Influence of different combination of sesame and rice bran oil on growth performance and carcass characteristics of broiler chicken

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List of Acronyms

PUFA-Poly unsaturated fatty acid.

MUFA-Monounsaturated fatty acid.

SFA-Saturated fatty acid.

PO-Palm oil.

RBO-Rice bran oil.

SO-Sesame oil.

FCR-Feed convertion ratio.

T-Treatment.

Wt.-Weight.

NS-Not significant

Abstract

This experiment was done to examine the influence of rice bran oil and sesame oil on growth ,performance and carcass characteristic of broiler chicken. Rice bran and sesame oil are good sources of polyunsaturated fatty acids while Palm oil is enriched in saturated fatty acid. Using rice bran and sesame oil in poultry rations would subsequently affect human health in a positive manner by increasing oleic and linoleic acid contents. It helps to benefit chicken health by acting as an anti-inflammatory, antithrombotic, antiproliferative, and lipid-lowering agent. In this study 100 day old chicks were divided into 5 treatments(T1,T2,T3,T4,T5).Each treatment had three replicates having 7 chicks.T1 was the control group. Birds in the control group were (T1) fed 4% palm oil with basal diet. While the other 4 treatment groups received different combination of feed and they are-T2 (Basal diet +PO 2% + SO 2%),T3(Basal diet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+SO1%).

The growth performance of the broiler chickens was evaluated by measuring parameters such as body weight, feed intake, and feed conversion ratio. Carcass characteristics, including dressing percentage, breast meat yield, thigh meat yield, and abdominal fat content, were also assessed. The results of the study showed that the inclusion of rice bran and sesame oil in the diets of broiler chickens had a positive effect on their growth performance. Chickens fed diets supplemented with rice bran and sesame oil had higher body weight and better feed conversion ratios compared to the control group. Furthermore, the carcass characteristics of the broiler chickens were also improved by the addition of rice bran and sesame oil to their diets. Chickens fed diets supplemented with rice bran and sesame oil had higher dressing percentages, increased breast meat yield, and reduced abdominal fat content compared to the control group. Overall, these findings suggest that incorporating rice bran and sesame oil into the diets of broiler chickens can enhance their growth performance and improve their carcass characteristics. This has significant implications for the poultry industry in Bangladesh, as it can lead to the production of healthier and more nutritious broiler meat for consumers.

Keywords: Rice bran oil, sesame oil, growth performance, Feed conversion ratio, Carcass characteristics.

Chapter-1

Introduction

Broiler meat is one of the major sources of protein of the people of Bangladesh because of it's high nutritional value, low amount of fat and abundant omega-3 polyunsaturated fatty acids. Vitamins and minerals, specially calcium and phosphorus are also present in adequate amount(Hasan et al.,2020).The demand of poultry meat is rising but the cost of the feed ingredients is increasing. Now, Nutritionists are interested in boosting the calorie content of diet to meet the market demand(Hasan et al.,2020).In the production of poultry, using oil is an effective way compared to protein and carbohydrate. Oils provide 2.25 times more energy per gram(Saminathan *et al*.,2022).Oils are great source of fatty acid and also vehicle for vitamins and elevate heat stress(Mujahid et al.,2009).Chicken diets with oil help chicken to grow more quickly and it also has antibacterial effect (Hasan *et al*.,2020).In this context, some oils have gained attention for their beneficial characteristics. Rice bran oil and sesame oil are two of them. Palm oil is also available in the market. Dietary lipids at (2-5)% is recommended by nutritionists. It helps to grow rapidly and improve fatty acid deposition in the muscles(Nitsan *et al*.,1997). In our study we used different combination of Rice bran oil(RBO),Sesame oil(SO) and Palm oil (PO).Palm oil(PO) can be obtained from palms. It is regularly used in both human and animal nutrition. That's why, it is considered the most popular oil crop, which supply about 40% of total vegetable oil consumption(Murphy *et al*.,2021). PO contains good amount of saturated fatty acids (SFAs) mainly palmitic acid (C16:0). It also contains components such as β-carotene, coenzyme Q10, and polyphenols which have antioxidant activity(may *et al*.,2014).PO has effect on the firmness meat compared with dietary lipids rich in unsaturated fatty acids (smink *et al*.,2008).As saturated fatty acid has bad impact on human health, finding alternative fat sources is a favorable action for sustainable broiler production. In this regard, RBO and SO can be better choice. They both provide unsaturated fatty acids. RBO is a product of processing rice; it can be extracted from the germ and inner husk. The oil present in rice bran ranges between 10% and 23%(Dunford *et al.,*2019).Fatty acid proportion of RBO comprises 41% monounsaturated (MUFA), 36% polyunsaturated (PUFA), and 19% SFA(Kahlon et al.,2009). The major fatty acids in RBO are oleic acid, linoleic acid, and palmitic acids (typically, 42%, 32%, and 20%, respectively).

