

# PRESERVATION OF THE NAN-AN PRESSED SALTED DUCKS

ZHOU YONGCHANG and XIAO DALIAO  
Jiangxi Agricultural University,  
Nanchang, China

## INTRODUCTION

The Nan-an pressed salted duck comes from Dayu county, Jiangxi Province, China, so it is called Nan-an pressed salted duck. It has been made for more than one hundred years. Nan-an pressed Big Gunny ducks are processed from high quality meat and eggs. The shapes of the ducks are middle-sized. The ducks grow fast, reproduce at a high rate and have tender meat, a thin skin and small pores in the skin; also they are easily processed into the pressed salted ducks. The processing technology of the Nan-an pressed salted ducks mainly includes the selecting of the ducks, fattening, slaughtering, plucking, cutting the outer five pieces, opening it chest and cutting off the internal organs, salting, exposing in sun light and so on. According to the difference of the processing season, they can be divided into three groups; the early pressed salted ducks (the middle ten days of Sept. to the last days of Oct.), the middle pressed salted ducks (the first ten days of November to the first ten days of December), and the later pressed salted ducks (the middle ten days of December to the middle ten days of January the next year). The Nan-an pressed salted ducks have many characteristics such as beautiful shape, moderate salt taste, delicious cured meat and rich nutrition, etc., and are deeply welcomed by consumers at home and abroad. From August to October, the early stage of pressed salted ducks, which were produced under a higher temperature and with high moisture, had a shorter shelflife, especially, the pressed salted ducks' semifinished

product (after killing, without other pressing) easily produced spoilage during bad weather. Thus it was very limited for export. This problem restricted development and affected production enthusiasm. Studying the Nan-an pressed salted ducks' preservation technically was a scientific research subject which had obvious economic social benefit, of great significance in accelerating the raising of poultry and its processing development in order to meet the needs of the markets at home and abroad and to increase export foreign exchange.

Food chemical preservatives are widely used, especially in fruit-vegetable, canned and meat products. But it has not been reported that food chemical preservatives are used in the pressed salted duck at present. The present study reports the effect of the chemical preservatives on the pressed salted ducks in

our experiment.

## MATERIALS AND METHODS

60 second grade Nan-an pressed salted ducks, fresh semifinished products, were selected from a random sampling with the traditional method in the Long-Hui pressed salted duck factory in October, 1988. They were divided into three groups: two treatment groups and one control group. Sodium benzoate (0.5%) and propionic acid calcium (0.3%) were used respectively in the two treatment groups. The pressed salted ducks were put into the solution for one minute, then put on the shelf in a shed for exposure in the day light. The control group was treated in the solution without preservatives in the same way as the treatment groups. Each group was observed and the results recorded in the sense index everyday. The test method of the microbial index was from the food analysis and methodology.

The physicochemical determination:

1) TVB-N: It was an index of protein disposition in muscle and was measured by the Kjeldahl method of Nitrogen determination and expressed by mg/100g.

2) Acid value: The quality of free fatty acid separating from oil fat was represented by KOH mg.

#### RESULTS

1. Sense determination .The test began on Oct. 5th, 1988, and ended on Oct. 15th. The sense determination result is in table one. Table 1: sense determination in pressed salted ducks storage test

| group*       | S.B. | P.A.C | Con. |
|--------------|------|-------|------|
| col.w.       | 40%  | 30%   | 10%  |
| col.y.       | 60%  | 70%   | 90%  |
| favor taste  | 100% | 0     | 10%  |
| sour taste   | 0    | 100%  | 0    |
| mouldy taste | 0    | 0     | 90%  |

|                   |      |      |     |
|-------------------|------|------|-----|
| light spoilage    | 0    | 0    | 40% |
| medium spoilage   | 0    | 0    | 60% |
| normal efficiency | 100% | 100% | 0   |

\*: S.B. sodium benzoate  
P.A.C.-propionic acid calcium  
con.-control  
col. w.-colour white  
col.y.-colour yellow

2. The results of the microbial index are shown in table 2.

Table 2 Results of the Nan-an pressed salted ducks' microbial assessment in the storage test

| group                  | bacteria counts (num/g) |
|------------------------|-------------------------|
| sodium benzoate        | $3.5 \times 10^3$       |
| propionic acid calcium | $6.38 \times 10^5$      |
| control                | $7.52 \times 10^6$      |

3. The chemical determination. The results of the chemical termination are shown in the following table 3.

Table 3. Chemical index of the pressed salted duck storage test

| group                  | TVB-N % | Acid Value% |
|------------------------|---------|-------------|
| sodium benzoate        | 14.8    | 2.305       |
| propionic acid calcium | 15.4    | 3.09        |
| control                | 20.5    | 4.16        |

Table 4 Results of the sense determination in the pressed salted ducks storage test on Sept. 1987.

