Study of Soy Protein Isolate, Mustard and Gluten Used as Fat Replacers in Pork Meat Balls

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Introduction

Pork meat balls are a popular emulsifying meat product in Taiwan. This meat product contained above 25% lard to make it taste juci and elasity. The Amercian Heart Assocation, the Surgeon General and other health organization have called for a reduction in total dietary f 30% of calories for most people (AHA, 1986; DHHS, 1988). The healthy concern was gradually accepted by the people in Taiwan with inc increasing and eduation level promption. The low -fat meat products also were required by the consumers. Therefore, it is important to loo a adquated fat-replacer which can be used in pork meat balls and be accepted. The purpose of this study was to investigate the effect o protein isolate (PSI), mustard or gluten rehydrated with 15%water to repace 15% lard (based on meat) on the quality of pork meat balls

Materials and Methods

The pork ham and lard were used as raw material in this experiment. Pork meat balls were produced by Liu's method (1992). Four pe of soy protein isolate (PSI), mustard or gluten rehydrated with 15% water, individually used to replace 15% lard (based on meat) in pork m balls (the control -containing 25% lard). The chemical composition (moisture, crude protein, crude fat and ash) of pork meat ball w analysesed with AOAC's method (1984). The rheological properties (hardness, elasity and chewiness) of the samples were performed Liu's report(1992). The color (L a b value) of the samples were determined by colormeter (NR3000, Nipon , Japan)and panel evaluation w measured in this study.

Results and Discussion

Chemical composition and color

The chemical composition of pork meat balls with different fat replacers was showed in Table1. The control sample had the lo moisture (45.50%) among all treatments (45.50-62.39%). The fat content of the samples with PSI, mustard and gluten significantly decrea from 29.63% to 13.31-14.27% but the crude protein increased from 16.15% to 18.85-22.83%. The L-value of all samples was not signific different but the higher a-values were observed in the samples with mustard or gluten (table 2). However, The sample added mustard ha highest b-value among all samples.

Rheological properties

The hardness of the samples with PSI, mustard or gluten had remarkably lower value than the control and no significant differences w found mang all treatments except the control (table3) No differences were obtained in elasticity and chewiness among the control, the samp with PSI, mustard or gluten (table 3).

Panel score

In panel evaluation, the control had noticeably higher panel scores (flavor, elasticity, color , juiciness and total acceptance) than those the samples with PSI, mustard or gluten (table 4). Pork meat balls with mustard or gluten had a bad effect on the flavor or elasticity of p samples, separately. However, all samples were accepted by all the panelists in this experiment.

Conclusion

In this experiment, musdard or gluten was not a suitable fat replacer in pork meat balls because they had a bad effect on the flavor elasticity. Four percentage ISP with 15% water (based on meat) may be as a suitable fat replacer in pork meat balls when compared to o others treatments.

References

AHA. 1986. Dietary guidelines for healthy adult Amercians. Am. Heart Assn. Circulation 74:1465A

Table 1 The hardness, elastity and chewiness of pork meat balls with varoius fat replacers from protein sources

	Hardness (g)	Elastity	Chewiness(g)
Control	152.00 ± 9.67[a]	0.97 ± 0.03	74.80 ± 14.01
ISP	124.20 ± 7.98[b]	1.04 ± 0.07	75.34 ± 7.72
Mustard	114.80 ± 6.30[b]	1.08 ± 0.04	84.56 ± 8.50
Gulten	123.75 ± 9.98[b]	0.97 ± 0.09	74.50 ± 18.90

[a,b] Means within the same column with different superscripts are significantly different ($P<0.05$).

Table 2 The L a b hunder value of pork meat balls with varoius fat replacers from protein sources

	L	a	b
Control	74.08 ± 1.22	5.84 ± 0.71[b]	15.13 ± 0.39[b]
ISP	73.72 ± 1.05	5.16 ± 0.47[b]	16.01 ± 0.41[b]
Mustard	74.94 ± 1.10	6.43 ± 0.34[a]	17.81 ± 0.42[a]
Gulten	75.09 ± 0.33	6.46 ± 0.68[a]	15.27 ± 0.37[b]

[a,b] Means within the same column with different superscripts are significantly different ($P<0.05$).

Table 3 Chemical contents of pork meat balls with varoius fat replacers from protein sources

	Moisture	Crude protein	Crude fat	Ash
Control	45.53 ± 0.71[c]	16.15 ± 0.05[d]	29.63 ± 0.39[a]	2.38 ± 0.53
ISP	62.27 ± 0.07[a]	20.98 ± 0.32[b]	13.31 ± 0.15[c]	2.36 ± 0.32
Mustard	62.39 ± 0.06[a]	18.85 ± 0.22[c]	14.27 ± 0.40[b]	2.08 ± 0.01
Gulten	58.49 ± 0.11[b]	22.83 ± 0.58[a]	13.84 ± 0.25[b]	2.09 ± 0.03

[a, b, c, d] Means within the same column with different superscripts are significantly different ($P<0.05$).

Table 4 Panel score of pork meat balls with various fat replacers from protein sources

	Control	ISP	Mustard	Gulten
Flavor	6.25 ± 0.50[a]	4.25 ± 0.96[b]	3.75 ± 0.50[b]	4.25 ± 0.50[b]
Elasity	5.75 ± 0.96[a]	4.50 ± 0.58[a]	5.00 ± 0.82[a]	3.25 ± 0.50[b]
Color	5.75 ± 0.96[a]	5.00 ± 0.50[ab]	4.25 ± 0.50[b]	4.75 ± 0.95[ab]
Juicness	5.75 ± 0.50[a]	4.75 ± 0.50[b]	4.25 ± 0.50[b]	4.25 ± 0.50[b]
Total accept.	6.00 ± 0.00[a]	4.25 ± 0.50[b]	4.25 ± 0.50[b]	4.25 ± 0.50[b]

[a, b] Means within the same row with different superscripts are significantly different ($P<0.05$).