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NUTRITIONAL MANIPULATIONS IN REVITALIZED LAYERS: EFFECT ON ORGANOLEPTIC PROPERTIES OF WHITE (BREAST) MEAT

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A study was conducted in the Department of Home Economics to evaluate the organoleptic properties of white (breast) meat of spent layers fed different moult diets. Twenty-one breast meat samples were secured at five differe~t stages, from each 'experimental unit of layers fed 7 different diets with three replications. These cooked breast meat samples were evaluated organoleptically for tenderness, colour, flavour, texture, taste, chewability and acceptability. The results indicated that maximum ($P<0.05$) taste score (7.38 ± 0.21) was found in breast meat of layers at post-moult while poor colour score (6.67 ± 0.11) was observed at 50% production stage. Tenderness (6.38 ± 0.22) and juiciness (6.52 ± 0.18) were reduced to minimum ($P<0.05$) at post-moult stage. However, nutritional regimens did not influence the organoleptic properties.

Key words: breast meat, revitalization, spent layers

INTRODUCTION

Nutritionists emphasize the use of poultry products in a varied and balanced diet because these products **contribute not only ample amount of high quality** protein but also furnish vitamins and minerals i.e. nutrients essential for life and growth (Bodwell, 1984). Among animal protein sources chicken meat is considered the best due to its high biological value and is referred to as an essential part of human food. Poultry meat as a food is quick and easy to prepare and serve with a number of desirable nutritional and organoleptic properties (Panda, 1995). Breast meat is low in calories in comparison to thigh meat. Cooked chicken breast meat contains 1.3% fat, 31.5% protein, 67.2% moisture in addition to 1366 food energy calories per kilogram.

Besides broilers, spent layers also contribute a major share towards poultry meat production in Pakistan. Spent layers are usually available after completing their first production cycle. Now with the introduction of a new technique of revitalization (Akram, 1998), the spent layers would be available in the market for meat purpose after completing two years of life instead of one year. Toughness has been reported to increase with age in breast muscles, consequently reducing its organoleptic quality (Peterson et al., 1959). Organoleptic properties of spent layers meat after completing two production years are not yet fully known, thus the need arose to evaluate the quality of layer breast meat at the end of second production cycle.

MATERIALS AND METHODS

After completing revitalization through the manipulation of 7 diets varying in protein and energy with 3 replications, the layers were maintained till the end of second production cycle. One bird from each of the 21 experimental units was picked up randomly **for meat samples and slaughtered at pre-moult, post-**fast, post-moult, at 50% egg production and at the end of 2nd egg production cycle.

The breast meat samples were roasted according to Passmore (1978) and were evaluated organoleptically for colour, flavour, taste, juiciness, tenderness, chewability and acceptability (Larmond, 1977). The data obtained on the above mentioned parameters were subjected to analysis of variance technique in completely randomized design (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

1, Tenderness : Maximum tenderness score (7.19 ± 0.15) was obtained at the end of 2nd year life and minimum (6.38 ± 0.22) at post-moult (Table 1). Significant difference was found in mean values of tenderness score in breast meat of layers at different stages of the study. However, the difference in tenderness due to moult diets was observed to be non-significant. The minimum tenderness score was also observed at post-moult stage (Manzoor et al., 1999). The results of the present study revealed that tenderness increased with age and it might have occurred due to increased percentage of body fat. Cross et al, (1980) also reported that high fat contents led to increased tenderness. Though another study showed that toughness increased with age in light muscle (Peterson et al., 1959), yet revitalization process helped overcome this adverse effect of aging.

Table 1. Sensory score (Mean±SE) of breast meat in revitalized layers at different stages of 2nd year life

Sensory factors	Stages				
	Pre-moult	Post-fast	Post-moult	50%	End
Colour	A 7.38±0.15	A 7.29±0.16	A 7.57±0.21	B 6.67±0.11	A 7.33±0.14
Flavour	7.00±0.15	7.19±0.16	6.81±0.16	6.86±0.14	7.29±0.16
Chewability	6.90±0.15	7.10±0.18	6.71±0.22	7.24±0.17	7.29±0.17
Tenderness	A 7.14±0.16	A 7.05±0.16	'B 6.38±0.22	AB 6.86±0.17	A 7.19±0.15
Juiciness	AB 6.71±0.16	AB 6.81±0.18	B 6.52±0.18	A 7.14±0.17	A 7.24±0.17
Taste	AB 6.85±0.15	AB 7.05±0.15	A 7.38±0.21	B 6.67±0.14	AB 7.14±0.14
Acceptability	7.10±0.12	6.90±0.15	6.86±0.21	7.14±0.16	7.48±0.13

Means with the same alphabets do not differ significantly at P<O.05.

