OPEN ACCESS
©NIJRMS
Publications 2024
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041

NEWPORT INTERNATIONAL JOURNAL OF RESEARCH IN MEDICAL SCIENCES (NIJRMS)

Volume 5 Issue 3 2024

https://doi.org/10.59298/NIJRMS/2024/5.3.2933



# The effect of feed Supplementation with *Cannabis sativa* on the Growth rate and Development of Broiler Chicks

**Zitte Leelee Famii and Edet Uduakobong Oluwafeyikemi**

**Department of Animal and Environmental Biology, Faculty of Science, University of Port Harcourt, Nigeria.**
**Correspondence Author: +234-803-7971-401, leelee.zitte@uniport.edu.ng**

## ABSTRACT

This experiment was carried out to study the effect of broiler feed supplementation with dry powdered *Cannabis sativa* on the growth performance of broiler chicks. A total of 25 day-old broiler chicks of similar weight were randomly divided into five equal groups (1, 2, 3, 4 and 5). Each group having 5 chicks. Dry ground *Cannabis sativa* powder were added to the feed of groups 2, 3, 4 and 5 at the rate of 0.1%, 0.2%, 0.4% and 0.8% respectively per kg of feed, while group 1 served as control. The studied parameters were body weight, feed intake and feed conversion ratio (FCR). After an experimental period of 28 days, the data were analyzed statistically. It was revealed from the results that feed intake and body weight gain was significantly higher ($P<0.05$) in group 5 compared to the control. FCR was significantly better in birds of group 5 compared to controls. Return per chick (in Naira) was lower in group 5 compared to group 2, 3 and 4 ($P<0.05$) due to the high cost of *Cannabis sativa*. It was concluded from these results that feed supplementation with *Cannabis sativa* has a remarkable impact on the growth rate and development of broiler chicks but may not be the best of option due to its restriction and cost

Keywords: Broilers, *Cannabis sativa*, Feed intake, Weight gain, FCR.

## INTRODUCTION

*Cannabis sativa* (Cannabaceae) is a diploid (2n = 20) dicotyledonous annual herbaceous plant that is distributed worldwide Cannais sativa is grown naturally and can be cultivated both indoors and outdoors, with specific strains suited for various growing conditions. *Cannabis sativa* contains compounds such as phytocannabinoids and plant sterols. Tetrahydrocannabinol (THC) is potent lipophilic antioxidants which stimulates appetite [1]; [2]. It is one of the three primary cannabis species, alongside Cannabis indica and Cannabis ruderalis. It is well known for its psychoactive and medicinal properties. Historically, *Cannabis sativa* has been used as an important source of food, fiber and medicine for thousands of years [3]; [4]. The plant is also called Hempseed, Indian hemp, Marijuana, and known locally as weed, ganja, igbo, mary jane, pot, kaya e.t.c. It contains over one hundred different cannabinoids (a group of C21 terpenophenolic compounds), with delta-9-tetrahydrocannabinol (Δ9-THC) and cannabidiol (CBD) being the most well- known. Δ9-tetrahydrocannabinol (Δ9-THC) is responsible for the psychoactive effects as it is known to have addictive properties but is efficacious as an analgesic, antiemetic, and antispastic agent while cannabidiol (CBD) a nonpsychoactive cannabinoid has potential therapeutic effects and has been clinically validated to treat specific medical conditions, such as epilepsy, glaucoma, and depressive disorders. While Cannabis has therapeutic potential, it can also have adverse effects including impaired cognitive function, addiction and mental health issues when used in excess.

Cannabis sativa strains are often associated with a "head high", leading to feelings of euphoria, pleasure and creativity, making them popular for recreational use. The popularity of Cannabis sativa as a recreational drug cannot be overemphasized as an estimated 2.5% of the world's population (about 147 million individuals), consume cannabis according to WHO. Cannabis is mostly consumed through smoking but can also be consumed by oral ingestion in food and drinks or vapouring. The legal status of Cannabis sativa varies widely around the world, with some countries and regions

ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041


legalizing its recreational and medicinal use, while others strictly regulate or prohibit it. The use of it is currently prohibited in Nigeria. Despite the numerous benefits of Cannabis sativa, its full potential is yet to be explored and utilized, while the dangers of abuse and addiction associated with the use of Cannabis have dominated the narrative surrounding its use, it is important to recognize and acknowledge the numerous beneficial uses and applications of this versatile plant species. Feed is a major component affecting net return from the poultry business, since 60- 70% of input is spent on poultry feed [5]. To maximize net return and to minimize feed cost, different feed additives are mixed with poultry feed in order to achieve desirable results. This can help farmers achieve greater results (increased growth rate of birds) in less time which will improve their profit margin and reduce their cost of production. Therefore, this study was undertaken to evaluate the effect of Cannabis sativa on the growth performance and economics of rearing broiler chicks. Ultimately, this research aims to enhance our knowledge and helps to ensure the safe use of Cannabis sativa.

## MATERIALS AND METHODS

This research was conducted at a poultry farm located at Rumuekini, Rivers state. After accessing a permit, the *Cannabis sativa* used in this research was locally sourced from a farmer in Igboh axis, Etche local government area of Rivers state. After collection, the Cannabis sativa was dried and ground into fine powder. This was done to properly incorporate it into the feed to avoid it being selected out by the broilers. A total of twenty-five (25) day-old commercial broiler chicks of similar weight (about 40 - 42g) were obtained from the local market, after which the Animals were brooded for a total of three (3) weeks before proper commencement of the experiment. After brooding, the animals were randomly divided into five (5) equal groups 1, 2, 3, 4 and 5. Group 1 being the control group and group 5 being fed the most amount of *Cannabis sativa*. The birds were raised in conventional deep litter system, in an open sided house. All the pens were located in one house to have identical environment. Chicks were reared in cages in an open sided house, provided with feeders, drinkers and electric bulbs, while wood shaving (saw dust) were used as bedding material. Strict sanitation practices were applied throughout the course of the experiment. After preparation, the Cannabis sativa was added to commercial starter and finisher at 0.1%, 0.2%, 0.4% and 0.8% per kg of feed for groups 2, 3, 4 and 5 respectively. During the course of the experiment, data on body weight and feed conversion ratio were recorded for each group on a weekly basis. While feed intake was recorded on a daily basis. The ingredients and composition of basal diet is given in Tables .1 and .2. The duration of the experiment was 4 weeks (28 days). The data were statistically analyzed through analysis of variance (ANOVA), to compare the results of different treatments. Significant differences was evaluated using Duncan multiple test in post hoc comparison test data presented as mean ± standard error of mean (mean ± SEM). The analysis was carried out using version 21 of statistical package for social sciences (SPSS). Significant differences was noted at $P \leq 0.05$ for 95% confidence limit.

## RESULTS

### Feed intake

The feed consumption data revealed significant differences among the groups. Feed consumption was significantly higher (969.20 ± 10.58) in group 5 compared to other groups, while feed consumption was lowest (676.79 ± 11.23) in group 1 (table 1). Feed intake results shows that group 1 had a weekly consumption data of 341.2±24.22(g), 395.8±17.32(g), 531.40±19.25(g), 676.79±11.23(g) at week 1, 2, 3 and 4 respectively. Group 2 had a weekly consumption data of 351.99±12.05(g), 484.00±28.51(g), 552.40±18.78(g), 710.00±10.05(g) at week 1, 2, 3 and 4 respectively. Group 3 had a weekly consumption data of 377.00±11.67(g), 486.00±5.80(g), 616.40±26.35(g), 777.80±10.38(g) at week 1, 2, 3 and 4 respectively. Group 4 had a weekly consumption data of 396.40±16.38(g), 501.20±25.32(g), 675.60±26.15(g), 871.00±12.38(g) at week 1, 2, 3 and 4 respectively. Group 5 had a weekly consumption data of 552.20±38.52(g), 749.80±30.18(g), 836.00±20.38(g), 969.20±10.58(g) at week 1, 2, 3 and 4 respectively.

