

RESEARCH ON YOUNG CHICKEN SERIAL PRODUCTS AND THE PRODUCTS' STORAGE PERIOD

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SUMMARY: Young chicken are chicken before sex maturity. After identification of male chicken from females on egg farm, the males are fed for 45 to 50 days, using chinese traditional fine cooking technique of chicken and scientific formulae, we have produced three new kind of chicken products successfully. According to our research results, they belong to very easy spoilage products, need to be stored in freezing condition to prolong the shelf life to two weeks. Our research has found a new way for the egg farm to make use of its culled male chicken, and supplied consumers with various chicken products.

INTRODUCTION: More than 320,000 adult hens are fed on Taiyuan egg farm every year, meanwhile, the same number of male chicken will be dealt with. If the layer species is fed as meat species, it is not economical. If some male chicken are sold to chicken dealers, they may sell the male chicken as females to cheat chicken feeders, this will be harmful to the farm's reputation, furthermore, 90% male chicken are made into meatmeal for pigs. In order to make full use of cull male chicken, exploit protein resources and supply consumers with various chicken products, We have conducted systematic research on processing young chicken products and their storage life.

MATERIALS AND METHODS: The young chicken products are made of male chicken on egg farm after sex identification. After being fed for 45 days, the young chicken can weigh 0.4-0.5kg. After slaughtering, cleaning and plastic operation, we add various valuable spices into the chicken. Considering the thinner skin, tender texture of the chicken and the flavour requirement of various products, We produce the products according to following technological process based on traditional Chinese cooking technique of chicken:

Qualified male young chicken---slaughtering---scalding---feather removal---semi-finished products
Pre-cooked---Air-drying---Coated with spice---Frying---Crisp fried chicken
Curing---Scald washing---Colouring---Roasting---Glazing---Roasted chicken
Curing---Plastic operation---Air-drying---Colouring---Frying Stewing---Taking out---
Plastic operation---Glazing---Stewed chicken
Vaccum-packed in plastic bags---Checking---For sale

After the final products are vaccum-packed in composite plastic bags (680mmHg column), they are stored at the room temperature of 16 °C-20 °C and 0 °C-5 °C in freezing tank respectively to conduct the experiment on storage life. The dynamics of the total bacteria count was monitored by agar plate method; aw value is measured by the method of coordinate internal insertion; PH value is measured with Model PH51 8012-01. We decide the storage period and condition according to aw, PH and dynamics of total bacteria count.

The analysed items include the content of water, protein, fat, ash and amino acid which are appraised generally.

10 persons attended the sense appraising, according to 5 points system, the items include appearance, colour, flavour and taste, the higher the total points are, the more the product is welcome.

We generally analysed the economic effect through calculating product yield, cost, selling price and social effect.

RESULTS: each chicken product has its characteristic: Crisp fried chicken have fine appearance, white-

yellowish colour,glittering,with outside roasted and inside tender,taste well;Stewed chicken have perfect appearance, red-yellowish colour, and taste tender flavour, suitable for the old and children; Roasted chicken contain their heads in their chests, have reddish colour, crisp skin and sweet meat,and taste delicious. Table 1 shows the sense appraising results.

Table 1-Young chicken serial products sense appraising results

Item kind	Colour	Appearance	Taste	Flavour	Total Points
Crisp fried chicken	4.88	4.78	4.9	4.88	19.44
Stewed chicken	4.66	4.66	4.78	4.77	18.87
Roasted chicken	4.46	4.63	4.70	4.60	18.39

Note: Total points for each item is 5, for four items are 20.
 From table 1, we know that every product has satisfied its quality requirement of colour, flavour, taste and appearance.Among them ,crisp fried chicken is most welcome, their total points is the highest, each item comes first on the list. Stewed chicken and roasted chicken are the second. The three products' measurement results of aw value and PH value are:after vaccum package and storage at the room temperature of 16℃-20℃ for 72 hours, all aw values are > 0.99; storage for 140 hours, stewed chicken PH is 6.31, crisp fried chicken PH 6.25,roasted chicken PH 5.91, all PH are > 5.2,aw values are > 0.95, According to Rodel (1975) classification, these products are "very easy spoilage" foods. After vaccum package and storage from 0℃-5℃, their shelf life prolonged to two weeks, the dynamics of microbe in figure 1 and figure 2 prove this conclusion.

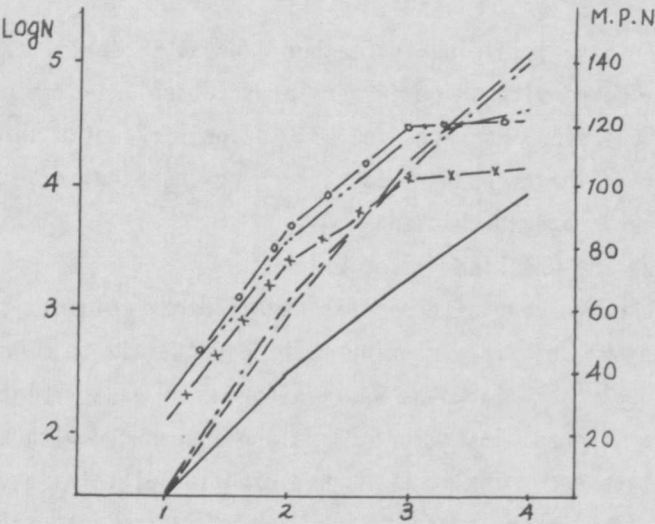


Figure 1 : curve diagram of dynamics of bacteria count and colon bacillus group at the temperature of 20℃.

