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Medicinal Plants Feeding Impact with Different Levels on Meat Quality in Hubbard Broiler Chicken

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ABSTRACT

At the confluence of food science and animal science, using dietary techniques to improve the quality of meat may be a cutting-edge strategy. In this experiment, 200 chickens were separated into 20 cages, with each cage covering 10 chickens. Six chickens were chosen randomly to evaluate research parameters, and the findings were applied to a CRD (completely randomized design), which included five treatment groups and four replications. The effects of dietary (T1) control without Supplementation (T2) garlic powder, (T4) hot red pepper, (T3) dark pepper, and (T5) a mixture of them on the qualitative characteristics of chicken thigh and breast meat were assessed. Meat's chemical characteristics and quality assessments included assessments of the meat's quality (PH, moisture, protein, fat, and ash). Plant supplementations exhibited a significant (P≤0.05) impact on most of the evaluated chicken meat quality criteria, with black pepper being the exception. In conclusion, plant supplementations had a favorable impact on the quality of chicken meat. This finding is evidence that Plant supplementations often have greater or the same impact on meat quality compared to chemical compounds without any side effects.

Keywords: water content, meat quality, medicinal herbs, and food.

1. Introduction

Numerous dietary elements have a significant impact on an animal's ability to function in terms of health, antioxidants, and productivity. In order to accelerate growth and improve productivity, phytogenic feed additives are employed in the production of chicken. Improvements in feed intake, appetite, energizing digestive enzyme secretion, triggering an immunological response, and antioxidant, antibacterial, antiviral, and activities and heat stress modulators are all positive effects of herbs in chicken feeding[1, 2] Consumers' concerns over the processed foods they consume have increased in the past decade. Utilized in the food sector, synthetic preservatives may have adverse effects on human health. Significant disadvantages are associated with using synthetic substances, including rising costs, handling dangers, concerns about residues in food, and harm to the environment in general. Therefore, there has been growing avail in substituting natural, useful, and non-toxic molecules for synthetic ones[3, 4]. These include extracts and essential oils[4, 5], spices[6, 7], and medicinal plants[8, 9] in the first place. Spices and medicinal herbs are popular because they are natural foods, which appeals to consumers who are wary of artificial food additives and prefer dependable, high-quality goods. In the past, many different illnesses have been successfully treated with medicinal herbs extracts from[10] plants, and known Phytochemicals have gained popularity as animal feed additives.

Additionally, medicinal plants and fragrant plants contain several cancer-preventive compounds that function well to halt oxidative changes a result, can reduce the production of off-odors in meat[11] at the intersection of animal science and nutrition research; a relatively untested method has emerged using healthy methods to improve the quality of meat[12–14] the molecule is optimally retained where it is most needed hence healthy ways are typically more effective than the coordinated expansion of the additional component to meat[15]. The Physical quality of the meat is essential, just as it is with other animal species, because broiler chicken meat is frequently consumed as cuts or processed commodities rather than as a full carcass. Herbal medicines have been widely used for a very long time to cure various disorders. demonstrated that the inclusion of black pepper in the broiler's diet had an impact on their enhanced health status through an increase in serum globulin concentration. The vascular system in

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the body is supported by hot red pepper, which also plays a significant part in lowering the body's triglyceride and cholesterol deposition. Capsaicin's are effective hot red pepper chemicals, some of which relieve rheumatic pain[16].

Meat's Physical quality can refer to several characteristics, including PH and color ranges. The quality of the meat is directly correlated with the lower autopsy PH. PSE (pale, delicate, and exudative) meat's PH rapidly decreases after death, giving it a pale appearance and a lower water-holding capacity[17]. The production of breeding poultry and improvements to feed efficiency have accelerated the use of feed additives in the diet of broilers. The feed is a significant input for raising broilers and accounts for 70–80% of production costs, thus it is essential to the economy of the broiler industry[18].Substantial color variations and muscle PH are negatively linked with broiler breast meat filet color alterations[19]. The natural synergistic impact of all substances within the plants gives phytogenic feed additives an edge over synthetic growth promoters. Some commonly used therapeutic plants and herbs, including Nigella sativa seeds, hot red pepper, thyme, rosemary, anise, and mint, have been demonstrated to have the new characteristic of promoting phytogenic growth[20, 2]. High PH causes "corrosive meat, "which has effects resembling those of PSE meat, while severe mood PH causes "corrosive meat, "which has a dark color and poor capacity quality[21].