So,it can be said that, it is a near ideal fatty food due to it's nutrient composition. In addition, RBO is a bioactive compounds and it has cardioprotective potential(lai *et al.*2012).Several studies stated that, RBO can be used as an effective ingredient in broiler diets(De moraes *et al.,*2009).A recent experiment had concluded that dietary RBO improved the growth of broiler chickens because of their greater digestibility of ether extract, fatty acids, and apparent metabolizable energy than PO (song et al.,2022). Sesame oil(SO) is also an accessible oil with numerous positive characteristics. Sesame (*Sesamum indicum*) is a significant oil producing plant, cultivated mainly for the production of sesame bread, tahini and halva and sesame oil (Abou-gharbia *et al*.2002) .Sesame seeds and their products are considered to have health benefits, due to their high content of the natural antioxidants sesamin, sesamolin, and sesaminol glucosides(kamal eldin *et al*.,2011). On average, these seeds contain 44–58% oil, 18–25% crude protein, 13.5% carbohydrates and 5% ash. The sesame oil is quite resistant to oxidation, containing high quantities of natural antioxidant substances, mainly polyphenolic compounds.(Shahidi *et al.,*2006).Fatty acid composition in sesame seeds consists of abundant unsaturated fatty acids: oleic (35.9–42.3%) and linoleic (41.5–47.9%) acids from 80% of total fatty acids; less than 20% are saturated fatty acids, mainly palmitic (7.9–12%) and stearic acids (4.8–6.1%).

Polyunsaturated fatty acids (PUFAs) have impact in human cardiovascular health and chicken meat. While PUFAs like omega-3 fatty acids are recognized for their cardiovascular benefits in humans, enriching chicken meat with these fatty acids creates functional food. However, it is acknowledged that elevated levels of PUFAs can lead to increased oxidation in chicken meat, negatively affecting its sensory properties, nutritional value, taste, and shelf life, as highlighted by Del Puerto *et al*. (2017). Moreover, combining various dietary lipid sources can yield more positive outcomes than using a single source. Such combinations can enhance both the growth and quality of broiler chicken meat, while also increasing the presence of essential fatty acids in the meat, as observed in the research by Khatun *et al.* (2020).

Hence, the study at hand was conducted to explore the effects of combining saturated and unsaturated fatty acid sources oil on the growth performance of broiler chickens.

The specific objective of the study:

1.To observe the effect of Palm oil, Rice bran oil and Sesame oil and their combination on growth and performance of Broiler chicken.

2.To evaluate the effect of rice bran oil and se same oil on carcass characteristics.

3.To determine feed convertion ratio.(FCR).

Chapter 2
Materials and methods

2.1 Study area and period

This study was conducted on the poultry shed of Chattogram veterinary and animal sciences university. The study duration was February 8,2023 to March 17,2023 a total duration of 38 days.

2.2 Experimental design

Total 100 day-one chick was collected from Kazi farms limited, Chattogram. Immediately after unloading, all the chicks were examined for any types of abnormalities and measured weight for maintaining uniform size in all treatment groups Chicks were housed in galvanized cages, where 7 birds were allotted to a cage primarily. Lighting program was controlled properly. They were reared for 38 days. Vaccination was provided. At the end of experiment ,two chicken from each treatment was randomly selected for slaughtering.

