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Comparative sensory evaluation of breast meat of different chickens

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Abstract

A study on comparative sensory evaluation of breast meat of different chickens viz commercial broiler (35 days), Aseel (90 days) and colour broiler (56 days) was conducted. All the chickens were slaughtered scientifically and breast meat was used for taste analysis by eight member descriptive sensory panel. Nine point numerical scale was used to assess the sensory evaluation. The appearance, flavour, juiciness, tenderness and overall acceptability were highly significant ($P \leq 0.05$) among different chickens. Commercial broiler chicken and Aseel had significantly higher ($P \leq 0.01$) flavor score, tenderness, overall acceptability and significantly higher ($P \leq 0.05$) appearance score than colour broiler meat. The breast meat colour was dark red in Aseel, pale pink in commercial broiler and yellowish in colour broiler. However, juiciness was significantly higher ($P \leq 0.05$) for commercial broiler than Aseel and colour broiler. It can be concluded that the commercial broiler and Aseel had better breast meat sensory scores than colour broiler.

Keywords: Commercial broiler, Aseel, colour broiler, sensory evaluation

Introduction

Chicken meat is one of the most common meats generally consumed by Indian consumers. Commercial broilers have rapid growth rate that these birds reaches the market weight of about 2.2 kg at 42 days of age under intensive system of management. India houses 20 recognized indigenous poultry breeds (Sharma and Chatterjee, 2006) ^[1] and various non-descript varieties amounting to 238.21 million birds (Kornel, 2008) ^[2]. Among native breeds, Aseel birds are commonly reared for meat purpose. Colour broiler chicken rearing is one of the traditional animal husbandry activities in the backyard rural areas of various districts of Tamil Nadu. Aseel and colour broiler birds are slower-growing birds that take up to 12 wk to reach market weight of 1.2- 1.5 kg. Apart from commercial broilers, rearing of native chicken and colour broiler chicken under intensive system in high numbers is being practiced by farmers in Tamil Nadu due to growing demand for these chicken meats among consumers in the poultry market. Understanding sensory characteristics is crucial in developing new products, markets and evaluating the quality of products (Dyubele *et al.*, 2010) ^[3]. The information of sensory attributes of different chicken breeds is scanty and hence, the present study was conducted to evaluate the sensory attributes of three different chicken breeds viz commercial broiler chicken (Cobb strain), Native chicken (Aseel) and colour broilers (Nandanam broiler).

Materials and Methods

The experiment was conducted at Poultry Research Station, Chennai, a constituent of Tamil Nadu Veterinary and Animal Sciences University, Tamilnadu. The three chicken breeds namely a fast growing commercial broiler (Cobb strain), Aseel (native breed) and colour broiler (Nandanam broiler II) was conducted. The age of commercial broiler, Aseel and colour broiler chickens reared under intensive system was 35 days, 90 days and 56 days respectively. All the chickens were slaughtered, dressed manually and breast meat was used for study. The colour and appearance of the hot carcasses were observed and recorded. Breast meat from hot carcass was separated without bones and skin and made in to 1cm × 1 cm × 1cm cubes and cooked in a pressure cooker for 15 minutes without salt. Taste analysis was conducted by descriptive sensory panel consisting of eight members. Panelists were randomly presented samples from all test groups in duplicate. Nine point numerical scale was used to assess the intensity of appearance, flavour, juiciness, texture and overall acceptability with higher scores indicating higher intensity.

The sensory panel data were subjected to standard statistical methods (Snedecor and Cochran, 1994)^[13].

Results and Discussion

The score value (Mean \pm SE) for sensory attributes of three different chicken breeds is presented in Table 1

1. Appearance

The breast meat colour of commercial broiler, native chicken (Aseel) and colour broiler chickens was pale pink, dark red and yellowish respectively. The breast meat colour of commercial broiler was pale pink when compared to native chicken (Aseel) and colour broilers as recorded in the present study might be due to higher myoglobin content. The intensively reared native chicken (Aseel) meat colour was dark red when compared to commercial broilers and colour broilers in this study. The breast meat colour of colour broilers was yellowish when compared to native chicken (Aseel) and commercial broiler in the present study. Watanachant *et al.* (2004)^[4] found that the color differences between native chickens and commercial broilers were caused by muscle pH differences between the breeds. High muscle pH is generally associated with darker meat (Fletcher, 1999)^[5]. The colour score values for commercial broiler chicken and Aseel chicken were higher and did not differ significantly between them, but the colour broiler chicken differed significantly from the other two breeds.

