RESEARCH NOTE

SENSORY CHARACTERISTICS OF ORGANICALLY GROWN CHICKEN UNDER COCONUT-BASED PRODUCTION SYSTEM

Cristy M. Bueno[1], Mary Jean G. Bulatao[2] and Luckylito A. Balon[2]

ABSTRACT

Meat from selected breeds of chicken (Paraokan genetic group of Philippine native chicken; free-range colored and commercial white breeds) grown organically in a coconut-based production system and commercially raised chicken were subjected to sensory evaluation to assess attributes such as flavor, off-flavor, tenderness, juiciness and general acceptability using a 9-point qualitative scale. All sensory parameters evaluated were not significantly different among treatments. However, commercially raised chicken tended to have better flavor and tenderness scores while the free range chicken breed tended to have better score on off-flavor, juiciness and general acceptability compared to other birds. Generally, there is a tendency for both the native and free range chicken grown organically to have better scores on off-flavor and juiciness characteristics and general acceptability scores compared to the other two treatments.

Keywords: chicken, coconut, organic, qualitative scale, sensory characteristics

INTRODUCTION

Organically grown chicken have gained popularity among the Filipino consumers who are now becoming more health conscious in terms of the food they serve on their tables. Aside from containing less harmful substances, organically grown chicken is claimed to have better flavor compared to the commercially grown chicken available in the market. However, not all studies showed significant differences.

The use of native chicken in organic farming is becoming popular in the country due to constant stock availability compared to imported free-range chickens Sasso and Kabir whose supply are not reliable and sustainable (Maghirang *et al*., 2011). Currently, few breeds of commercial free-range colored chicken are locally available whose appearance is somewhat similar to the Philippine native breeds, which have yellow skin, elongated body, narrow breast and bigger thigh and leg ratio in relation to the body, but generally grow faster and with higher meat yield compared to the native breeds. The white commercial broiler has a rounder appearance, white skin, white shanks, well developed breast muscles with smaller thigh and leg muscles ratio to body (Fernando, 2011). The free range colored chicken breeds are more appealing to the consumer compared to the white commercial breeds due to the closeness of its appearance to our native breeds.

[1]Animal and Dairy Sciences Cluster (email: cristy.bueno@yahoo.com) and [2]Agricultural Systems Cluster, College of Agriculture, University of the Philippines Los Banos, College, Laguna, Philippines.

This study aimed to evaluate the sensory characteristics of selected breeds of chicken grown organically under the coconut-based production system in comparison with the commercially raised chicken.

MATERIALS AND METHODS

Three breeds of chicken: native (Paraokan genetic group), commercial free range and commercial broiler, were raised organically under the coconut production system for 90 days. The birds were given organic feeds and raised in range provided with shed with no vaccination or any biologics given during the rearing period. Representative birds from the different breeds were dressed and used in the sensory evaluation. Commercially produced broiler chicken was purchased from the supermarket and used as one of the treatments in the evaluation.

The chicken breasts without added salt or flavorings were wrapped in an aluminum foil and were cooked in an oven set at 163˚C until an internal temperature of 82˚C was reached. The cooked samples were then cut into about 10-15 g and were randomly placed in a pre-coded trays before serving to the experienced panel of evaluators composed of 12 persons. The samples were evaluated for flavor, off-flavor, tenderness, juiciness and general acceptability using a 9-point qualitative scale (Tables 1 and 2) and replicated

Table 1. Qualitative scale for sensory evaluation of chicken by experienced panel members.

Rank	Flavor	Off-Flavor	Tenderness	Juiciness	General acceptability
9	very rich	very strong	very tender	very juicy	very much acceptable
8	rich	strong	tender	juicy	very acceptable
7	moderately rich	moderately strong	moderately tender	moderately juicy	acceptable
6	slightly rich	slightly strong	slightly tender	slightly juicy	moderately acceptable
5	neither rich nor weak	perceptible	neither tender nor tough	neither juicy nor dry	slightly acceptable
4	slightly weak	moderately perceptible	slightly tough	slightly dry	neither acceptable nor unacceptable
3	moderately weak	slightly perceptible	moderately tough	moderately dry	slightly unacceptable
2	weak	very low	tough	dry	moderately unacceptable
1	very weak	none	very tough	very dry	unacceptable

thrice. The data obtained were subjected to analysis of variance using the randomized complete block design and the treatment means were compared using the Tukey Range test.

RESULTS AND DISCUSSION

Table 2. Sensory characteristics of different breeds of chicken raised under the coconut system of production.