Table 2. Sensory Score (Mean±SE) of breast meat in revitalized layers fed different moult diets of 2nd year life

Sensory factors	Moult diets						
	Corn	CP 14 ME 2700	CP 14 ME 2900	CP 16 ME 2700	CP 16 ME 2900	CP 18 ME 2700	CP 18 ME 2900
Colour	7.40±0.24	7.20±0.17	7.00±0.20	7.33±0.21	7.33±0.16	7.33±0.21	7.13±0.22
Flavour	7.07±0.18	7.00±0.17	7.00±0.20	7.00±0.20	6.93±0.23	6.87±0.19	7.33±0.16
Chewability	7.33±0.19	7.27±0.21	7.13±0.22	6.93±0.23	6.80±0.24	6.80±0.17	7.07±0.25
Tenderness	7.27±0.28	6.73±0.23	6.73±0.23	6.87±0.19	6.93±0.21	6.93±0.23	7.00±0.14
Juiciness	7.13±0.22	6.87±0.19	7.UO±0.17	6.87±0.19	6.73±0.23	6.73±0.25	8.87±0.24
Taste	7.07±0.15	7.07±0.21	7.20±0.17	7.20±0.22	6.93±0.18	7.00±0.28	6.80±0.17
Acceptability	7.20±0.17	7.20±0.14	6.93±0.21	7.13±0.19	7.13±0.19	6.87±0.22	7.20±0.22

Means with similar alphabets do not differ significantly at P<O.05.
CP = Crude protein; M.E.= Metabolizable energy.

2. Juiciness: Juiciness score was found maximum (7.24±0) 7) at the end of 2nd year life and minimum (6.52±0.18) at post-moult. The difference in mean values of juiciness score in breast meat of layers at different stages was found to be significant. Moult diets, however, did not make any significant change in juiciness score. The minimum juiciness score was also observed at post-moult stage (Manzoor et al., 1999). Since fasting for 10 days and restricted feeding for 18 days during revitalization process (Akram, 1998) led to depletion of body fat, therefore, minimum fat content resulted in decreased juiciness consequent to revitalization process. But prior to revitalization and at the end of 2nd year life, the birds had developed ample fat which apparently caused juiciness.

3. Taste: The maximum taste score (7.38±0.21) was observed at revitalization process and minimum (6.67 ±0.14) at 50% production (Table 1). The difference in mean values of taste score in breast meat of layers at different stages was found statistically significant. However, non-significant differences were recorded in taste due to moult diets. Manzoor et al. (1999) also observed the maximum taste score in breast meat of layers at post-moult and minimum at 50% production stage. As taste refers to sweetness, sourness, saltiness, or bitterness perceived in the mouth (Stewart and Maynard, 1982), thus with advancing age the chicken meat under study while passing through various processes during revitalization might have shown a significant change in taste characteristics.

4. Colour: Maximum (7.57± 0.21) colour score was observed as a consequence of revitalization process and minimum (6.67±0.11) at 50% production (Table 1). According to the evaluation by a panel of judges, significant differences were found in mean values of colour score in cooked white (breast) meat of layers examined at different stages of 2nd year life. On the other hand, moult diets did not effect any significant change in colour score. The poor colour score was also observed at 50% production (Manzoor et al., 1999). Comparison of means by applying DMR test indicated improvement in colour score in white meat of layers with advancing age. Improvement in colour with advancing age was also reported earlier which probably could be attributed to revitalization process.

5. Flavour: The maximum (7.29± 0.16) flavour score was observed at the end of 2nd year life and minimum (6.81±0.16) at post-moult. The difference in mean values of flavour score in breast meat of layers due to moult diets and at different stages was found non-significant.

6. Chewability: Maximum (7.29 ± 0.17) chewability score was observed at the end of 2nd year life and minimum (6.71 ± 0.22) at pre-moult stage. The difference in mean values of chewability score in breast meat of layers at different stages in relation to moult diets was non-significant. The minimum chewability score was also observed at post-moult stage by Rafiq et al. (1999).

7. Acceptability: Maximum acceptability score (7.48 ± 0.13) was found atthe end of 2nd year life and minimum (6.86 ± 0.21) at post-moult (Table 1). The differences in mean values of acceptability score in breast meat of layers at different stages of the study were found statistically non-significant. The mean values of breast meat of layers fed different moult diets showed non-significant differences which iridicated that these diets had no effect on the accaptabil'ity score of white meat of layers.

To conclude it may be stated that during revitalization process useful effect of nutritional manipulation on organoleptic properties of white meat of layers was observed. Due to revitalization process, tenderness, juiciness, taste and colour score increased with advancing age.

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