### Feed conversion ratio

The feed intake data revealed significant differences in feed consumption between the groups. Statistical analysis of the feed efficiency data revealed significant differences between the groups, with group 5 showing significantly higher FCR ($P<0.05$) than the control. FCR was lowest in group 1 (control group). Feed conversion ratio result shows that group 1 had a FCR of 4.92, 4.40, 2.03 and 2.07 at week 1, 2, 3 and 4 respectively with a mean FCR of 3.35 at the end of the experiment. Group 2 had a FCR of 4.19, 4.14, 2.34 and 1.60 at week 1, 2, 3 and 4 respectively with a mean FCR of 3.07 at the end of the experiment. Group 3 had a FCR of 3.56, 3.06, 2.42 and 1.53 at week 1, 2, 3 and 4 respectively with a mean FCR of 2.65 at the end of the experiment. Group 4 had a FCR of 3.04, 2.63, 2.21 and 1.72 at week 1, 2, 3 and 4 respectively with a mean FCR of 2.40 at the end of the experiment. While, Group 5 had a FCR of 3.08, 2.51, 2.68 and 1.61 at week 1, 2, 3 and 4 respectively with a mean FCR of 2.47 at the end of the experiment, indicating group 5 as the group with the most feed efficiency and group 1 as the group with the least feed efficiency (table 2).

OPEN ACCESS
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041

**Body weight**

The statistical analysis revealed that the level of *Cannabis sativa* was positively associated with weight gain, and that the mean body weight gain at the end of the experiment was substantially larger ($P<0.05$) in group 5 compared to the control. As evident from the observations recorded in Table 3, addition of Cannabis sativa at 0.8% per kg resulted in maximum weight gain (1902.6±23.73) for group 5. This resulted in group 5 having the highest mean body weight and group 1 having the lowest (table 3). Body weight results shows that group 1 had a weekly weight increase of 13.62%, 31.29%, 82.61% and 146.72% at week 1, 2, 3 and 4 respectively. Group 2 had a weekly weight increase of 16.59%, 39.69%, 86.33% and 174.13% at week 1, 2, 3 and 4 respectively. Group 3 had a weekly weight increase of 20.85%, 52.11%, 102.25% and 202.05% at week 1, 2, 3 and 4 respectively. Group 4 had a weekly weight increase of 25.88%, 63.69%, 124.21% and 224.41% at week 1, 2, 3 and 4 respectively. While Group 5 had a weekly weight increase of 35.11%, 93.87%, 155.23% and 273.64% at week 1, 2, 3 and 4 respectively, indicating that group 5 had the highest growth rate and group 1 had the least (table 4).



**Table 1: Weekly feed consumption data per group**

| Day | GROUP 1(g) | GROUP 2 (g) | GROUP 3 (g) | GROUP 4 (g) | GROUP 5 (g) |
|---|---|---|---|---|---|
| wk1 | 341.2±24.22 | 351.99±12.05 | 377 .00±11.67 | 396.40 ±16.38 | 552.20± 38.52 |
| wk2 | 395.8 ±17.32 | 484 00±28.51 | 486.00 ±5.80 | 501.20±25.32 | 749.8030.18 |
| wk3 | 531.40±19.25 | 552.40±18.78 | 616.40 ±26.35 | 675.60 ±26.15 | 836 .00±20.38 |
| wk4 | 676.79±11.23 | 710.00 ±10.05 | 777.80±10.38 | 871.00±12.56 | 969.20 ±10.58 |

**Table 2: Weekly FCR of the groups over four (4) weeks**

| Day | GROUP 1 (g) | GROUP 2 (g) | GROUP 3 (g) | GROUP 4 (g) | GROUP 5 (g) |
|---|---|---|---|---|---|
| WK1 | 4.92 | 4.19 | 3.56 | 3.04 | 3.08 |
| WK2 | 4.40 | 4.14 | 3.06 | 2.63 | 2.51 |
| WK3 | 2.03 | 2.34 | 2.42 | 2.21 | 2.68 |
| WK4 | 2.07 | 1.60 | 1.53 | 1.72 | 1.61 |
| **mean** | ***3.35*** | ***3.07*** | ***2.65*** | ***2.40*** | ***2.47*** |

