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Comparison different methods for improving tenderness and microbiological of marinated pork ham (#188)

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Introduction

Meat composes of valuable nutrients such as protein, fatty acid and vitamins [2]. Tenderness is the most important attribute for quality that affects consumer eating satisfaction [4]. The process of marinade isimmersion, injection or tumbling meat with a solution containing ingredient such as vinegar, salts, herbs and spices. It is known to improve the meat quality, especially tenderness by increasing the water holding capacity and extend shelf life of meat products. Marinade meat in solution allows penetration of the meat through diffusion over time resulted in tenderness [5]. Another method to increase meat tenderness is sous vide cooking which is a method of low temperature and prolong heating that improves texture and shelf life [1,4]. Therefore, the objective of this study was to improve tenderness of marinated pork ham by comparison of sous vide at 45 ℃ with holding time at 0, 2 and 4 hr to meat in marinade and massage, then keeping for 12 hr.

Methods

Pork ham was cut into 1x1x1 cm^3 cubes. Marinade mixture contained oyster sauce, soy sauce, chili sauce, tomato sauce, onion, garlic, pepper, oregano and sugar were mixed well. Pieces of pork ham were immersed into the marinade mixture. The comparison of different methods for improving tenderness was conducted in 4 treatments as following ; i) pork ham was immersed into marinade, massage and kept at 4 ℃ for 12 hr, ii), iii) and iv) after marinated, pieces of pork ham were put in sous vide cooking at 45 ℃ for 0, 2 and 4 hr. respectively. Shear force expressed as kg (Instron, U.S.A.), total plate count and sensory evaluation were determined. The sensory evaluation was examined by 30 students using a seven point hedonic scale (1= dislike extremely, 2= dislike very much, 3= dislike, 4= neither like nor dislike, 5= like, 6= like very much and 7= like extremely) for their tenderness and overall liking.

Results

1. Effect of different methods applied to marinated pork ham on shear force value and microbial count

Tenderness of cooked marinated pork ham was determined by obtaining shear force value. The lowest shear force value was found in pork ham after sous vide for 4 hr, followed by pork ham after immersed into marinade and massage, then kept for 12 hr ($p<0.05$) as shown in Table 1. [3] reported that marination process could improve the tenderness by increasing the water holding capacity. [1] reported that low temperature heating method provided juicy and tender meat by improving the water holding capacity of the muscle tissue during heating. In this study, initial number of microorganisms was determined in fresh pork ham before marinated, after marinating and sous vide. Number of microorganisms in marinated pork ham significantly decreased ($p<0.05$). However, the lowest number of microorganisms was observed in pork ham marinade, massage and kept for 12 hr (Table 2).

2. Effect of different methods applied to marinated pork ham on sensory evaluation

The sensory evaluation of cooked marinated pork ham were displayed in Table **3.** The highest tenderness and overall liking score were observed in pork ham treated in sous vide for 4 hr, followed by pork ham immersed in marinade, massage and kept for 12 hr.

Conclusion

Marination process by immerse, then massageand sous vide method using low temperature at 45 ℃ for 4 hr enhance tenderness and extend shelf life of marinated pork ham product. This finding could be used to improve marinated pork ham process.

References

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Notes

Treatments	Shear force (Kg)
Sous vide 45 ℃0 hr	3.88 ± 0.10[a]
Sous vide 45 ℃2 hr	3.78 ± 0.18[ab]
Sous vide 45 ℃4 hr	3.61 ± 0.31[b]
Immersion and massage, kept for 12 hr at 4 ℃	3.59 ± 0.23[b]

[a–b] Means within the same column with different letters are significantly different (P<0.05).

Table 1
Effect of different methods applied to marinated pork ham on shear force value (Mean ± SD)

Treatments	Log cfu/g
Fresh pork (Initial number of microorganisms)	3.80 ± 0.14[a]
Sous vide 45 ℃0 hr	2.25 ± 0.05[c]
Sous vide 45 ℃2 hr	2.70 ± 0.16[b]
Sous vide 45 ℃4 hr	2.64 ± 0.46[bc]
Immersion and massage, kept for 12 hr at 4 ℃	2.71 ± 0.09[b]

[a–c] Means within the same column with different letters are significantly different (P<0.05).

Table 2
Effect of different methods applied to marinated pork ham on number of microorganisms (Mean

	tenderness	Overall liking
Sous vide 45 ℃0 hr	4.37 ± 0.81[c]	4.67 ± 0.71[d]
Sous vide 45 ℃2 hr	5.2 ± 0.89[b]	5.03 ± 0.32[c]
Sous vide 45 ℃4 hr	6.03 ± 0.72[a]	6.5 ± 0.51[a]
Immersion and massage, kept for 12 hr at 4 ℃	5.67 ± 0.71[a]	5.73 ± 0.87[b]

[a–d] Means within the same column with different letters are significantly different (P<0.05).

Table 3
Effect of different methods applied to marinated pork ham on number of sensory eveluation

Notes