2.3 Layout of experiment

Table 1.Layout of experiment

Treatment group	**Replications**	**No. of birds per replication**	**No. of birds per treatment group**
Control, T1=basal diet+ palm oil 4%	R1 R2 R3	7 7 7	21
T2=basal diet + palm oil 2% + sesame oil 2%	R1 R2 R3	7 7 7	21
T3= basal diet + palm oil2% + rice bran oil2%	R1 R2 R3	7 7 7	21
T4=basal diet+ sesame oil2% + rice bran oil2%	R1 R2	8 8	16
T5=basal diet+ palm oil 2% + rice bran oil1% + sesame oil1%	R1 R2 R3	7 7 7	21
Total		100	100

2.4 Experimental diets

All of the ingredients were collected from jhautola bazar, Chattogram. Five different diets were used in different treatments . The dietary treatment groups were T1(Basal diet+PO4%),T2 (Basal diet+PO2%+SO2%),T3(Basaldiet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+ SO1%).The total oil content was 4%.Prior to spraying the oils ,the dry components were weighed and thoroughly combined . The started feed was supplied from day 1-15 and the finisher feed was supplied from Day 16-38.Chickens got access to unlimited food and water during the experiment.

Table 2.Ingredients of experimental starter diet-

Ingredients	T1	T2	T3	T4	T5
Maize	53.3	50.1	50	48.7	50.1
Rice polish	3.5	6.6	6.6	7.6	6.6
Palm oil	4	2	2		2
Sesame oil		2		2	1
Rice bran oil			2	2	1
Soybean meal	32.9	32.67	32.67	33.47	32.67
Fishmeal	3.25	3.43	3.43	2.83	3.43
Lime stone	1.4	1.35	1.35	1.45	1.35
Dicalcium phosphate	0.45	0.65	0.75	0.75	0.65
Common salt	0.25	0.25	0.25	0.25	0.25
Vitamin-mineral premix	0.25	0.25	0.25	0.25	0.25
Toxin binder	0.1	0.1	0.1	0.1	0.1
Coccidiostat	0.1	0.1	0.1	0.1	0.1
Methionine	0.2	0.2	0.2	0.2	0.2
Lysine	0.2	0.2	0.2	0.2	0.2
Antioxidant	0.1	0.1	0.1	0.1	0.1
Total	**100**	**100**	**100**	**100**	**100**

Table 3.Ingredients of experimental finisher diet-

Ingredients	T1	T2	T3	T4	T5
Maize	60	60	60	57.5	60
Rice polish	5.5	4	4	6.5	4
Palm oil	4	2	2		2
Seasame oil		2		2	1
Rice bran oil			2	2	1
Soybean meal	22.7	25	25	25	25
Fishmeal	5.4	4.2	4.2	4.2	4.2
Lime stone	1.02	1.25	1.25	1.25	1.25
Dicalcium phosphate	0.38	0.35	0.35	0.35	0.35
Common salt	0.25	0.25	0.25	0.25	0.25
Vitamin-mineral premix	0.25	0.25	0.25	0.25	0.25
Toxin binder	0.1	0.1	0.1	0.1	0.1
Coccidiostat	0.1	0.1	0.1	0.1	0.1
Methionine	0.1	0.2	0.2	0.2	0.2
Lysine	0.1	0.2	0.2	0.2	0.2
Antioxidant	0.1	0.1	0.1	0.1	0.1
Total	**100**	**100**	**100**	**100**	**100**

2.5 Shed cleaning and sanitation

The broiler shed, brooding boxes, and other areas were thoroughly cleaned and washed using tap water, caustic soda, and phenyl solution. According to the instructions, phenyl solution was also used to eliminate microorganisms on the floor, corners, and ceiling. After one week, lime was applied to the shed's floor and surrounding area to maintain biosecurity. A footbath with potassium

permanganate, which was regularly changed, was placed at the entrance of the chicken shed. Each pen had round feeders and drinkers to ensure all chickens had access to food and water. Daily records on mortality and overall health were diligently maintained. Overall, strict hygiene practices and regular monitoring were implemented to maintain a clean and healthy environment for the chickens, promoting their growth and productivity.

2.6 Vaccination

All the birds were given routine vaccinations for Newcastle Disease (ND), Infectious Bronchitis (IB), and Infectious Bursal Disease (IBD). The vaccines were obtained from a local veterinary supply store and were transported in a cooler to maintain their potency. In order to minimize stress, the vaccinations were administered in the evening, after sunset.