It's important to remember the economic importance of meat's sensory and chemical qualities in addition to its Physical excellence. The entire manufacturing process, from farm to fork, must be taken into account to maintain the highest level of quality[19]. The main goal of scientists is to increase productivity while maintaining the health of broilers. Herbs and medicinal plant extracts are being tested as growth promoters in the diet of poultry as a means of resistance to these issues[22]. In order to find more efficient alternatives or combinations of options for maintaining health and boosting the quality and safety of poultry and meat without the use of antibiotics, multiple studies have evaluated the effects of various dietary supplement components.

Therefore, this study aimed to investigate how broiler meat's Physical and chemical characteristics were affected by garlic, black pepper, and hot red pepper.

2. Materials and Methods

2.1 Nutrition and Habitat for Animals

There were biological experiments conducted under Iraq-Kalar conditions. Up to 200 one-day-old Hubbard species birds were randomly assigned to one of five feeding treatments using a Complete Randomization Plan at the beginning of the experiment to examine the effects of each treatment (Table 1).

2.2 Research Parameters

Chemical analyses of meat properties were conducted by the ISO-prescribed standards for moisture, protein, fat, and fiery debris content[23]. The data suggests six measurements. The PH values of chicken breast and thigh with drumstick were determined. Five examples of estimates were shown using a flexible PH meter (Partner C931, Turnout, Belgium). On the 42nd day of the experiment, three male and three female broiler chicks of normal body weight were selected from each treatment group for meat quality evaluations.

Table 1: doses of medicinal herbs added to chicken diets (gm. /kg feed).

Treat.	Nutrition (gm./Days)			Caption
	1 to 14 Days	15 to 35 Days	36 to 42 Days	
T1	0	0	0	Control (mixed poultry feed)
T2	0.5	1	1.5	Garlic powder(gm. /kg feed)
T3	0.5	1	1.5	Black pepper powder(gm. /kg feed)
T4	0.5	1	1.5	Hot red pepper powder(gm. /kg feed)
T5	0.5	1	1.5	A mixture of garlic, black pepper, and hot red pepper (1:1:1)(gm. /kg feed)

2.3 Statistical calculations

Excel was used to create a graph after Genstat v.12[24] was used to discover if variables differed across treatments. A significance criterion of $P \leq 0.05$ was utilized to determine significant effects using analysis of variance (ANOVA) in CRD and Duncan test[25].

3. Results and Discussion

This study's findings are shown in tables with Mean square, and standard errors of square means, The utilization of medicinal herbs makes a significant difference in chicken meat quality. Therefore, the discussion will compare our findings about the chemical quality of broiler meat with those of previously published publications.

The results for the chemical features of the meat (PH value, moisture, protein, fat, and ash) of all five dietary regimens are provided in Tables 2 and 3, respectively.

Since glycolysis is exothermic, there are demonstrable correlations between PH and glycolysis, and the effects of PH are greatest when a carcass is at rest[26]. In this experiment, chicken breast meat in dietary treatment T3 with 1 g/100 g of dark pepper powder had the lowest PH of 5.52, while treatment T2 and T4 with a dietary expansion of 1 g/100 g of garlic and hot ruddy pepper powder had the highest PH of 5.71. The chicken drumstick meat in dietary treatment T1 (control) had the highest PH of 6.55, while treatments T5 and T6 had the lowest PH of 5.5. (1:1:1).

In addition to PH value, various other sensorial, instrumental, and biophysical methods are utilized to determine the quality of chicken flesh[27]. In the following years, changes in meat quality

that did not appear to be typical criteria of (Pale, Soft, Exudative (PSE) and (Dark, Firm, Dry (DFD) were described many times. In our study, the PH value of chicken breast meat ranged from 5.52 to 5.71 and between 5.5 and 6.55 in thighs and drumsticks, were significant (P≤0.01) differences, broilers supplemented with improved growth performance and meat quality[28]. The PH values of lighter-than-normal, normal, and darker-than-normal bunches were 5.81, 5.96, and 6.23, respectively, and they differed significantly[29]. Measured a PH value of 5.6 in chicken flesh supplemented with 2% garlic powder[14]. Also, the inclusion of medicinal herbs in the feed of broiler chickens improved the meat quality[21].