The least FCR indicate the best feed efficiency in carcass growth

**Table 3: Weight of the birds over the experimental period**

| | GROUP 1 | GROUP 2 | GROUP 3 | GROUP 4 | GROUP 5 |
|---|---|---|---|---|---|
| week 0 | $509.4\pm7.24_a$ | $506.4\pm6.83_a$ | $507.4\pm10.42_a$ | $504.6\pm13.50_a$ | $509.2\pm10.20_a$ |
| week 1 | $578.8\pm27.27_a$ | $590.4\pm16.40_a$ | $613.2\pm25.07_{ab}$ | $635.2\pm24.66_b$ | $688\pm34.37_b$ |
| week 2 | $668.8\pm19.13_a$ | $707.4\pm16.40_a$ | $771.8\pm23.55_b$ | $826\pm24.66_b$ | $987.2\pm16.78_c$ |
| week 3 | $930.2\pm20.45_a$ | $943.6\pm35.22_a$ | $1026.2\pm20.81_c$ | $1131.4\pm37.47_d$ | $1299.6\pm6.03_e$ |
| week 4 | $1256.8\pm32.19_a$ | $1388.2\pm54.38_b$ | $1532.6\pm20.87_c$ | $1637\pm46.23_c$ | $1902.6\pm23.73_d$ |

Each value represents Mean ± SEM, n =5 ,$P \leq 0.05$. Values on the same row having the same alphabetical subscripts are not significantly different from each other.

OPEN ACCESS
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041

**Table 4: Weekly percentage growth per group**

| | GROUP 1 | GROUP 2 | GROUP 3 | GROUP 4 | GROUP 5 |
|---|---|---|---|---|---|
| week 1 | 13.62 | 16.59 | 20.85 | 25.88 | 35.11 |
| week 2 | 31.29 | 39.69 | 52.11 | 63.69 | 93.87 |
| week 3 | 82.61 | 86.33 | 102.25 | 124.21 | 155.22 |
| week 4 | 146.72 | 174.13 | 202.05 | 224.41 | 273.64 |



## DISCUSSION

This experiment was carried out to investigate the effect of feed supplementation with Cannabis sativa on the growth rate and development of broiler chicks. Cannabis sativa, commonly known as marijuana or hemp, contains various psychoactive compounds, with delta-9-tetrahydrocannabinol (THC) being the primary psychoactive component [6]. The endocannabinoid system (ECS), present in both humans and animals, plays a crucial role in regulating physiological processes, including appetite [7]. This discussion aims to explore the potential impact of Cannabis sativa on broiler chicks, investigating whether the psychoactive properties of THC influence their feeding behavior. Cannabis, specifically the psychoactive compound THC (tetrahydrocannabinol), is known to increase appetite through its interaction with the endocannabinoid system in the body [8]. The endocannabinoid system plays a crucial role in regulating various physiological processes, including appetite, mood, and sleep. According to a study by [9], when THC binds to cannabinoid receptors in the brain, particularly the CB1 receptors, it stimulates the release of certain neurotransmitters and hormones that influence appetite. The primary neurotransmitter involved in this process is ghrelin, often referred to as the "hunger hormone". According to [10], Ghrelin increases appetite and promotes the intake of food. THC also enhances the sensitivity of taste and smell receptors, making food more appealing. Additionally, THC can affect the hypothalamus, a region of the brain that plays a central role in regulating appetite and energy balance. It may alter the perception of hunger and satiety, leading to an increase in the desire to eat. It is worth mentioning that not all cannabinoids have the same effect on appetite. Cannabidiol (CBD), another major cannabinoid found in cannabis, does not have the same appetite-stimulating properties as THC. Research has suggested that CBD may have appetite-suppressing effects [11]. The hypothesis of this experiment posits that broiler chicks exposed to cannabis supplementation will exhibit increased feed consumption compared to the control group. This hypothesis is based on the assumption that the psychoactive effects of THC on the avian endocannabinoid system may influence appetite and feeding behavior in a manner similar to the observed "munchies" effect in humans. Results from this experiment has demonstrated that feed supplementation with 0.8% *Cannabis sativa* had the best effect on the feed intake, feed conversion ratio and weight gain of broiler chicks as the results indicate that birds of group 5 had the highest growth rate, highest body weight and lowest FCR values indicating that the feed was efficiently converted into weight gain. The results also hypothesizes that the psychoactive properties of THC influenced the feeding behaviour of the broiler chicks leading to an increase in appetite and subsequently feed intake. The positive results of this experiment could open avenues for further research into optimizing feed strategies in the poultry industry. Understanding the potential impact of *Cannabis sativa* on broiler chicks' feed consumption may have implications for enhancing growth and production efficiency. Additionally, it would underscore the need for comprehensive studies on the effects of psychoactive substances on non- human animals, considering both ethical and economic perspectives.

