

# COMPARATIVE ANALYSIS OF MEAT QUALITY TRAITS OF NEW NATIVE CHICKEN BREED BY PATERNAL AND MATERNAL LINES

Ji-Young Park<sup>1</sup>, Jung-Min Hyun<sup>1</sup>, Samooel Jung<sup>2</sup>, Cheorun Jo<sup>3</sup>, and Ki-Chang Nam<sup>1\*</sup>

<sup>1</sup>Sunchon National University, Suncheon, 57922, South Korea

<sup>2</sup>Chungnam National University, Daejeon, 34134, South Korea

<sup>3</sup>Seoul National University, Seoul, 08826, South Korea

\*Corresponding author email: kichang@scnu.kr

## I. INTRODUCTION

Color-feathered meat type chickens (native chickens) are still attractive to certain consumers preferring a characteristic meaty flavor and texture, despite of their relatively low growth rate [1]. Korean native chickens have been newly developing throughout the “Golden See Project” for more productivity with rapid growth rate [2]. Despite of the breeding target focusing on growth rate, meat quality must be one of the most important traits to be considered. Thus, this study was performed to determine the carcass and meat quality traits of candidate native chicken strains and to provide information on which quality characteristics can be genetically transferred to the next offspring.

## II. MATERIALS AND METHODS

Total 550 male chicks (each 50 birds for a breed line) selected from crossbred 10 lines [2 paternal lines (1 and 2) x 5 maternal lines (A, B, C, D and E)] were fed a commercial diet (3,200 kcal ME/kg, 20% CP) with free access to water and without access to outdoor. After 5 weeks, birds were slaughtered and processed at a chicken slaughtering plant, where carcass weight and partial meat percentage were measured. The chilled carcasses were vacuum-packaged and stored in a freezer at -50C until analysis. After thawed in meat laboratory, physicochemical meat traits such as pH, color values, drip loss, fatty acid composition of the breast and thigh muscles of each carcass were analyzed. The mean values by each breed, paternal, and maternal lines were statistically compared by Student-Newman-Keul multiple test using SAS 9.1.

## III. RESULTS AND DISCUSSION

Table 1 shows a few carcass and meat quality traits of the breast muscles from the 10 lines of selected native chickens, and the carcass weights and breast percentages of the chicken lines were significantly different. However, there was no significant differences between paternal lines 1 and 2. Mostly significant differences of the carcass and meat quality traits were found by maternal lines (A to E). Maternal C line was distinctively heavier than any other maternal lines. Breast percentage was especially higher in maternal E line than the A or the B.

Among 10 crossbred lines, the color a\* values of skinned breast from 1xA were significantly higher than the 2xC. Drip losses (data not shown) were not significantly different by 10 crossbred lines. There were differences of pH values by 10 crossbred lines, and the pH values of maternal D line were significantly lower than the other maternal lines.

Among analyzed fatty acids, the most predominant fatty acid, oleic acid (C18:1), were more detected in 1xE and 1xC lines than other crossbred lines. Oleic acid content was not different by paternal comparisons (between 1 and 2). According to the comparison by maternal lines, the oleic acid of maternal D line was significantly lower than maternal B or E line. Arachidonic acid (C20:4), characteristically detected in native chickens, were highly detected in 1xA, 2xC, 2xD crossbred lines.

