

STUDIES ON THE PROCESSING TECHNOLOGY AND QUALITY CONTROL FOR NANAN PRESSED SALTED DUCK1, Chen Cai-shui 2, Gao Yin-yu 3, Chen Chin

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Background.

Nanan pressed salted duck is one of the famous poultry products in China, it also has been known abroad (traditional export commodities). But it can only be preserved from decay for about 15 days in August, September and October. In recent years, with the yield is increasing and the quality decreasing, the yield rate of first grade has only approximately 30% of total output. So, its exporting yield is lower than before. Processing technique of this product was systematically summarized and the factors for its quality control was exploited in order to overcome its shortcoming, prolong the preservation, expand the export, and to improve its quality compete in the market.

Objective.

To evaluate the effects of processes and packaging on the quality, preservation period of Nanana pressed salted duck.

Method.

Nanan pressed salted duck was processed according to promoted method, the emphasis on the key processing parameters were accurately evaluated. The method of sealing the duck with FOA (Free Oxygen Absorbent) in a plastic bag was used to prolong its preservation, and after the dealing with microwave energy, its shelf life and quality was tested by sensory evaluation, physi-chemical properties and microbial index.

Results and discussions.**1. Duck selecting and fattening**

Nanan pressed salted ducks are processed from the Da-yu sheldrake, Which have been bred through the crossing of Deng Fuang female ducks of Nanxiong, Guangdong, with the local gunny drakes since the year 1930. This breed is high quality for meat and eggs. The shapes of the ducks are middle, the head is slightly big in size, the mouth blue, the skin white, the feet blue with some yellow. The ducks are strong in adaptability, grow fast, high in product tender meat, thin skin and small pore in the skin, it is easy to process the pressed salted duck. A 90-100 days breeding, weight 1.25-1.75kg Da-yu sheldrake is selected. Classifying them by their sex. The period of fattening is generally 28-30 days. The fattening ends when the new feathers in the head of the duck grow up again. Generally, the weight of the duck can increase about 0.25kg during the fattening, and it consumes 4-5kg rice. After fattening, the processed salted duck has white skin and fat, tender meat and fusion point of the fat is increased.

2. Slaughtering

The gross duck must be stopped from feeding 12-16h before slaughtering but drink enough water. It should be stopped from drinking water 2h before slaughtering to prevent pollution. Stopping feeding can make the food in the gastrointestinal of the duck digested clean and prevent it from polluting the duck. Drinking water can retain the normal physiological function of the duck. Part of the protein in the duck is catabolised into amino acid, and the meat becomes tender and fresh after stopping feeding.

The duck is killed in the neck or in the first cervical vertebra connection with the headbone. The dead duck, which has not lost the quantity of heat, is put into the boiling water at once; otherwise it is very difficult to pull out the duck feathers after the duck becomes cold and the pores contract. The temperature of the water for artificial scalding feather is about 60-70°C and the time for scalding is 1.5-2min.

The following procedure is to cut outer five pieces. Outer five pieces include the two wings, two legs and lower jaw with tongue. The edge of the knife must be pointed to the bone seam, which can protect the bones and muscles from harm and affection the appearance of beauty.

After opening the thoracic abdominal cavity, the muscles of the big side have the appearance of a longitudinal ditch, the section of the breastbone appears upon a shape like a sickle. The small side has the appearance of a white edge. The trachea is pulled apart at the joint of the lung, then the heart and the liver are pulled out. The faeces in the rectum are pushed through to the anus. The rectum is pulled apart to near the anus about 3cm, and then the viscera are pulled out. Finally the lung is cut off.

First the testis, the ovary and the remaining viscera are cut off and put on the operating table. The knife is put on the right ribs. The front edge of the knife is close to the thoracic vertebrae. The operator beats on the back of the knife and ribs will be cut off. The other side ribs are cut off the same way. While the ribs are being cut the last two ribs remain in the female duck, but the ribs are all cut off in the drake to make the shape circular. Finally, the remaining rectum, the reproductive organs and the anus are cut off. However the anus is only cut one third to make it shaped like a new moon. This is also a characteristic of the Nanana pressed salted duck.