Sensory Parameter[ns]	TREATMENTS			
	Native chicken*	Free Range chicken*	Commercial Broiler chicken*	Commercially raised broiler**
Flavor	6.60±1.35	6.90±1.32	6.63±1.13	7.13±1.25
Off-flavor	1.23±0.63	1.23±0.68	1.37±0.93	1.4±1.04
Tenderness	7.23±1.30	7.27±1.26	6.83±1.32	7.47±0.97
Juiciness	6.07±1.80	6.23±1.63	5.43±1.72	5.57±1.81
General acceptability	6.83±1.21	6.97±1.19	6.27±0.94	6.53±1.33

[ns-] not significantly different at P<0.05

*grown organically under coconut production system

**finished broiler chicken bought from the supermarket

The sensory characteristics of the chicken coming from different treatments such as flavor, off-flavor, tenderness, juiciness and general acceptability were not significantly different from each other. The flavor scores of all the samples were between the slightly rich to rich characteristic. Though not significantly different from the rest of the treatments, commercially raised broiler had the highest flavor score which could be attributed to the greater amount of fat underneath the skin. During the roasting process, those fats melted and coated the surface of the lean tissue, thus, contributing to the greater flavor score of the sample, since fat itself is very rich in flavor compounds. Similar to the results of this study, Fernandez *et al*., (2000) noted similar flavor scores between Darag and commercial broiler. Lambio *et al*. (2000) reported that flavor scores of Banaba, Paraokan, Bolinao and Camarines genetic groups of Philippine native chickens were higher compared to the broilers, though the differences found were not significant. Off-flavor scores of all the samples were described as none to very low off-flavor characteristic. Though not significant, commercially raised broiler tended to have higher off-flavor characteristic which can be partly attributed to the different kind of feeds offered to those birds and to the nature of management.

The broiler chicken bought from the supermarket had a tendency to be more tender compared to other treatments. This is due mainly to the age of the animal and

the production systems used during the rearing period. The older the birds, the greater the amount of connective tissue, the tougher the meat is and the greater the amount of exercise, the greater the inter-linking of the connective tissues in the meat system, the less tender the resulting meat. The organically grown birds used in this study were raised under the free-range system for 90 days while the birds reared commercially were raised for about 35-38 days under the confinement system; thus, were subjected to less exercise. Results of this study were supported by Fernandez *et al*. (2007) who obtained higher mean scores in tenderness for roasted commercial broiler compared to Darag.

Though juiciness scores were similar among treatments, both broiler samples (organically and commercially grown) tended to have lower juiciness scores compared to native and free range breeds. This could be attributed to the breed differences where the samples came from. Agreeding with this study, Lambio *et al*. (2000) also reported no differences in juiciness characteristic of meat between the native chicken genetic groups and the broiler chicken while Fernandez *et al*. (2007) reported higher juiciness mean score for commercial broiler than the Darag chicken.

The general acceptability of chicken from the different treatments was not significantly different from each other. However, there was a tendency for the native and free range chicken grown organically to have better scores compared to the other two treatments due to better scores on off-flavor and juiciness characteristics. Similar general acceptability was found out by Lambio *et al*. (2000) between the native chicken genetic groups and the broiler chicken and by Fernandez *et al*. (2007) between Darag and commercial broiler.

Studies on the sensory attributes of Taiwan native chickens reported differences in comparison with the commercial broiler. Cheng *et al*. (2008) reported that aroma, flavor, firmness, tenderness, juiciness and overall acceptability of leg meat from Taiwan free-range chickens were slightly higher than that of the conventional chickens. Lin *et al*. (2014) evaluated the sensory characteristics of Taiwan game hens which is the main source of chicken meat in eastern Taiwan. They reported that the sensory scores for flavor, chewiness and overall acceptability of both thigh and breast meat of the free-range group were significantly better than those in cage or floor pen.

The sensory characteristics of the organically grown chicken are highly comparable to that of the commercially grown chicken. Though not significantly better, those organically grown birds have better scores for off-flavor, juiciness and general acceptability compared to that of commercially grown birds. Greater number of replications for future studies is recommended to fully elicit the differences in the palatability characteristics. In addition, further study involving consumers and other stakeholders must be conducted to fully capture the preferences of the intended market.

ACKNOWLEDGMENT

The authors would like to acknowledge the funding from the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) for the project entitled “Organic Livestock Production: A Comparative Study on the Growth Performance, Carcass Yield and Characteristics of Selected Breeds of Swine and Chicken Grown Organically in a Coconut-Based Production System” from which this paper originated.

REFERENCES

Cheng FY, Huang CW, Wan TC, Liu YT, Lin LC and Lou CCY. 2008. Effects of free-range farming on carcass and meat qualities of black-feathered Taiwan native chicken. *Asian-Aust J Anim Sci* 21(8): 1201-1206.

Fernandez MEG, Diaz DA, Ardeña JG, Mercado FA and Matibag PM. 2007. Nutrient, physico-chemical and sensory evaluation of meat of a Philippine native chicken strain (darag). Accessed 7 June 2015. http://www.fnri.dost.gov.ph/files/fnri%20files/abstracts33rd/nativechickendarag.pdf.

Fernando B. 2011. The difference between dressed bounty fresh free-range chicken and white industrial broiler physically. Accessed 7 June 2015. http://bountyfreshfreerange.blogspot.com/2011/03/difference-between-dressed-bounty-fresh.html.

Lambio AL, Grecia MC and Amado AP. 2000. Comparative evaluation of carcass and sensory characteristics of four genetic groups of Philippine native chicken. *Philipp J Vet Anim Sci* 26: 129-136.

Lin CY, Kuo HY and Wan TC. 2014. Effect of free-range rearing on meat composition, physical properties and sensory evaluation in Taiwan game hens. *Asian-Aust J Anim Sci* 27(6): 880-885.

Maghirang RG, Dela Cruz R and Villareal RL. 2011. How Sustainable is Organic Agriculture in the Philippines? *Trans Nat Acad Sci Tech Philipp* 33 (2).