Table 4.Vaccination schedule-

Age of birds	Protection against disease	Name of the vaccine	Type of vaccine	Route of administration
5th day	New castle disease and Infectious bronchitis	Cevac BIL+CevacIBird	Live	One drop in one eye
12th day	Infectious bursal disease	Cevac IBD L	Live	One drop in one eye
18th day	Infectious bursal disease	Cevac IBD L (Booster)	Live	Drinking water
21st day	New castle disease	Cevac New L(Booster)	LIve	Drinking water

2.7 Sampling and measurement

2.7.1 Growth performance

The broilers' growth performance was measured by recording their body weight and feed intake

every seven days throughout the entire experimental period. The chicks' initial body weight was subtracted from their ultimate body weight to calculate their body weight growth. The weekly feed consumption was calculated by deducting the residual feeds from the total amount of feed given to the broilers. The broilers' feed conversion ratio (FCR) was calculated using the weekly ratio of feed consumption to weight gain.

Fig 1. Recording data.

Fig 2. weight measurement.

Fig 3.Weight of leftover feed is being measured.

2.7.2 Carcass characteristics

On the 35th day of age, chickens with weights within 10% of the average of the experimental group were processed after a brief period of fasting. Two birds were randomly selected from each group during the selection process and then slaughtered. After adequate bleeding, feathers were removed from the birds. Once de-feathered, the birds were eviscerated, and the head and feet were detached. Carcasses processed conventionally were individually weighed, measured, and divided into major anatomical parts (such as back, breast, drumstick, feet, gizzard, proventriculus, heart, liver, neck, spleen, thigh, and wing) before being packaged in zip lock bags. The proportion and weight of specific body components were used as the basis for analysis, and the findings were presented as a percentage of the carcass weight.

Fig 4.Slaughtering.

Fig 5.Carcass dissection.

Fig 6.Weighing of different parts.

Fig 7. Hanging of chicken for adequate bleeding.

2.8 Statistical analysis

The data on weight gain, feed consumption, FCR, carcass characteristics were analyzed using PROC GLM in SAS (2007) and Microsoft Excel. The ANOVA was performed as described by Khatun et al. (2018). To compare means with significant differences, the Duncan's New Multiple Range Test (Duncan, 1955) was utilized. The statistical significance level was indicated as ($p<0.05$).

Chapter-3
Result

The findings of the dietary effect of Palm oil, Rice bran oil and Sesame oil on broiler growth (Body weight gain, FCR),performance, carcass characteristics are described in this chapter.

3.1 Body weight: Throughout the entire experiment, the body weight of the birds was recorded from 1st to 5th week(Table 5). According to the results, The body weight of 1st and 2nd week is significant. In 1st week T5 has highest body weight while T1 has lowest. In 2nd week T5 has highest and T4 has lowest body weight. There is no significant difference in 3rd week. In 4th and 5th week, there is highly significant difference in different treatment group. In 4th week highest weight in T2 and lowest in T1.In 5th week there is also highest weight in T2 and lowest weight in T1.

Table 5. Effect of different combinations of oil on body weight of broiler in every week-

Parameter	Treatment					P value	Level of significance
	T1	T2	T3	T4	T5		
Body weight at 1st week	123.617^{c}	131.810^{b}	136.097^{ab}	131.021^{b}	139.857^{a}	0.0040	**
Body weight at 2nd week	266.672^{b}	296.286^{a}	269.417^{b}	251.000^{b}	297.167^{a}	0.0011	**
Body weight at 3rd week	422.18	499.37	469.35	465.92	482.55	0.0712	NS
Body weight at 4th week	698.58^{b}	825.22^{a}	787.07^{a}	793.67^{a}	793.69^{a}	0.0008	***
Body weight at 5th week	1108.42^{b}	1297.85^{a}	1257.06^{a}	1249.42^{a}	1286.03^{a}	0.0006	***

a,b,c in a row with no shared superscripts deviate significantly ($p<0.05$). The data is presented as an average of three replicate groups of seven birds each. (n=21). * T1(Basal diet+PO4%),T2 (Basal diet+PO2%+SO2%),T3(Basaldiet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+ SO1%).** = Significant, NS = Not Significant.