3. Processing

Salting is the key process to the quality of Nanana pressed salted duck. The tiny white salt is put into an iron pot and fried over a strong fire until it does not give off any water vapor. The salt must be used after it gets cold. If it has not been used up at the present day. It must be fried again the next day. In general, salting is going on in a vat. The quantity of salt is 150-200g for the early stage duck, and the later duck 125g. The time of salting is usually 8-12h. In warm weather, it is shorter, and longer in cold weather. The salt cannot penetrate the inner muscles when the time of salting is too short, and the duck will spoil easily. Generally, the thigh, the big side and the tail muscles are thick, so they should be salted 5-10 times more. When salted, the skin should not be broken.

The ducks are taken out from the vat when the time of salting is ended. First the ducks are required to wash in the mild water (about 40°C) to get rid of the crystal salt which has not dissolved, then the duck is put in mild water and washed 3 times, the ducks can be shaped on the board. When the skin is slightly dry, the shape has been fixed. Then the fermented procedure must by coming.

The duck was exposed in the night and shone in the day for 5-7 days, the muscles of the small side appear in rose red color and five to seven hard cervical vertebrae can be seen clearly through the skin. It indicates that the duck has been dried, or it can be stored and packed for further fermented to get a good flavor.

4. Packaging

In general, 80% ducks in the control group was spoiled within 15 days, the spoilage efficiency was increased as the experiment time prolonged and reached 100% within 30 days. The microwave and the oxygen scavenger had an effect on the mould. There were significant differences between control and treatment group in physicochemistry indexes (Table 1). The treatment by microwave and the oxygen scavenger could maintain the initial weight of the pressed salted ducks. However, the moisture in untreated ducks was reduced by 20.2%, which resulted in economic loss because of the loss of duck weight.

The bacterium counts in treated ducks after preservation for 100 days were twice or four times as those at the beginning with microwave and the oxygen scavenger, respectively. While the bacteria counts in control ducks preserved for 100 days were 100 or 1000 times as initially with microwave and the oxygen scavenger, respectively (Table 2). The result indicated that the microwave could inhibit and kill the bacteria effectively. The amino acid losses only 2.5% and 3.4% after storing 90 days in the pressed salted ducks with microwave and oxygen scavenger, respectively. The nutrient basic content had not been changed.

Conclusions.

The processing season of the early Nanan pressed salted duck is in the seasons of high temperature, so it is easy to get mould and fat oxidative rancidity. Some measurements must be taken to prevent the ducks from becoming mould.

The Nanan pressed salted duck, packaging in a plastic bag with the oxygen scavenger in or treated by 2450MHz microwave for 60s, could completely be preserved well. The ducks maintained the originally good qualities in color, flavor, odor, shape, and nutrition content after storing 90 days. In the major physicochemical indexes, they corresponded to the National Food Hygiene Standard and there were marked differences between control and treatment group. Killing bacteria with microwave had the advantages for preservation of ducks, including the high efficiency of heat transformation, well-distributed heat to ducks, quick killing bacteria, safety, no residual and pollution, easy automation. Oxygen scavenger can change the air content in the sealed bag. It is beneficial to inhibit the mould and aerobic bacteria growing and reproducing and to prevent fat oxidation. The oxygen scavenger used for preservation in the pressed salted ducks was also safe, non-residual and pollution-free, so this new technology of food preservation has broad prospects in the future.

Table 1 physicochemical indexes of Nanan pressed salted duck storage test

	Microwave				Oxygen scavenger				Control			
	15d	30d	60d	100d	15d	30d	60d	100d	15d	30d	60d	100d
Moisture content (%)	38.9	38.8	41.34	42.8	38.9	40.58	41.14	41.85	38.8	38.94	35.33	30.97
TVB-N (mg/100g)	3.23	3.61	3.85	7.43	3.97	4.43	5.02	9.74	6.31	9.27	15.19	22.67
Peroxide value (%)	0.16	0.16	0.21	0.27	0.16	0.18	0.21	0.24	0.17	0.35	0.39	0.43
Acid value (mg/g)	0.68	0.81	0.97	1.19	0.71	0.76	0.89	1.21	0.92	1.93	2.37	3.73

Table 2 microbial indexes of Nanan pressed salted duck storage test

	Initial	Microwave	Oxygen scavenger	Control
		100d	100d	100d
Bacteria counts (CFU/mL)	8.0×10^3	1.7×10^4	3.6×10^4	8.2×10^6
Bacillus. Coli. Counts (num./g)	<30	<30	<30	<30
Pathogenic bacteria	No	No	No	No