Table 1. Major carcass and meat quality traits of native chicken breed lines

Breed line	Carcass weight (g)	Breast percentage (%)	Color a* value	pH	Oleic acid (%)	Arachidonic acid (%)	Chewing no. to swallow
1 x A	582.71 <sup>cd</sup>	17.86 <sup>ab</sup>	7.23 <sup>a</sup>	6.51 <sup>c</sup>	27.89 <sup>cde</sup>	8.61 <sup>a</sup>	29.73 <sup>ab</sup>
1 x B	631.71 <sup>bc</sup>	18.50 <sup>ab</sup>	5.59 <sup>ab</sup>	6.54 <sup>bc</sup>	30.67 <sup>abcd</sup>	6.42 <sup>bc</sup>	32.73 <sup>a</sup>
1 x C	621.33 <sup>bcd</sup>	19.08 <sup>a</sup>	5.72 <sup>ab</sup>	6.63 <sup>a</sup>	31.19 <sup>abc</sup>	6.11 <sup>c</sup>	26.27 <sup>b</sup>
1 x D	624.75 <sup>bcd</sup>	17.86 <sup>ab</sup>	5.11 <sup>ab</sup>	6.58 <sup>bc</sup>	27.60 <sup>cde</sup>	7.96 <sup>ab</sup>	33.80 <sup>a</sup>
1 x E	681.67 <sup>ab</sup>	19.40 <sup>a</sup>	5.64 <sup>ab</sup>	6.60 <sup>bc</sup>	32.56 <sup>a</sup>	5.93 <sup>c</sup>	30.27 <sup>ab</sup>
2 x A	598.67 <sup>cd</sup>	17.97 <sup>ab</sup>	6.09 <sup>ab</sup>	6.61 <sup>abc</sup>	30.55 <sup>abcd</sup>	7.22 <sup>abc</sup>	31.13 <sup>a</sup>
2 x B	545.00 <sup>d</sup>	17.32 <sup>b</sup>	6.37 <sup>ab</sup>	6.58 <sup>bc</sup>	30.40 <sup>abcd</sup>	7.15 <sup>abc</sup>	32.27 <sup>a</sup>
2 x C	711.29 <sup>a</sup>	18.05 <sup>ab</sup>	4.6 <sup>b</sup>	6.64 <sup>a</sup>	27.31 <sup>de</sup>	8.42 <sup>a</sup>	32.60 <sup>a</sup>
2 x D	614.17 <sup>bcd</sup>	18.73 <sup>ab</sup>	6.11 <sup>ab</sup>	6.59 <sup>bc</sup>	26.76 <sup>e</sup>	8.67 <sup>a</sup>	31.73 <sup>ab</sup>
2 x E	623.17 <sup>bcd</sup>	18.89 <sup>ab</sup>	5.32 <sup>ab</sup>	6.64 <sup>a</sup>	28.79 <sup>bcd</sup>	8.11 <sup>ab</sup>	31.47 <sup>ab</sup>
SEM	19.72	0.42	0.47	0.02	0.83	0.43	1.31

<sup>a-e</sup>Figures with different letters within the same row differ significantly ( $p < 0.05$ )

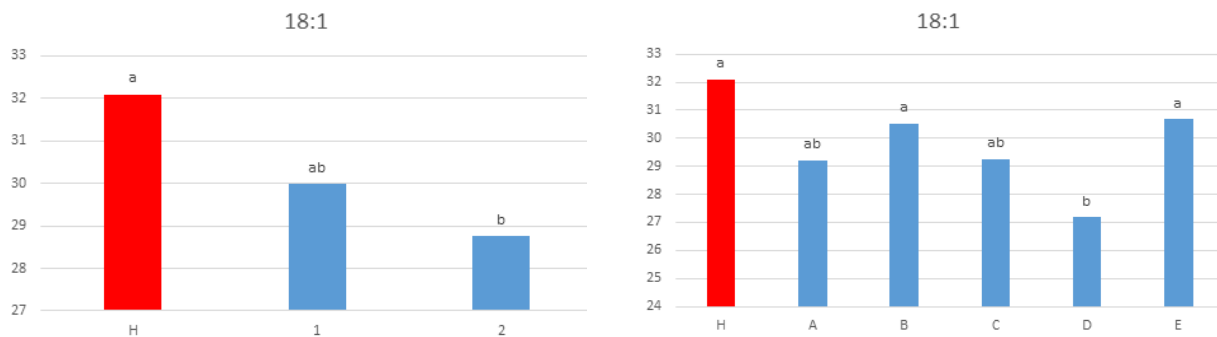


Figure 1. The oleic acid content (%) of native chicken breast meat by paternal (left) and maternal (right) lines

#### IV. CONCLUSION

A few carcass and meat quality characteristics of candidate native chicken lines were different. The meat quality traits of native chicken meats were influenced by mainly maternal lines in the new chicken breeding project. The result will help to crossbreed new chicken lines considering meat quality traits.

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