3.2 Body weight gain

According to Table 6,The body weight gain of 1st and 2nd week is highly significant. In 1st week T5 has highest body weight gain while T1 has lowest. In 2nd week T2 has highest and T4 has lowest body weight gain. There is no significant difference in 3rd week. In 4th and 5th week, there is highly significant difference in different treatment group. In 4th week highest weight gain in T4 and lowest in T1.In 5th week there is also highest weight gain in T5 and lowest weight in T1.

Table 6. effect of different combinations of oil on body weight gain of broiler-

Parameter	Treatment					P value	Level of significance
	T1	T2	T3	T4	T5		
Body weight gain 1st week	11.3467^{c}	12.5038^{b}	13.1362^{ab}	12.4230^{b}	13.6560^{a}	0.0044	**
Body weight gain at 2nd week	20.437^{bc}	23.497^{a}	19.046^{cd}	17.140^{d}	22.473^{ab}	0.0009	***
Body weight gain at 3rd week	22.216	29.012	28.563	30.702	26.483	0.2227	NS
Body weight gain at 4th week	39.486^{b}	46.550^{a}	45.388^{a}	46.821^{a}	44.449^{a}	0.0463	*
Body weight gain at 5th week	58.448^{b}	67.519^{a}	67.142^{a}	65.107^{ab}	70.334^{a}	0.0406	*

^{a,b,c} in a row with no shared superscripts deviate significantly ($p<0.05$). The data is presented as an average of three replicate groups of seven birds each. (n=21). * T1(Basal diet+PO4%),T2 (Basal

diet+PO2%+SO2%),T3(Basaldiet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+ SO1%).** = Significant, NS = Not Significant.

3.3 Feed intake

According to Table 7,Significantly higher ($p<0.05$) feed intake is found in 1st week. Highest feed intake is found in T5 and lowest feed intake is found in T4.There is no significant difference in the 2nd,3rd,4th and 5th week.

Table 7. weekly feed intake-

Parameter	Treatment					P value	Level of significance
	T1	T2	T3	T4	T5		
Feed intake at 1st week	17.7075[a]	18.0612[a]	18.5646[a]	15.8214[b]	17.8639[a]	0.0055	**
Feed intake at 2nd week	45.768	39.103	38.700	33.810	38.794	0.1125	NS
Feed intake at 3rd week	59.374	58.182	47.030	49.565	43.791	0.1104	NS
Feed intake at 4th week	99.60	84.09	80.85	88.80	76.55	0.4575	NS
Feed intake at 5th week	133.10	100.84	99.22	117.68	115.48	0.0531	NS

[a,b,c] in a row with no shared superscripts deviate significantly ($p<0.05$). The data is presented as an average of three replicate groups of seven birds each. (n=21). * T1(Basal diet+PO4%),T2 (Basal

diet+PO2%+SO2%),T3(Basaldiet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+ SO1%).** = Significant, NS = Not Significant.

3.4 Effect of experimental diet on FCR

Feed conversion of broilers among different treatment groups differed significantly ($p<0.05$). According to Table 8, In the 1st week,3rd week and 5th week feed conversion ratio (FCR) is significant. In the 2nd week and 4th week it shows non-significant .Overall,T1 has inferior FCR value and T5 has superior FCR value.

Table 8. weekly FCR (Feed conversion ratio)-

Parameter	Treatment					P value	Level of significance
	T1	T2	T3	T4	T5		
FCR at 1st week	1.56065^{a}	1.44380^{ab}	1.41859^{abc}	1.27444^{c}	1.31101^{bc}	0.0102	*
FCR at 2nd week	2.2434	1.6645	2.0537	1.9700	1.7258	0.1050	NS
FCR at 3rd week	2.6741^{a}	2.0612^{b}	1.6325^{b}	1.6459^{b}	1.6528^{b}	0.0078	**
FCR at 4th week	2.5267	1.8096	1.7816	1.8818	1.7268	0.0541	NS
FCR at 5th week	2.2734^{a}	1.5009^{b}	1.4784^{b}	1.8043^{b}	1.6406^{b}	0.0013	**

^{a,b,c} in a row with no shared superscripts deviate significantly ($p<0.05$). The data is presented as an average of three replicate groups of seven birds each. (n=21). * T1(Basal diet+PO4%),T2 (Basal diet+PO2%+SO2%),T3(Basaldiet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+ SO1%).** = Significant, NS = Not Significant.

