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RESEARCH ARTICLE

SENSORY EVALUATION OF VARIOUS CHICKEN CUTS FED ON RATIONS CONTAINING GINGER (ZINGIBER OFFICINALE), GARLIC (ALLIUM SATIVUM) AND NIGELLA (NIGELLA SATIVA) WITH DIFFERENT CONCENTRATIONS.

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Key words:-

Chicken cuts, sensory evaluation, panelists, rations, overall acceptability.

Abstract

Triplicates of Broiler chicken (a total of 30 birds) were fed on a ration containing Nigella (*Nigella sativa*), ginger (*Zingiber officinale*) and garlic (*Allium sativum*) in concentrations of 0 (control), 1%, 2% and 3% for 45 days. The birds were slaughtered, defeathered, eviscerated and cuts were obtained. Breast, legs and wings were chosen, cleaned, water boiling cooked (in a ratio of 1:2 w/v (meat: water for 40 min.) and hot served for sensory evaluation. Twenty-five panelists form staff and students in the College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia were sensory evaluated the cuts for taste, color, flavour, juiciness and overall acceptability on a 9-point hedonic scale (1 = dislike extremely, 5 = neither like nor dislike, 9 = like extremely). The results revealed that the highest scores were obtained in the chicken samples fed on Nigella followed by garlic, ginger and control ones.

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Introduction:-

Poultry meat is consider as a popular food commodity all over the world due to its high nutritional value, low fat content, distinct flavor and low cost of production (Barbut, 2002 and Patsias et al., 2008). The consumption of processed chicken products has increased dramatically over the last decades (Bianchi et al., 2009). Herbs and spices and their extracts are increasingly used in food products as preservatives because of their antibacterial and antioxidant activities and they occur naturally in foods. There are many attempts dedicated with the objectives of improving quality of meat using various methods (Ichraq et al., 2004, Fallah et al., 2008, Al-Bachir and Zeinou, 2009, Mohammad and Naimeh, 2011, Hamid and Vahid, 2012, Jouki and Khazaei, 2012, Hussein et al., 2012, Hamid et al., 2014, Sajid et al., 2015). However, there are some studies have been reported with the objectives of enhancing quality of chicken meat and its products using different methods (Dotaset et al., 2014, Gordana et al., 2014, Li et al., 2016, Liuet al., 2016, Zhang et al., 2016). Sensory attributes, such as taste, texture, appearance, odor and flavor of foods detectable by human senses, are normally used to evaluate food quality. These characteristics may also serve as references during the selection of such foods (Lyon and Lyon, 2001).

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They considered as analytical sensory evaluation methods that involve the description and discrimination of sensory components of products by several panelists (Murray et al., 2001). Sow and Grongnet (2010) reported that when evaluating sensory attributes of chicken meat consumers or sensory panelists respond based on their perceptions. By using sensory analysis, producers can identify and respond to consumer preferences more efficiently, thus increasing their competitiveness and segmenting their specific market. Up to date, there is insufficient published data on quality properties of chicken meat fed on rations containing herbs and spices. The objective of this research was to investigate sensory properties of various broiler chicken cuts fed on diets containing Nigella (*Nigella sativa*), ginger (*Zingiber officinale*) and garlic (*Allium sativum*) with different concentrations.

Materials and methods:-

Birds and sampling:-

One day of age, a total of 30 birds were fed on ration contain 20.5% protein, 6% fat, 3.3% crude fiber and 5.5% ash (control). The ration were bought from Genral Organization for Grains, Saudi Arabia. Concentrations of 1%, 2% and 3% of Nigella (*Nigella sativa*), ginger (*Zingiber officinale*) and garlic (*Allium sativum*) were added individually to the control ration and the birds were fed for 45 days. The birds then at forty-five of age were slaughtered, defeathered, eviscerated in slaughter house located in the Animal Breeding Field, Qassim University, Saudi Arabia. The carcasses were transported from the breeding field to the Meat Laboratory, Department of Food Science and Human Nutrition, Qassim University and stored in a refrigerator adjusted to about 2°C for one day. Next day the carcasses were washed, cut and breast, legs and wings were chosen.

Sensory evaluation:-

The cuts were cooked in boiled water in a ratio of 1:2 w/v (meat: water) for 40 m and hot served in dishes with random numbers. Twenty- five panelists form staff and students in the College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia who are frequently consuming chicken meat were chosen for sensory evaluation test. The sensory evaluation room had good light and water was provided in between tests to remove the remaining flavor. The panelists were requested to evaluate the cooked samples for taste, color, flavour, juiciness and overall acceptability on a 9-point hedonic scale (1 = dislike extremely, 5 = neither like nor dislike, 9 = like extremely).

Statistical analysis:-

Three independent replications were performed for all treatments. Data analyses was performed by ANOVA (analysis of variance) using Minitab statistical software version 16. Multiple comparisons among the treatments with significant differences tested in ANOVA were conducted using LSD (least significant difference) at $p < 0.05$.