The legend for figure 1 and 2 (16℃-20℃)

Bacteria	Colon bacillus group
———— Roasted chicken	—* —* — Roasted chicken
- - - Crisp fried chicken	- - - Crisp fried chicken
- . . Stewed chicken	- ° - ° - Stewed chicken

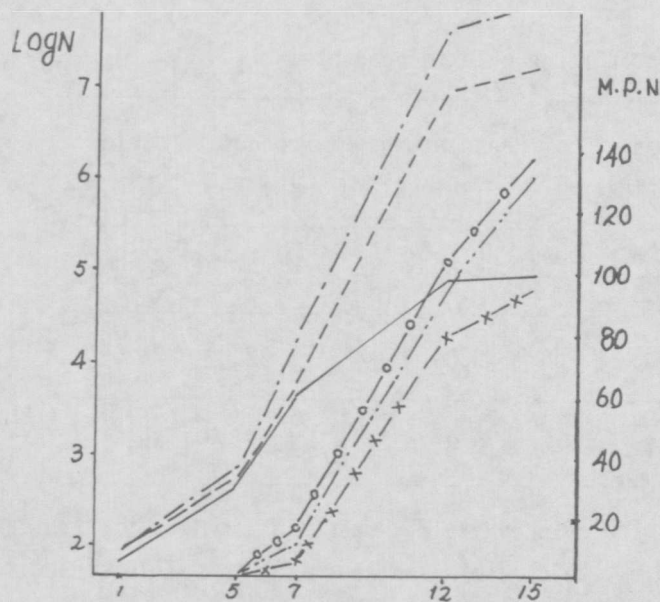


Figure 2 ---Curve diagram of dynamics of bacteria count and colon bacillus group at the temperature of 0°C-5°C.

Table 2 show the results of nutrient element analysis.

Table 2 --- Roasted chicken nutrient element analysis

item	Water	Ash %	Fat %	Protein %	Thr mg/100g	Val mg/100g	Met mg/100g
content	66.85	1.79	7.82	25.5	1113.65	1168.48	755.73

Item	Ile mg/100g	Leu mg/100g	PHe mg/100g	lys mg/100g	Trp mg/100g
content	1148.45	2091.71	695.91	136.90	290.02

Note: Analysed by the Check and Measurement Center of Meat Food Quality of China (1990).

The protein content of chicken products is higher than that of other poultry and animal meat product, according to reference, the eight essential animal acids content for human body is higher than that of lean pork, beef and mutton, so young chicken products are considered as nutrient foods. Figure 1 and figure 2 show the dynamics of total bacteria count of the same package, but different storage condition. Vacuum package in polyethylene plastic bags and storage at the room temperature of 20°C for 4 days, the total bacterial count and colon bacillus group in crisp fried chicken are 80,000/g and 139/100g respectively; those in stewed chicken is 70,000/g and 140/100g respectively; those in roasted chicken 50,000/g and 98/100g respectively, which all have reached or are close to the upper limit of GB 2726-81 standard, this prove that the storage life of very easy spoilage products is only 2-3 days in the condition of room temperature and vacuum package.

From the dynamics analysis of colon bacillus and total bacteria count, we know that if the three products are stored from 0°C-5°C for 15 days, the total bacteria count and colon bacillus group in crisp fried chicken are 72,000/g and 98/100g respectively; those in stewed chicken are 80,000/g and 100/100g respectively, those in roasted chicken are 50,000/g and 99/100g, which have reached or are close to the warning upper limit of GB 2726-81 standard, this means that vacuum package and low temperature storage can prolong the storage life of very easy spoilage meat product, but if the storage time exceeds two weeks,

the products are still unsafe.

Table 3 --- Yield experiment result of young chicken products

Item Name	Number	Carcass weight(kg)	Pretreatment weight(kg)	Product (kg)	Yield %
crisp fried chicken	7	2.72	1.93	2.06	75.7
Roasted chicken	8	2.98	3.06	2.22	74.5
Stewed chicken	8	2.93	3.01	1.92	65.5

From table 3, we know that crisp fried chicken yield is the highest (75.7%), that of roasted chicken is 74.5%, that of stewed chicken is 65.5%, which are all higher than the yield of adult chicken. The reason is that young chicken have thinner skin and tender meat, process time is very short, so cooking loss is small. Another reason is that young chicken do not have fat melting loss.

Taiyuan egg farm has more than 300,000 culled male chicken every year, suppose that all the chicken could be sold at the price of ¥0.15 each (in fact, only a small number of chicken are sold), the egg farm can get ¥45,000. However, if the male chicken are fed for 45-50 days and processed, their average yield is 71.8%, ¥6/500g according to marketing price. the egg farm could get ¥977,000. Except ¥400,000 for cost, the egg farm could get net profit of ¥577,000.

CONCLUSION: According to our research results, the three young chicken products belong to very easy spoiled meat products, need to be stored in freezing condition to prolong the shelf life to two weeks. Our research has found a new way for the egg farm to make use of its culled male chicken, and supplied consumers with various chicken products.

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