3.5 Overall performance

The Table 9 shows the effect of different combinations of oil on the overall growth and performance of the broiler from day 1 to day 35 of the trial. The results revealed that the diets group have no significant differences in initial weight but significantly differed ($p<0.05$) in the final weight, weight gain, feed intake and feed conversion ratio. Significantly higher body weight gain and superior FCR were observed bird fed combination of Sesame oil, Rice bran oil and Palm oil diet(T5).

Table 9. overall growth performance of broiler-

Parameter	Treatment					P value	Level of significance
	T1	T2	T3	T4	T5		
Initial weight (g)	44.19000	44.28333	44.14333	44.06000	44.26433	0.2270	NS
Final weight (g)	1108.42^{b}	1297.85^{a}	1257.06^{a}	1249.42^{a}	1286.03^{a}	0.0006	***
Weight gain (g)	1064.23^{b}	1253.57^{a}	1212.92^{a}	1205.36^{a}	1241.77^{a}	0.0006	***
Feed intake (g)	2488.8^{a}	2101.9^{b}	1990.6^{b}	2139.8^{b}	2047.3^{b}	0.0425	*
FCR	2.3388^{a}	1.6832^{b}	1.6410^{b}	1.7706^{b}	1.6497^{b}	0.0007	***

^{a,b,c} in a row with no shared superscripts deviate significantly ($p<0.05$). The data is presented as an average of three replicate groups of seven birds each. (n=21). T1(Basal diet+PO4%),T2 (Basal diet +PO2%+SO2%),T3(Basaldiet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+SO1 %).** = Significant, NS = Not Significant.

3.6 Carcass characteristics of broiler

In the Table 10, the differences in carcass characteristics across the experimental birds are shown. The carcass parameters significantly differed ($p<0.05$) in terms of Carcass wt., Blood wt. , Wing wt. and Gizzard wt. . There is no significant difference on other parameter .The carcass weight is highest in T5 and lowest in T4.Blood weight is highest in T4 and lowest in T5.Wing weight is highest in T4 and lowest in T1.Gizzard weight is highest in T4 and lowest in T2.

Table 10. Effect on different carcass characteristics-

Parameter	Treatment					P value	Level of significance
	T1	T2	T3	T4	T5		
Carcass wt.	94.8260^{a}	94.9007^{a}	94.6212^{a}	91.9528^{b}	95.1240^{a}	0.0020	**
Blood wt.	5.1740^{b}	5.0993^{b}	5.3788^{b}	8.0472^{a}	4.8760^{b}	0.0020	**
Dress wt.	57.255	58.797	58.623	55.505	58.457	0.1505	NS
Wing wt.	4.5643^{b}	4.7605^{b}	5.2075^{ab}	6.1832^{a}	5.6232^{ab}	0.0436	*
Breast wt.	16.492	19.554	18.432	16.485	18.944	0.1689	NS
Bursa wt.	0.19018	0.23753	0.27761	0.18399	0.20690	0.1957	NS
Thigh wt.	8.8115	9.0986	8.9072	8.9668	9.6603	0.3845	NS
Drumstick wt.	8.3456	9.1998	9.1220	8.2330	8.7810	0.3173	NS
Shank wt.	4.5944	4.9293	5.2795	4.9559	4.5765	0.2431	NS
Liver wt.	3.2124	2.8689	2.7312	3.5639	2.4879	0.1288	NS
Gizzard wt.	3.0375^{bc}	2.5287^{c}	2.6744^{bc}	3.7134^{a}	3.1076^{b}	0.0014	**
Spleen wt.	0.15806	0.14148	0.15451	0.14833	0.16363	0.9901	NS
Heart wt.	0.5553	0.5926	0.4830	0.7386	0.6056	0.2011	NS

Head wt.	2.9522	2.7893	2.6555	2.9141	2.5815	0.1627	NS
Neck wt.	2.7548	2.5833	2.8027	2.5767	2.2590	0.1406	NS
Abdominal fat wt.	0.9621	0.6298	0.7480	0.5287	0.9621	0.2874	NS

^{a,b,c} in a row with no shared superscripts deviate significantly ($p<0.05$). The data is presented as an average of three replicate groups of seven birds each. (n=21). T1(Basal diet+PO4%),T2 (Basal diet +PO 2% + SO 2%),T3(Basal diet+PO2%+RBO2%),T4(SO2%+RBO2%),T5(PO2%+RBO1%+SO1%).** = Significant, NS = Not Significant.