Results and Discussion:-

The results of sensory evaluation attributes (taste, colour, flavour, juiciness and overall acceptability) of the treated and untreated (control) samples of the chicken are presented in Table 1, Figure 1 and Figure 2. In terms of all sensory attributes the highest scores were obtained in the chicken samples fed on Nigella (7.1 – 9.6) followed by garlic (6.8 -7.9), ginger (6.4 – 7.3) and control (5.1 – 6.4). This explained that the treated samples gave better results compared to the control (without treatment) because the lowest scores were given to the control. Figure 1 presents the individual values of the attributes. For the taste the lowest value was given to the control (5.6) and the highest (7.3) was given to the sample fed on Nigella in the concentration of 3%. The same trends were noticed in all other sensory attributes which means that lowest value for the colour attribute was obtained in control (5.9) while the highest value was given to the sample fed on Nigella in the concentration of 3% (7.9). The lowest value for flavor was given to the control (6.0) and the highest (7.9) was given to the sample fed on Nigella in the concentration of 3%. The worst value of 5.1 was given to the juiciness attribute for the control. However, the lowest value for overall acceptability (6.4) was obtained in the control sample and the highest (9.6) was scored in the sample fed on Nigella in the concentration of 3%. Figure 2 showed the boxplot of all attributes. In terms of (taste, colour, flavour and juiciness) it was observed that the sensory evaluators preferred the treated chicken samples because of their flavour followed by colour, their juiciness and their taste.

Table 1:-Values of sensory evaluation attributes of different chicken cuts

Variables and concentrations	Sensory evaluation attributes and values				
	Taste	Colour	Flavour	Juiciness	Overall acceptability
Control	5.6	5.9	6.0	5.1	6.4
Ginger 1%	6.5	6.5	6.9	6.4	6.9
Ginger 2%	6.4	6.8	6.9	6.7	7.3
Ginger 3%	6.6	7.2	7.0	6.8	7.3
Garlic 1%	6.8	7.3	7.2	6.9	7.4
Garlic 2%	6.8	7.3	7.3	7.2	7.8
Garlic 3%	7.0	7.3	7.3	7.3	7.9
Nigella 1%	7.1	7.5	7.4	7.5	8.2
Nigella 2%	7.2	7.5	7.6	7.6	8.2
Nigella 3%	7.3	7.8	7.9	7.6	9.6

Control and treated samples; Sx–standard deviation

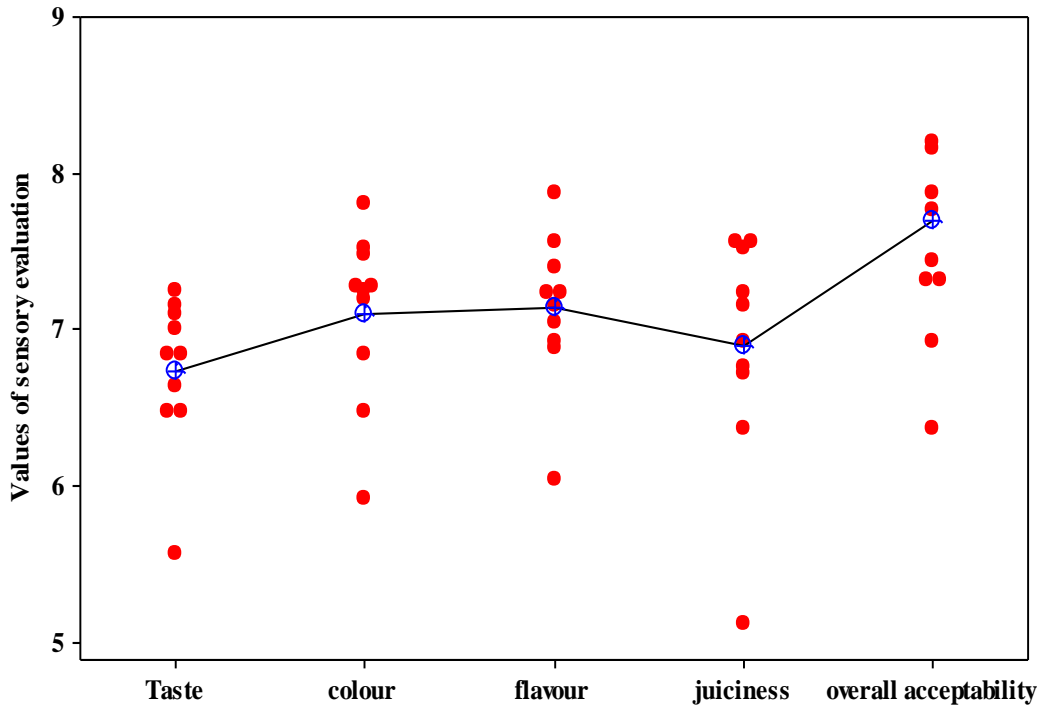


Fig. 1: Individual Value Plot of Taste; colour; flavour; juiciness and overall acceptability of the samples

Conclusion:-

From this study we can state that, the highest overall acceptability scores (8.2 – 9.6) were obtained in chicken meat fed on the ration contained Nigella in the concentration of 1-3%, followed by values of 7.4 – 7.9 which obtained in chicken meat fed on the ration contained garlic in the concentration of 1-3%, followed by values of 6.9 – 7.3 which obtained in chicken meat fed on the ration contained ginger in the concentration of 1-3% and the control 6.4 fed on the ration without treatment. It could be concluded that for better results in sensory attributes (taste, colour, flavour juiciness and overall acceptability), feeding of chicken in rations contain Nigella (Nigella sativa) is highly recommended.

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