Effect of Perilla Extracts Addition on Keeping Quality of Chinese-Style Sausage and Frankfurter

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Abstract:

The purpose of this study was to investigate the keeping quality of Chinese-style sausage and frankfurter with addition of *Perilla frutescens* extracts. The Chinese-style sausage and frankfurter with pertlla extracts (0%, 1%, 2% and 3%) addition were stored at 4℃ for eight weeks. The result showed that the Chinese-style sausage with perilla extracts addition has higher *a* value and *b* value ($p<0.05$), lower TBA value ($p<0.05$), lower lactic acid bacteria in second week ($p<0.05$), lower coliform and total plate count in the fourth week ($p<0.05$). In sensory evaluation of Chinese-style sausage, perilla groups (1%, 2% and 3%) had higher score in the color, odor, perilla flavor and after-taste ($p<0.05$), control and 1% groups had higher score in overall acceptability ($p<0.05$). In Frankfurter study, perilla treatment had higher *a* value and *b* value ($p<0.05$). The group of 2% had the best performance in the lactic acid bacteria and total plate count ($p<0.05$). In sensory evaluation of Frankfurter, perilla groups (1%, 2% and 3%) had higher score in the color, odor, perilla flavor and after-taste ($p<0.05$), group of 0% has higher score than other groups in overall acceptability ($p<0.05$). The perilla extract could reduce oxidation and microorganism on products effectively, but perilla own strong odor, may cause the acceptability of products drop with an excess of perilla. Adding the perilla extracts with optimum level (1~2%) in meat products not only improve shelf-life and increase the value of meat products, also keep meat products original flavors.

Index Terms: Keeping quality, perilla, sausage, shelf-life

I. INTRODUCTION

Synthetic preservatives have been used in foods for decades; however, an increasing perception by consumers that synthetic compounds lead to negative health consequences and led to a reduced acceptance for their use in foods. Plant-derived spices are generally used in foods for flavoring and medicinal purposes (Zhang *et al*., 2009). However, a number of studies have demonstrated that compounds existing in many spices also possess antimicrobial activity.

Perilla frutescens L. have the function of antimicrobial growth (Huang *et al*., 2007), antioxidation (Huang *et al*., 2006), protecting the liver, lowering blood pressure, preventing tumour, resisting inflammation, and resisting allergy, etc (Huang *et al*., 2007). Although the antimicrobial effects of some herbs and spices have been well documented, few studies have been conducted to investigate the feasibility of using herbal and spice extracts as potential antimicrobial agents for the preservation of chilled meat and processed meat products (Zhang *et al*., 2009).

The purpose of this study was to investigate the keeping quality of Chinese-style sausage and frankfurter with addition of perilla extracts.

II. MATERIALS AND METHODS

Chinese-style sausage and frankfurter were manufactured with raw meat (80%), back fat (20%), and pertlla extracts (0%, 1%, 2% and 3%). The perilla extracts was extracted form dry perilla leaf with rice wine (Mizhiu Tou). Sausage samples stored at 4℃ were taken for keeping quality test every two weeks till eight weeks of storage. Color of Chinese-style sausage and frankfurter was measured with a CIE colorimeter to determine lightness (L), redness (*a*) and yellowness (*b*). Furthermore, proximate analysis was determined according to A.O.A.C. (1995). pH value and 2-Thiobarbituric acid value (TBA value) of Chinese-style sausage and frankfurter was determined according to Ockerman (1985). Total plate count, lactic acid bacteria and Coliform was determined according to FDA (1998). Sensory evaluation was carried out by a trained panel on sensory characteristics of Chinese-style sausage and frankfurter. The data were analyzed using the completely randomized design with split plot, and the analysis of variance was performed to determine the significance for perilla concentration and storage effect.

III. RESULTS AND DISCUSSION

The results showed that the Chinese-style sausage with perilla extracts addition had higher *a* value and *b* value ($p<0.05$), lower TBA value ($p<0.05$), lower lactic acid bacteria ($p<0.05$), lower coliform and total plate count ($p<0.05$). In sensory evaluation of Chinese-style sausage, perilla groups (1%, 2 % and 3%) had higher score in the color, odor, perilla flavor and after-taste ($p<0.05$), 0% and 1% perilla groups had higher score in overall acceptability ($p<0.05$).

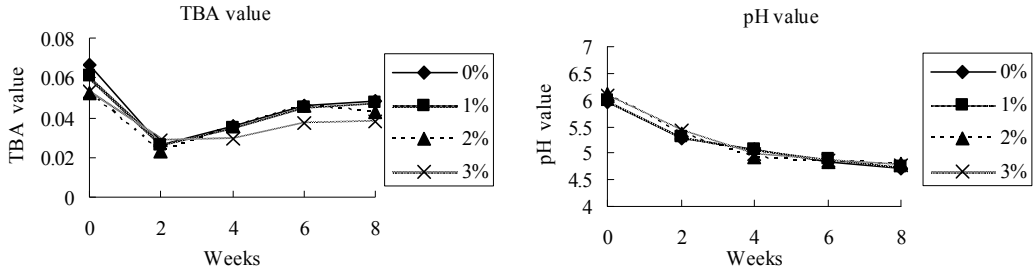

Fig 1. Effect of perilla extracts additions on TBA and pH value of Chinese- style sausages.

