

Performance of Broiler Chickens ,Fed Different Dietary Fat Sources

Graduation Research Project 2020

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Introduction

The inclusion of fat and oil is a common practice in modern poultry production to increase the energy content of diet, improves the absorption of fat-soluble vitamins, increases the palatability of the rations, and increases the efficiency of the consumed energy (lower caloric increment).


Furthermore, it reduces the passage rate of the digesta in the gastrointestinal tract, which allows a better absorption of all nutrients present in the diet.

Oils are expensive because of their competition with human food, which limits its use when formulating least cost rations, animal fat or vegetable oils may be used as a source of energy up to a maximum of 6% in the diet.



Herbs and herbal products are incorporated in poultry diets to stimulate body weight (BW) gain and improve feed efficiency. Thyme (*Thymus vulgaris*) and oregano (*Origanum vulgare*) are common medicinal plants known for their antibacterial properties, mainly due to their active components thymol and carvacrol.

The proposed research will focus on some important oils such as oregano and thyme oil and measuring their effect on the performance of broiler chickens.



Thyme (*Thyme vulgaris* L.)

Thyme is a medicinal plant that is used for the medical. This vegetation is spread throughout the Mediterranean area .Plant extracts, such as essential or volatile oils, are usually utilized in animal feeding and are considered growth and immune enhancers due to their antioxidant, antimicrobial and digestion properties. The main functions of volatile essential oils are the control of pathogenic bacteria, the stimulation of endogenous digestive enzyme activity, increasing absorbed nitrogen and the control of excreta odor and ammonia content .

Thymol and carvacrol are the major components of herbal oil, which form 20–55% of thyme oil extract, and showed considerable antimicrobial properties with no negative effects such as residues in animal meat and bacterial cross resistance.

Table 1: Chemical composition of Thyme Oil(%)

Thymol	39.44
P-cymene	23.6
Y-Terpinene	12.51
Ledol	2.24
Aromadenrrene	2.12
Caryophyllene	0.94
Farnesyl acetate	0.63
Linalyl acetate	0.55

Oregano(*Origanum vulgare*)

Oregano is an aromatic plant used to improve organoleptic characteristics of foods. Oregano oil (OO) is obtained from plant leaves and contains high amounts of thymol and carvacrol. These phenolic compounds have anti-parasitic, antimicrobial and antioxidant activity.

Oregano oil is used in broilers to promote growth and reduce conventional antibiotics use.

Table 2: Chemical composition of Oregano Oil(%)

Thymol	93.34
Linalool	0.21
α-pinene	0.27
α-terpinolene	0.27
P-cymene	0.99
α-terpinene	1.29
Trans-Caryophyllene	0.72
Germacrene	0.13



Objectives

The aim of the research is to:

Find whether you can use oregano oil, thyme oil, or their mixture as a substitute for stock oil in the ration formulation.

Measuring the effect of these oils on the performance of broiler chickens.

Materials and Method

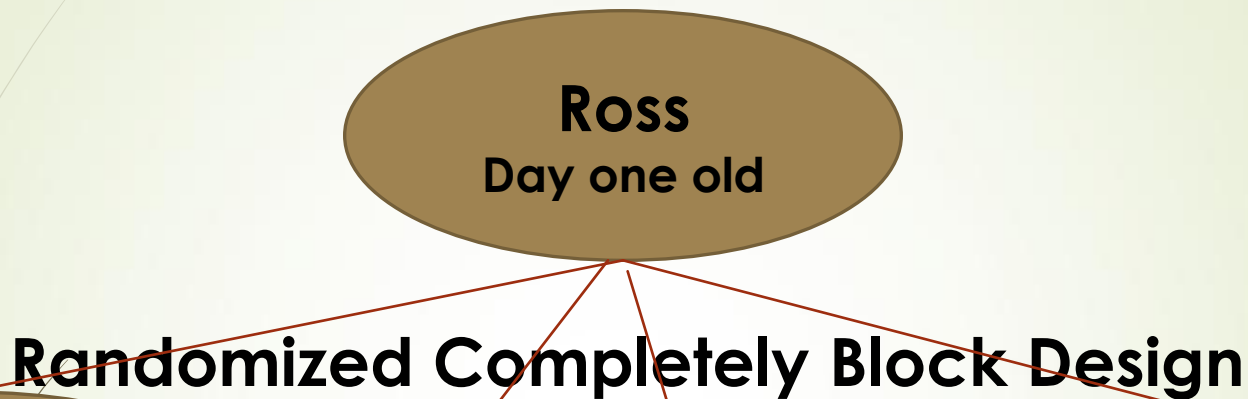
Birds and experimental design:

Six hundred and twenty four one- day -old broiler chicks of the ross strain were be obtained from local hatchery and randomly assigned the four treatment. They are 4 diets: each will be fed to 3 replicate pens of 52 chicks of each. Feed and water will be supplied ad libitum. All chicks were fed starter ration 1 up to 21 day and the finisher diets form 22 to 42 day of life.