## CONCLUSION AND RECOMMENDATIONS

In conclusion, feed supplementation with *Cannabis sativa* at 0.8% has a positive effect on the growth rate and development of broiler chicks by significantly improving the feed intake and feed efficiency (FCR) of the birds thereby leading to increased weight gain within a shorter period of time, this may be attributed to the psychoactive property of *Cannabis sativa*. However, challenges of ethical restriction and unit cost of Cannabis sativa as food supplement may limit its inclusion in poultry feed. It is recommended that further research on *Cannabis sativa* should be carried out in order to gain more in-depth knowledge on its nutritive and medicinal properties, as well as the negative effects associated with its overuse or abuse.

## REFERENCES

1. Hampson, A. J., Grimaldi, M., Lolic, M., Wink, D., Rosenthal, R., & Axelrod, J. (2000). Neuroprotective antioxidants from marijuana. Annals of the New York Academy of Sciences, 899, 274-282.

OPEN ACCESS
ONLINE ISSN: 2992-5460
PRINT ISSN: 2992-6041


2. Koch, J.E. (2001). Delta 9-THC stimulates food intake in Lewis rats: effects on chow, high-fat, and sweet high-fat diets. Pharmacology, Biochemistry, and Behavior, 68, 539–543.
3. Pringle, H. (1997). Ice age community may be the earliest known net hunters. Science, 277, 203–204.
4. Padua, L.S., Bunyaprafatsara, N., & Lemmens, R.H.M.J. (1999). Plant Resources of South-East Asia: Medicinal and Poisonous Plants. Backhuys Publishers, New Delhi, India, 167–175.
5. Khan, R. U., Durrani, F. R., Chand, N., Anwar, H., Naz, S., Farooqi, F. A., & Manzoor, M. N. (2009). Effect of Cannabis sativa fortified feed on muscle growth and visceral organs in broiler chicks. International Journal of Biology and Biotechnology, 6(3), 179-182.
6. Mechoulam, R., & Gaoni, Y. (1965). A total synthesis of delta-1- tetrahydrocannabinol, the active constituent of hashish. Journal of the American Chemical Society, 87(14), 3273-3275.
7. Di Marzo, V. (2008). Targeting the endocannabinoid system: To enhance or reduce? Nature Reviews Drug Discovery, 7(5), 438-455.
8. Cota, D., Marsicano, G., Tschop, M., Grubler, Y., Flachskamm, C., Schubert, M., ... & Pagotto, U. (2003). The endogenous cannabinoid system affects energy balance via central orexigenic drive and peripheral lipogenesis. The Journal of Clinical Investigation, 112(3), 423-431.
9. Di Marzo, V., & Matias, I. (2005). Endocannabinoid control of food intake and energy balance. Nature Neuroscience, 8(5):585-589.
10. Rigamonti, A. E., Piscitelli, F., Aveta, T., Agosti, F., De Col, A., Bini, S., ... & Cella, S. G. (2010). Anticipatory and consummatory effects of (hedonic) chocolate intake are associated with increased circulating levels of the orexigenic peptide ghrelin as well as endocannabinoids in obese adults. Food Research International, 43(8):1629-1633.
11. Pinto, J. S., & Martel, F. (2022). Effects of Cannabidiol on Appetite and Body Weight: A Systematic Review. Clinical Drug Investigation, 42(11):909-919. https://doi.org/10.1007/s40261-022-01205-y

**CITE AS: Zitte Leelee Famii and Edet Uduakobong Oluwafeyikemi (2024). The effect of feed Supplementation with *Cannabis sativa* on the Growth rate and Development of Broiler Chicks. NEWPORT INTERNATIONAL JOURNAL OF RESEARCH IN MEDICAL SCIENCES, 5(3):29-33**
**https://doi.org/10.59298/NIJRMS/2024/5.3.2933**