| group               | color              | odour | spoil. | normal |
|---------------------|--------------------|-------|--------|--------|
| sodium ben.         | normal             | fav.  | 0      | 100%   |
| prop. acid          | nor.               | fav.  | 0      | 100%   |
| calcium sorbic acid | with white crystal | sour  | 13.3%  | 86.7%  |

|              |              |       |       |       |
|--------------|--------------|-------|-------|-------|
| P.G.         | blue-black   | fav.  | 6.6%  | 93.4% |
| contr. black | mouldy taste | 86.6% | 13.4% |       |

ANALYSIS AND DISCUSSION  
1. The early pressed salted ducks commonly have a shorter shelf life, generally being preserved about 15 days only. The semi-finished products, which do not shine easily, ve shining and exposing, sudden spoil, when the weather humidity gets bad (rainy or high humidity). Then they lose the value of processing and usefulness as food. The pressed salted ducks can be prevented from spoiling, when they are treated with chemical preservatives and exposed under sunshine. This result has been proved.

2. A similar test in our laboratory had been studied on Sept. 1987. The sodium benzoate, sorbic acid, propionic acid calcium and P.G. were used in that experiment. In the results it was found that the sodium benzoate

and propionic acid calcium can prevent the pressed salted ducks from spoiling (see table 4). This test was based on the last test, and the efficiency of the sodium benzoate and propionic acid calcium was further studied. It can be seen from the result that the normal efficiency of the two preservatives is also 100%,

but the pressed salted ducks treated by propionic acid calcium have a slightly sour taste. The pressed salted duck was a kind of food which was very easily spoiled, that was caused by microorganisms which grow and reproduce under the high temperature and high humidity during the processing of the pressed salted ducks. For example, the slight spoilage after 3 days in the test in the control group could be smelled (table 1). The colour of the duck became grey-green colour. The swelling in some pressed salted ducks can be found later and the mouldy point in the control group sometimes can be seen. But in the sodium benzoate group, the colour in the duck was white or slightly yellow and it had its original odour, and the spoilage and mouldy change were not found in the group. In the propionic acid calcium group, there was only a slightly sour taste, but other indexes were normal phenomena. From table 2, it can be seen that the bacteria counts in the control group were higher than those of the other two groups, they were ten times as much as those in the propionic acid calcium group and 2000 times as much as those in the sodium benzoate had a stronger effect on inhibiting the bacteria. This was the key of the preservation. The propionic acid calcium also had the function of inhibiting bacteria, but it was not stronger than the sodium benzoate. From table 3, it can be found that the TVB-N and acid value

in the control group was higher than that in other two groups. According to the Country Food Hygiene Standard: TVB-N  $\leq 15\text{mg}/100\text{g}$  Acid Value  $\leq 3\text{mg}/\text{g}(\text{koH})$ . The TVB-N and the acid value in the sodium benzoate group in the test were lower than those in the standard, and those in the propionic acid calcium group were similar to those in the standard, but those in the control group were higher than those in the standard. We know that the TVB-N stands for the degree of protein dissolving and the acid value represents the quality of free fatty acid separating from oil fat. So it was discovered that sodium benzoate can prevent the pressed salted duck from spoilage.

6. It also was found that the propionic acid calcium had a preservation effect on the pressed salted duck, but it had a slightly sour taste, this may be the result of propionic acid calcium breaking up into propionic acid. So it is necessary to study this method further to eliminate the sour taste but still get the effect of preservation.

7. The dosage of the preservatives in this test was in the permissible dosage legislation of Chinese Food Hygienic Standards. So it was safe and available. According to the measurements, the residue of sodium benzoate was low (0.14PPM).

It was known from the test that the spoilage of pressed salted duck could be inhibited by sodium benzoate, and the original characteristics kept. The result indicated that the preservatives could prolong the processing time of the pressed salted duck, on the other hand, it also could protect the semifinished products from the effects of bad weather, such as high temperature and high humidity. Using sodium benzoate reached the goal of increasing the processing quality and quantity of the pressed salted ducks, so it has an important use in the proce-

ing of pressed salted duck treated with preservative. It was one of the most important measures to prolong the processing time and to increase profit in the factories.

#### REFERENCES

1. R.B. Tompkin, Effect of Potassium Sorbate on Salmonella, Staphylococcus Aureus, Clostridium Parvum and Clostridium Botulinum in Cooked, Uncured Sausage, 1974 28(2) Applied Microbiology
2. Zhou Yongchang, Nan-an Pressed ducks' pressing technology, Journal of Jiangxi Animal Husbandry and Veterinary, 1987, 2: 14-23 (Chinese)
3. Wei Pouda, Preservative Effect of Sorbate Acid on the Meat Products. Meat Research, 1988, 3(1): 16-20.