The bird feeding was divided into four groups. The first group was fed stock oil (control), second group was fed thyme oil (T1) ,third group was fed oregano oil (T2), and last group was fed mix (oregano oil and thyme oil)(T3).

Animals in each group were closely monitored and daily mortalities were recorded.

Experimental Design



Control group
C
(stock oil)

C

Treatment
1
1kg (thyme Oil)

T1

Treatment
2
1 Kg
(Oregano
Oil)

T2


Treatment
3
(Mix: oregano
o 50% and
thyme 50%)

T3



Statistical Analysis

Analysis of variance was used to test the significance of treatment effects. Differences among treatment's groups means were tested using Duncan's multiple range test with a significance level of 0.05. These analyses were performed using SPSS statistical software program.





Results

There are significant differences in chicken weight (p value < 0.05), among the four treatments.

There are significant differences in feed conversion ratio (p value < 0.05), among the four treatments.

The lowest mortality was in the oregano oil group due to its high content of thymol and because thymol contains have anti-parasitic, antimicrobial and antioxidant activity.

Table 3 :Average weight in total chickens for the four groups (g).

Days	C	T1	T2	T3
7	163	173	178	163
14	400 ^c	413 ^b	426 ^a	401 ^c
24	720	746	760	723
28	1148 ^c	1162 ^b	1177 ^a	1148 ^c
35	1538	1550	1571	1537
42	1965 ^c	2009 ^b	2026 ^a	1971 ^c

Results are expressed as mean and SE, standard error of the four independent samples (n=3). Abbreviations: Control(stock oil 100%),T1(Thyme oil 1Kg %),T2(oregano oil 1Kg),T3(oregano 50%and Thyme 50%)); Stat. signif., statistical significance; a, b, c, statistically different means (Duncan test; $p \leq 0.05$).

Table 4: Feed Conversion Ratio (FCR) for the four groups

Days	C	T1	T2	T3
7	0.87	0.84	0.82	0.88
14	1.23 ^c	1.19 ^b	1.17 ^a	1.23 ^c
21	1.44	1.40	1.37	1.44
28	1.60 ^c	1.57 ^{a,b}	1.55 ^a	1.59 ^{b,c}
35	1.85	1.82	1.80	1.84
42	2.04 ^c	1.99 ^b	1.97 ^a	2.04 ^c

Results are expressed as mean and SE, standard error of the four independent samples (n=3). Abbreviations: Control(stock oil 100%),T1(Thyme oil 1Kg),T2(oregano oil 1Kg) T3(oregano 50%and Thyme 50%)); Stat. signif., statistical significance; a, b, c, statistically different means (**Duncan** test; $p \leq 0.05$).

Table 5: Average feed intake in total chickens for the four groups (g).

Days	C	T1	T2	T3
7	142	145	146	143
14	491	493	496	493
21	1036	1143	1041	1039
28	1838	1820	1827	1821
35	2843	2816	2821	2826
42	4014	3995	4004	4016

Results are expressed as mean and SE, standard error of the four independent samples (n=3). Abbreviations: Control(stock oil 100%),T1(Thyme oil 1Kg),T2(oregano oil 1Kg),T3(oregano 50%and Thyme 50%)); Stat. signif., statistical significance; a, b, c, statistically different means (**Duncan** test; $p \leq 0.05$).

Table 6: Mortality percentage (%) for the four groups.

Days	C	T1	T2	T3
7	0	0	0	0
14	1.28	1.28	1.28	1.28
21	1.92	3.84	1.92	3.21
28	3.2	0.64	1.92	1.28
35	0.64	0	0.64	0.64
42	0	0.64	0	0.64
Total	7.05	6.41	5.77	7.05

Results are expressed as mean and SE, standard error of the four independent samples (n=3). Abbreviations: Control(stock oil 100%),T1(Thyme oil 1Kg),T2(oregano oil 1Kg),T3(oregano 50%and Thyme 50%)); Stat. signif., statistical significance; a, b, c, statistically different means (**Duncan** test; $p \leq 0.05$).



Conclusion

From the results that obtained, oregano oil achieved the best possible results, as it achieved the best conversion rate and the lowest mortality, and it can be used as an alternative to oil stocks, as well as thyme oil, but other experimental research is needed to introduce these oils into feed ration.

