 1. Average value of total plate count on fresh meat with addition of curry leaves powder

The growth of microorganism was increasing in addition of 25% and 50% curry leaves powder [2] stated some microorganism in food are able to grow perfectly and grow more when it do not move then stop to metabolize. [3] reported the higher concentration of curry leaves powder will decrease total bacteria in the fresh meat. However, the longer storage period will increase total bacteria. Microorganism requires certain condition for growth, and these condition are not same for all microorganism. Factors such as temperature, humidity and pH influence microbial growth [4]. However, active compounds contained in herb plant are able to extend the storage period of fresh meat [5].

3.2 Total of *Escherichia coli* Counts (cfu/ml)

Analysis of variance showed the effect of storage period (Factor B) on fresh meet was significantly ($P < 0.01$) on *Escherichia coli* growth. Interaction factor between concentration of addition curry leaves powder and storage period on *Escherichia coli* was significant ($P < 0.05$). Duncan test showed storage period (factor B) in day-0 was significantly different with day-4 and day-6, but no significant differences between day-0 and day-2. The storage period in day-4 was significantly different with day-2 and day-6. Then storage period in day-6 was significantly different with day-2. The number of *Escherichia coli* in day-0 was 3.48 cfu/ml, and increase in line with storage period. The number of *Escherichia coli* in day-2, day-4 and day-6 were 3.50, 4.16 and 4.59 cfu/ml, respectively. The addition of 25% and 50% curry leaves powder only affect and inhibit microbial growth in day-0, day-2 and day-6. This result shows curry leave powder in raw beef are able to protect meat surface then decrease the number of bacteria.

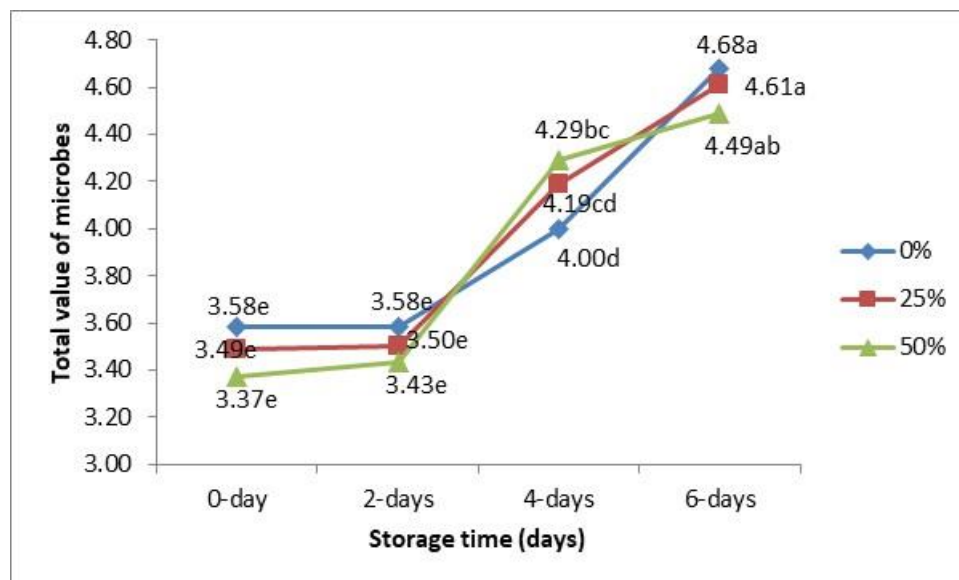


Figure 2. Total of *Escherichia coli* on fresh meat with curry leaves powder

The number of bacteria in the raw beef without curry leaves powder and with curry leaves powder (25 and 50%) in day-4 showed the high population then against constantly. This is due to active compounds in curry leaves powder are not able to inhibit the bacteria growth. [6] stated the growth of pathogenic bacteria was inhibited by curry leaves powder due to interaction of active compounds such as tannin, saponin, flavonoid that are able to inhibit bacteria growth on fresh meat. In addition, tannin and saponin in curry leaves act as antibacterial in preservative process and food storage period [7]. Other study by [5] indicated that curry leaves inhibited *E.coli*, *Staphylococcus*, *Shigella sonnei* and *Aerobacter aerogenes*.

3.3 Total of *Salmonella* sp. Counts

The result shows the additional of curry leaves powder did not affect storage period. Presence of *Salmonella* sp. was not detected on fresh meat and meat with curry leaves. According to SNI 7388:2009 about carcass and fresh meat quality mentioned that the number of *Salmonella* sp should be negative. *Salmonella* sp is a pathogenic bacteria can cause food poisoning in human. *Salmonella* sp is also zoonotic, it can be transmitted both from animal to human. Most *Salmonella* can be classified as gastroenteritis.

4. Conclusion

The potential of curry leaves have observed in this study. In conclusion, total plate count on fresh meat with addition of 25% curry leaves powder showed a good microbial growth phase and inhibit *Escherichia coli* up to day-2.

References

- [1] Das A K, Rajkumar V, and Dwivedi D K 2011 *J. Intenl. Food Resch.* **18** 563
- [2] Supardi I 1999 *Mikrobiologi Dalam Pengolahan dan Keamanan Pangan* (Bandung,Yayasan Adikarya)
- [3] Nurwantoro V P, Bintoro A M, Legowo and Purnomoadi A 2008. *J. Wartazoa.* **22** 72
- [4] Nugroho, and Astri 2007 *J. Ilmu Dasar.* **8** 13
- [5] Anton 2007 *Bahan Tambahan Pangan* (Jakarta Depkes)
- [6] Nagappan T, Ramasamy P, Wahid M E A, Segaran T C, and Vairappan C 2011 *J. Mol.* **16** 9651
- [7] Winarno F G 2002 *Kimia Pangan dan Gizi* (Jakarta: Gramedia)