STUDIES ON THE PROCESSING TECHNOLOGY OF GOOSE HAM SAUSAGE

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Background.

With the development of economy and improvement of the people's living standard in the nation, the tremendous changes of food structures of Chinese have taken place since 1990's. The food structures have being developed toward rational food structures of the inhabitants. But pork and pork products hold a dominant position in China. There is lack of variety in meat processing, which hinders the development of consuming interesting for people. Goose is a kind of large waterfowl, whose economical value is very high, not only because of its meat but also its down and feather. Raising goose is always a traditional household sideline production in rural in jingxi province. The project of "Goose and Duck Engineering" is being put into effect in the province. Breed good strains farm was established for "Lianhua white goose" 3 years ago in Lianhua County. Goose breeding has been reached approximately 100 million in this district. The situation mentioned above requires a large-scale carcass processing for goose. In order to promote economic prosperity and increase the variety of colors and designs for meat products, we group have prepared a mixed additive for goose ham sausage. Comparing of different meat, including pork, beef, mutton, chicken, duck, and goose, the length of sarcomere is short, and the diameter of myofibril is thin. When the meat is put into boiling water, it has little shrinking and gets a high cooking yield. So, goose has tender meat, good water holding capacity. Unfortunately, having the smell of soil (unpleasant smell) is a shortage for processing high quality meat products.

Objective.

To prepare a new type of goose ham sausage and evaluate the effect of self-made mixed additives on the quality of the products.

Method.

Material: goose, pork, fat, mixed additives, PVDC casings, spices, isolated Soya bean protein (ISP), carrageenan, polyphosphate (PP), etc.

Using partially and all goose to replace pork in meat ham sausage. Quality control indexes are sensory evaluation, texture characteristics, nutrition, microbial, and cooking yield. Ingredient is as follows: pork, 65%; wine, 2.5%; fat, 25%; sugar, 2%; starch, 10%; sodium glutamate, 0.1%; salt, 2.8%; mixed powder, 1.5%; spices, 0.3%. I group: pork, II group: 50% of pork and goose respectively, III group: goose. Processing procedure is trimming, curing (0-4□,24h), comminuting, chopping (<10□,5min), stuffing, steam cooking (121,30min), cooling, packaging. Chopping method is 1min on low-grade, 2min on high-grade after adding additives, 2min on high-grade for other materials.

FR-801 texture apparatus determines texture parameters, including shear force, viscosity, elasticity and elasticity rate, elastic deformation, and the other indexes are determined by conventional methods. Simulated test: adding self-made mixed powder in comminute which made from 50% of pork and goose in order to evaluate its physical properties.

Results and discussions.

Using 50% and 100% goose to replace pork in ham sausage formulations can improved the cooking yield by 1.7% and 3.8%, respectively. The sausage produced by the given ingredients and the selected method has a good flavor, massiness, elasticity, satiation, and no break and drip (Table 1). The total acceptability is over 90%. The more the value of shear force is small, the more the products are tender. Elastic deformation, which reflects the deformation of the ham sausage when suffered applied force, is decisive factor for elasticity. The ham sausages which use goose to replace pork in the ingredients has a good tender, and this is in accordance with the high water holding capacity and the short diameter of myofibril. Elastic deformation of group III is large, that illustrate the product has good elasticity. The value of viscosity is decrease in the same group; that is to say, the product has also a good total acceptability (Table 2). In general, nutritional indexes in goose ham sausage have no significance difference to the control, but 7.4% and 22% improves the essential amino acid, respectively (Table 3, Table 4). Especially the LYS in-group III is improved by 53.8%. The microbial indexes are all in keeping with the national hygiene standard. The results of physical properties of self-made mixed powder showed that it has good water holding capacity, oil absorbing and keeping capacity. It could also lower water activity and improve texture in meat products (Table 5).

Conclusions.

It could improve the cooking yield and lysine content by 3.8% and 53.8%, respectively Using 100% goose to replace pork in traditional meat ham sausage formulations to produce goose ham sausage products. The ham sausage features good flavor, appearance, and color, rich in nutrients and lower production cost. It is of great significance to "Goose-Duck Project" in the province. It is suited to the public consuming, and to meet the demand for poultry protein intake.

Table 1 Sensory evaluation of goose ham sausage

Index	I	II	III
Appearance	Elasticity, satiation, no break and drip.	Elasticity, satiation, no break and drip.	Elasticity, satiation, no break and drip.
Color	Pink section, uniform	Carmine section	Carmine section
Slice	Shaped, massiness	Shaped, massiness	Shaped, massiness
Flavor	No residue, aromatic	No residue, aromatic,	No residue, aromatic

	No unpleasant flavor	No unpleasant flavor	No unpleasant flavor

Table 2 Texture parameters of goose ham sausage

	Tender (g)	Viscosity (p)	Elasticity (%)	Elastic time (s)	Elastic deformation
I	98	62959	30.35	1.18	4.68
II	90	53735	35.0	1.16	4.96
III	78	49702	36.46	1.1	5.08

Table 3 the content of amino acid in goose ham sausage (%)

	I	II	III
Asp	1.03	1.01	0.98
Thr	0.47	0.44	0.41
Ser	0.50	0.33	0.26
Glu	1.89	1.34	1.06
Gly	0.56	0.32	0.15
Ala	0.70	0.49	0.34
Cys	0.24	0.32	0.36
Val	0.51	0.53	0.58
Met	0.06	0.06	0.05
Ile	0.50	0.42	0.31
Leu	0.90	1.09	1.32
Tyr	0.40	0.31	0.19
Phe	0.49	0.53	0.64
Lys	0.84	0.98	1.29
His	0.30	0.23	0.19
Arg	0.69	0.63	0.61
Pro	0.44	0.43	0.37

Table 4 Nutrition index in goose ham sausage (%)

	Moisture	Protein	Fat	Sugar	Total Aa
I	56.2	16.2	14.2	9.8	10.51
II	57.3	15.8	14.6	9.72	9.46
III	58.1	15.3	14.9	9.68	9.17

Table 5 Physical properties of mixed powder in simulated test *

	Water holding capacity	Oil absorbing (mL)		Water activity depressing	Viscosity (CP)		
	4□,24h	Room temperature	85□ water-bath	4□,24h	40□water-bath	60□ water-bath	80□water-bath
Mixed powder	97.2±1.3	2.85±0.76	2.92±0.68	0.0052	42.5±0.5	45.2±0.7	51.0±2.1
Commercial Powder	94.0±1.3	4.68±0.93	5.12±1.03	0.0016	22.7±0.9	26.4±1.2	29.8±0.3

* Results are expressed as the mean±standard deviation (SD) for triplicate determinations .