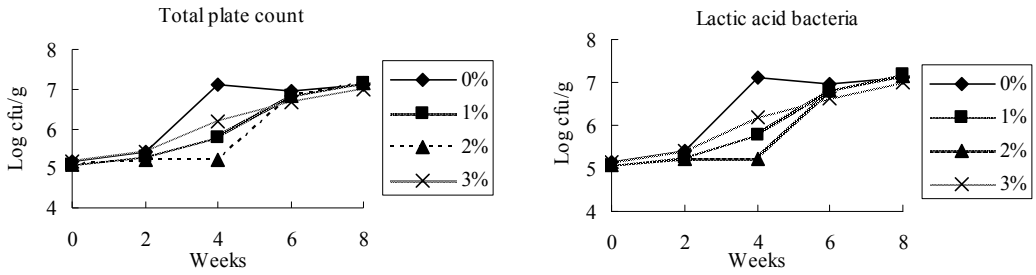

Fig 2. Effects of perilla extracts additions on total plate count and lactic acid bacteria of Chinese- style sausages.

Table 1. Effects of perilla extracts additions in sensory evaluation[A] of Chinese-style sausages and frankfurter

Treatment[B]	Color	Odor	Tenderness	Juiciness	Perilla flavor	After-taste	Overall acceptability
CS0%	4.68[a]	4.10[a]	4.95	5.05	1.39[a]	1.85[a]	6.41[b]
CS1%	5.59[b]	4.84[b]	4.95	5.40	3.14[b]	3.00[b]	6.20[b]
CS2%	5.27[b]	6.05[c]	5.23	5.36	5.23[c]	4.50[c]	5.27[a]
CS3%	5.90[b]	6.32[c]	4.82	5.14	5.36[c]	4.62[c]	4.73[a]
FS0%	3.96[1]	3.73[1]	6.75	5.81	1.05[1]	1.24[1]	7.25[4]
FS1%	5.29[2]	5.09[2]	6.50	6.25	3.38[2]	3.13[2]	6.00[3]
FS2%	5.63[2]	5.92[23]	6.25	5.75	5.21[3]	4.33[3]	4.67[2]
FS3%	5.38[2]	6.63[3]	6.29	5.87	6.46[4]	5.08[3]	3.88[1]

[A]: Color: 1=extremely light, 9=extremely dark; odor: 1=extremely bland, 9=extremely intense; tenderness: 1=extremely tough, 9=extremely tender; juiciness: 1=extremely dry, 9=extremely juicy; perilla flavor: 1=extremely bland, 9=extremely intense; after-taste: 1=extremely bland, 9=extremely intense; overall acceptability: 1=extremely dislike, 9=extremely like.

[B]: CS=Chinese-style sausage, FS=frankfurter.

[a-d] Different letters in the same column indicate significant difference ($p<0.05$).

[1-4] Different numbers in the same column indicate significant difference ($p<0.05$).

In Frankfurter study, perilla treatment had higher *a* value and *b* value ($p<0.05$). The group of 2% had the best performance in the lactic acid bacteria and total plate count ($p<0.05$). In sensory evaluation of Frankfurter, perilla groups (1%, 2% and 3%) had higher score in the color, odor, perilla flavor and after-taste ($p<0.05$), group of 0% had higher score than other groups in overall acceptability ($p<0.05$).

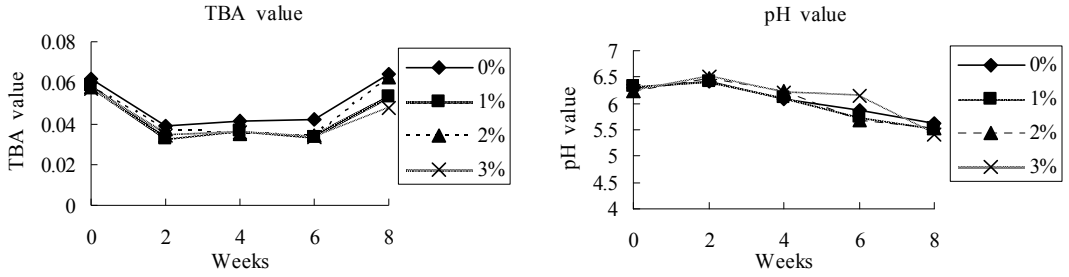

Fig 3. Effects of perilla extracts additions on TBA and pH value of frankfurter during storage.

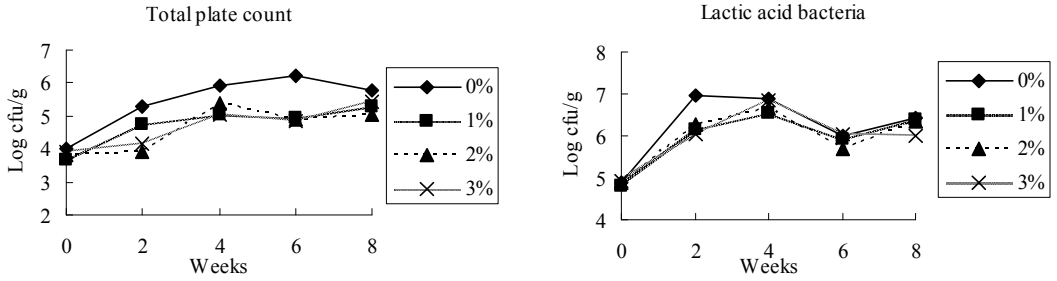

Fig 4. Effects of perilla extracts additions on total plate count and lactic acid bacteria of frankfurter.

IV. CONCLUSION

The perilla extract could reduce oxidation and microorganism on products effectively; however, perilla own strong odor, might cause the lower acceptability of products with an excess of perilla odor. The optimum level (1~2%) of perilla extracts in meat products could improve shelf-life and retain original flavors of processed meat product.

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