2. Flavour

The flavour score values were 6.75 \pm 0.31, 7.63 \pm 0.18 and 6.00 \pm 0.33 for commercial broiler, native chicken (Aseel) and colour broiler chickens respectively. The flavour score values for commercial broiler and colour broiler chickens had statistically comparable values and significantly ($P\leq 0.01$) higher than colour broiler chickens. Flavour is a contribution of taste and smell. Flavor is a complex attribute of meat palatability, it depends on the combination of several chemical interactions involving proteins, lipids, and carbohydrates (Spanier *et al.*, 1997)^[6]. Meat from animals that have the opportunity to exercise, including game animals, may have more flavor, because inosine monophosphate and hypoxanthine are breakdown products of adenosine triphosphate and enhance flavor and large energy stores in muscle also contribute to flavor (Aberle *et al.*, 2001)^[7]. The higher flavour score values for native chicken (Aseel) recorded in this study might be due to its dark meat which might have had more fat as flavour is positively correlated with the lipid level (Chartrin *et al.*, 2006)^[8]. Higher physical activity would have resulted in poor fat deposition which in turn resulted in low flavour in colour broiler meat.

3. Juiciness

The mean score of juiciness for commercial broiler, native chicken (Aseel) and colour broiler chickens were 7.50 \pm 0.46, 6.00 \pm 0.46 and 5.38 \pm 0.53, respectively. The mean score of juiciness for commercial broiler was significantly ($P\leq 0.01$) higher than native chicken (Aseel) and colour broiler chickens. The lower juiciness of the breast meat of native chicken (Aseel) and colour broiler chickens may be related to possible low content of intramuscular fat due to higher physical activity. The present observations agree with previous findings of Fanatico *et al.* (2005)^[9] and Fanatico *et al.* (2007)^[10].

4. Tenderness

The mean score value of tenderness of commercial broiler, native chicken (Aseel) and colour broiler chickens were 7.25 \pm 0.53, 6.38 \pm 0.42 and 4.38 \pm 0.38, respectively. The mean score value of tenderness of commercial broiler and native chicken (Aseel) had comparable values and significantly ($P\leq 0.01$) higher than the colour broiler chickens. The present findings are in agreement with earlier reports (Husak *et al.*, 2008^[11] and Fanatico *et al.*, 2007^[10]). Tenderness is the most important attribute in consumer's final satisfaction with poultry meat (Fletcher, 2002)^[12].

5. Overall acceptability

The experience of consuming meat does not cause separate impressions of tenderness, juiciness and flavour but rather an overall impression (Aberle *et al.*, 2001)^[7]. The overall acceptability score values for commercial broiler, native chicken (Aseel) and colour broiler chickens were 7.35 \pm 0.24, 6.66 \pm 0.35 and 5.22 \pm 0.34, respectively. The mean score value of overall acceptability of commercial broiler and native chicken (Aseel) had comparable values and significantly ($P\leq 0.01$) higher than the colour broiler chickens. However, Fanatico *et al.* (2007)^[10] who observed that more panelists found the breast meat of slow growing birds with outdoor access too dry ($P < 0.05$). Although a descriptive panel detected some differences in texture and flavor among treatments, the consumer panel did not indicate differences in liking between conventional and specialty products.

The sensory attributes of meat in three different chicken namely commercial broiler, native chicken (Aseel) and colour broiler chickens were evaluated in this study. From this research, it can be concluded that the taste panel scores for sensory attributes of appearance, flavour, juiciness, tenderness and overall acceptability of breast meat of commercial broiler chicken and Aseel were significantly higher sensory scores than colour broiler chicken.

Table 1: Score value (Mean \pm SE) for sensory attributes of three different chicken breeds

Chicken Genotype	Appearance*	Flavour**	Juiciness*	Tenderness**	Overall acceptability**
Commercial broiler	7.88 ^a \pm 0.48	6.75 ^a \pm 0.31	7.50 ^a \pm 0.46	7.25 ^a \pm 0.53	7.35 ^a \pm 0.24
Aseel	6.63 ^a \pm 1.03	7.63 ^a \pm 0.18	6.00 ^b \pm 0.46	6.38 ^a \pm 0.42	6.66 ^a \pm 0.35
Colour broiler	5.13 ^b \pm 0.44	6.00 ^b \pm 0.33	5.38 ^b \pm 0.53	4.38 ^b \pm 0.38	5.22 ^b \pm 0.34

*significant ($P\leq 0.05$), ** Highly significant ($P\leq 0.01$)
Column bearing different superscript differs significantly.

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