According to the findings in Table 2, there are no significant (P≥0.05) differences between Fiery remains in the thigh and drumstick flesh, which ranged from 0.57 to 1.18 in treatments T4 and T2 with red pepper and garlic powder. Significant (P≤0.05) differences were observed between T2 (73.93), T3 (23.96), T1 (0.56), and T3 (1.2) in terms of the levels of moisture, protein, fat, and fiery debris in Breast meat, as compared to T2 (73.93), T3 (23.96), T1 (0.56) and T3 (1.2), respectively. T3 (71.55), T1 (21.48), T3 (0.15), and T5 were observed to have the smallest total of evaluated factors (1.02). This may indicate the beneficial effect of expanding dietary restorative plants on the nutritional content of chicken meat.

From these results, it can be concluded that increasing the quantity of black pepper in the diet significantly increased meat quality[30]. In previous studies conducted to prove the effects of garlic in broiler feed on production parameters, health status, and carcass quality[15, 29], garlic powder for consumption The addition of 2.0 g/100 g hens count calories resulted in significant differences in breast meat protein content (22.9 g/100 g) compared to control count calories (21.8 g/100 g)[13, 31]. The red meat in the control treatment had the lowest protein content (18.6 g/100 g)[30, 32]. Reported that the protein content of chicken breast meat varied insignificantly between 22.48 and 22.61 g/100 g.

Table 2: shows the mean square of the effects of garlic, black pepper, and hot red pepper on the chemical composition of chicken breast and drumstick meat.

S.O.V	*df*	Breast					Drumstick				
		PH	Moisture	Protein	Fat	Ash	PH	Moisture	Protein	Fat	Ash
Treatment	4	0.024	4.356	3.312	0.137	0.027	0.575	2.566	6.091	1.087	0.218
Error	15	0.0002	0.032	0.032	0.0002	0.004	0.001	0.045	0.042	0.000	0.119
Total	19	**	**	**	**	**	**	**	**	**	ns
F Table	0.05	3.06									
	0.01	4.89									

** Significantly 1%, ns none significant

Table 3: Duncan test comparison of research parameter means.

Treatment	Breast					Drumstick				
	PH	Moisture	Protein	Fat	Ash	PH	Moisture	Protein	Fat	Ash
T1(control)	5.65b	73.65b	21.48d	0.56a	1.03b	6.55a	74.45a	17.75d	2.71c	1a
T2(Garlic Powder)	5.71a	73.93a	23.1b	0.32c	1.15a	6.14b	73.45b	19.43c	2.66d	0.57a
T3(Black Pepper Powder)	5.52c	71.55e	23.95a	0.15e	1.2a	5.95c	72.43c	21.08a	2.27e	1.18a
T4(Red Pepper)	5.71a	71.93d	22.68c	0.49b	1.16a	5.99c	74a	19.2c	3.35b	0.81a
T5(Mix of all Powders)	5.64b	72.53c	23.2b	0.17d	1.02b	5.5d	74.18a	20.18b	3.53a	1.03a

Conclusion

Based on the findings, it is possible to conclude that adding garlic, black pepper, and hot red pepper to broiler diets significantly impacted the development of meat's chemical characteristics. Furthermore, supplementation can improve chicken meat's dietary, mechanical, and administrative qualities, as not all added substances positively affect meat quality, but some have the opposite effect. This finding is evidence that Plant supplementations often have greater or the same impact on meat quality compared to chemical compounds without any side effects. Black pepper effectively favorably regulates lipid metabolism to prevent atherosclerosis or coronary heart disease in humans who consume this type of chicken product daily. As a result, the general conclusion would be that the addition of these spice herbs has a positive effect on chicken production, and plant supplementations had a favorable impact on the quality of chicken meat. but further research is needed.

Conflict of interests

None

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