

Effect of moringa oleifera utilization on meat quality in japanese quails

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Abstract. Moringa oleifera, with its many parts, is a plant rich in nutrients such as protein, fiber, vitamins, minerals and antioxidants. Many studies on Moringa Oleifera have been conducted to examine the effects of moringa added to the ration on performance and welfare parameters, but studies on the effects on meat quality have been limited. This study was conducted to investigate the effects of Moringa Oleifera utilization on meat quality in Japanese quail diets. In the study, no moringa powder was added to the ration in the control group, 2% moringa powder was added to the ration in Moringa-1 group, 4% moringa powder was added to the ration in Moringa-2 group and 6% moringa powder was added to the ration in Moringa-3 group. Texture Profile Analysis (TPA) was performed to determine meat quality. TPA analysis, which gives information about the textural properties of meat; variables related to hardness, adhesiveness, springiness, cohesiveness, gumminess, chewiness and resilience were analyzed. When the effects of the addition of Moringa oleifera powder to the ration on meat quality between the groups were examined, it was determined that hardness 0.69 springiness 0.09 cohesiveness 0.73 gumminess 0.83 chewiness 0.81 and resilience values were 0.36. As a result of the statistical analysis, the variables related to TPA were found to be insignificant at 0.05 level of significance, although the values found between group were different ($P>0.05$). As a result, the addition of Moringa oleifera powder to the ration between 2% and 6% had no effect on meat quality.

1 Introduction

Recently, different feed stuffs have been explored to reduce the effects of increasing animal feed and overall cost of poultry production. The cost of Poultry feed represents about 80% of the total cost of production. When exploring new feed materials, it is necessary to focus on plants that are rich in nutrients. Moringa plant is one of the most used and explored plant as animal feed. This plant is a native of India and Pakistan [1]. Currently, Moringa is widely cultivated in different regions such as Indonesia, Ghana, Malaysia, Sri Lanka, Mexico and the Philippines. This plant is also called Miracle tree in Turkish Moringa oleifera can grow at temperatures between 25 °C and 40 °C and requires annual rainfall between 250 mm and 3000 mm [2].

The production of Moringa in Turkiye is carried out in Gaziantep, Mugla and Antalya. Moringa leaves contains flavonoids which exhibit more antioxidant [3, 4] and antimicrobial activity with high levels of ascorbic acid [5], fatty acids and carotenoids.

Moringa is very rich in antioxidants and bioactive plant compounds. Moringa is an alternative feed plant with high content of vitamins A, C, D, E, K, proteins, minerals and energy. Moringa Oleifera seeds contain 36.7% fat, 31.4% protein, 18.4% carbohydrate and 7.3% fiber.[y] Moringa is a feed source rich in protein and crude cellulose. The crude protein level of moringa varies between 7.12% and 39.17%. [7] The fruits, leaves and

flowers of the Moringa plant have an average protein content of 5-10% [8].

Moringa oleifera, with its many parts, is a plant rich in nutrients such as protein, fiber, vitamins, minerals and antioxidants. Many studies on Moringa Oleifera have been conducted to examine the effects of moringa added to the ration on performance and welfare parameters, but studies on the effects on meat quality have been limited. This study was conducted to investigate the effects of Moringa Oleifera utilization on meat quality in Japanese quail diets.

These nutrients have an important effect on meat quality when used as poultry feed. For example, some authors [9] reported that supplementation of 1% Moringa improved meat color, flavor, juiciness, tenderness, texture and acceptability by consumers. Some authors [10] also observed that quails supplemented with 5% Moringa had the best meat flavor and those supplemented with 7.5% Moringa had the best meat aroma, texture and overall meat acceptance by consumers.

One of the common methods for determining meat quality is the Texture Profile Analysis (TPA). Meat quality traits such as chewiness, hardness, gumminess, texture and elasticity are determined using the TPA analysis. The sample of the meat is placed on the device and the values are recorded on a computer.

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2 Material and method

This study was conducted at the Research and Poultry Unit of Çukurova University. A total of 40 quails, 20 females and 20 males quails, were used in this study.

2.1 The meat quality analysis

The Texture Profile Analysis (TPA) was used to determine the hardness, adhesiveness, springiness, cohesiveness, gumminess, chewiness, and resilience of the breast meat.

2.2 Housing and experimental animals

The Japanese quails used in this were reared in cages. The birds were given feed and water ad libitum.

2.3 Statistical analysis

The data obtained were subjected to Analysis of Variance (ANOVA) using SPSS version 22.

3 Results and discussion

Table 1. The influence of moringa oleifera leave powder on meat quality parameters of japanese quails.

Group	BREAST MEAT QUALITY TRAITS						
	Hardness	Adhesiveness	Springiness	Cohesiveness	Gumminess	Chewiness	Resilience
Kontrol	1042.64± 474.56	95.64± 18.46	0.90±0,03	0.60± 0.06	645.42± 336.72	585.72± 308.26	0.35± 0.10
Moringa1	755.46± 600.84	89.68±21.35	0.87±0.02	0.57± 0.08	464.07± 412.71	408.62± 364.67	0.28± 0.13
Moringa2	1021.28± 632.50	94.65± 19.87	0.88±0.03	0.57± 0.05	605.20±406.76	539,02± 368.55	0.30± 0.10
Moringa3	785.20± 925.97	91.25± 21.17	0.86±0.6	0.58± 0.09	516.89 ± 681.68	465,80± 629.36	0.25± 0.16
P Value	0.685	0.901	0.087	0.731	0.827	0.809	0.357

When the effects of the addition of Moringa oleifera powder to the ration on meat quality between the groups were examined, it was determined that hardness 0.69 springiness 0.09 cohesiveness 0,73 gumminess 0.83 chewiness 0.81 and resilience values were 0.36. These values were not found to be statistically significant.

4 Conclusion

In this study, it was concluded that Moringa oleifera leave powder can be added up to %2-6 in the diet of Japanese quails without any negative effect on meat quality traits.

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