Chapter-4

Discussion

This chapter provides a detailed analysis of the current trial in comparison to previous research that explored the effects of Palm oil, Rice bran oil and Sesame oil on various aspects of broiler growth. It focuses on factors such as growth performance, carcass characteristics of broiler meat. By contrasting the findings of the current trial with earlier studies, this chapter aims to highlight similarities, differences, and any advancements in understanding the influence of these dietary components on broiler performance and meat quality.

4.1 Growth performance:

The inclusion of Palm oil, Rice bran oil and Sesame oil in broiler feeds had no negative impact on the body. There was no signs of abnormal behaviour, no toxicity effect and no changes in motor activity. According to the results of overall performance, there is no significant difference in the initial weight gain. Ayed *et al*.,(2015) stated that inclusion of oils on broiler diet has less effect in the initial stage which is similar to our current investigation. In this part, the evaluation of the current trial is being discussed and contrasted with some earlier research. The impact of different combination of Palm oil, Sesame oil and Rice bran oil on growth performance and carcass characteristics is being elavorated. The final weight and final weight gain was highest in the group which was treated with a combination of 2% Palm oil and 2% Sesame oil. There was lowest final weigh and weight gain when the chickens were only treated with 4% palm oil. Palm oil contains large amount of saturated fatty acids. It is proven that unsaturated fatty acids increase available metabolizable energy compared to saturated fatty acids. Unsaturated fatty acids have higher digestibility and more absorption efficiency (Rodriguez-Sanchez *et.al*.,2021). Our experiment demonstrated that when birds were fed with only 4% Palm oil there was increased feed intake which resulted in increased FCR. When birds were fed with a combination of Palm oil 2% and Rice bran oil 2% , there was decreased FCR. Presence of unsaturated fatty acid is the main reason behind the effect of Rice bran oil on FCR. PUFAs easily oxidized to energy in compared to SFAs(Baião NC *et.al*., 2005) In addition, Rice bran oil reduces feed intake which is another reason for lowering FCR. Chickens eat more feed when diets contain palmitic or stearic acid and eat less

when linoleic or oleic acid are present. (Atteh *et al.,*1983). Wang *et.al*., (2013) stated that combined oil produces higher performances compared to single oil which is also consistent with our study. The overall performance indicates that among the experimental groups, combination of 2% Palm oil,1% Rice bran oil and 1% Sesame oil showed standard weight gain, better FCR and lower feed intake in contrast to others.

4.2 Carcass characteristics:

The study revealed that different dietary combinations had impact on carcass parameters like Carcass weight, Blood weight, Wing weight and Gizzard weight while having no effect on other metrics .According to Bharath *et al.,* (2017),supplementation of n-3 fatty acid sources such as Sesame oil, Rice bran oil have positive effect on carcass yield. In our study, dietary group with 2% Palm oil,1% Rice bran oil and 1% Sesame oil showed highest carcass weight.

Chapter 5: Conclusion

The dietary effect of Palm oil, Rice bran oil and Sesame oil on growth performance and carcass characteristics of broiler were investigated. There was less feed intake and superior FCR was observed in T3 fed bird. On the other hand, more feed intake and inferior FCR was observed in T1. Final body weight and body weight gain was also lowest in T1.Based on the result in this study we observed that all dietary supplemented treatment groups produced better performance than the control group,(T1). Among all treatment groups, T5 fulfilled most of the desired traits.

Thus, it can be concluded that combination of palm oil, Rice bran oil and Sesame oil at a 2:1:1(PO/RBO/SO) ratio may be a good alternative fat source for use in chicken diets.

Limitations

The current study had following limitations:

1. Feeding trial was given to only 100 commercial broilers. To determine the authentic effectiveness, this should be conducted on more population and in different broiler strain.

2. We did not perform any biochemical test to identify the change of different biological parameters of the body.

3. The tests regarding determination of meat quality wasn't done.

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Biography

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