

## Impact of Medical Plants as Feed Additives

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**Abstract:** The present study was undertaken to evaluate the antimicrobial activity of some medicinal plants. Ethanol extracts of various herbs such as turmeric (*Curcuma longa*), *Zingiber officinale* (ginger), *Piper nigrum* (black pepper), cinnamon cassia (Cinnamon), *Thymus Vulgaris* (Thyme), *Laurusnobilis* (bay leaf), and *Syzygium aromaticum* (Clove a) using the disc diffusion method for their antimicrobial activity against bacteria, *E. coli*, *S. Typhimurium*, *E. faecium*, and microbes were tested. Cinnamon extract (CE), the 130 mg / disc antibacterial activity against bacteria, *E. coli*, *S. Typhimurium* and *E. Faecalis* is exhibited. Thyme extract (TE), at 30 mg / disk, exhibited antibacterial activity against bacteria, *E. coli*, *E. faecium*, and *E. Faecalis* while the remaining medicinal plant extracts showed no activity. These results suggest that cinnamon and thyme have antibacterial activity in vitro.

**Key words:** medicinal plant extracts, antibacterial, feed additives, broiler, MIC.

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### INTRODUCTION

Antimicrobial resistance in zoonotic enteropathogenic such as *Salmonella*, *Escherichia coli* (*E.Coli*), And enterococci in animal feed to human health is of particular concern because the bacteria are most likely transmitted to humans through the food chain (Cai, L. and C.D. Wu, 1996).

As a result, the Europe Commission banned the use of antibiotics usually feed monensin Sodium salinomycin Sodium avilamycin, flavophospholipo. To minimize the resistance of various organizations including the Centers for Disease Control and Prevention (CDC), Atlanta, United States of America in support of the ban on oral antibiotics in the United States of America (Chapman, H.D. and Z.B. Johnson, 2002).

To minimize the loss of growth, it is necessary to find alternatives AGP or A number of other alternative therapies such as enzymes, mineral acids, probiotics, prebiotics, herbs there, for safety and other management practices (Chander, H., 1991a).

Since ancient times, herbs and essential oils for their various degrees of antimicrobial activity have been identified. Recently, extracts of medicinal plants was developed and proposed for use in foods as a natural antimicrobial. However, little or nothing is known about the effects of plant extracts on body weight and performance in poultry is done. This study was conducted to determine the effects of plant medicines (herbs) extract as a possible alternative to antibiotic feed additives in diets of broilers.

#### **Literature Review:**

Antibiotics are powerful, yet controversial. In the United States, food animals are often subjected to antimicrobial compounds for the treatment or prevention of infectious diseases and / or to promote growth (Chander, H., 1991b). The early history of animal feed supplemented with antibiotics as separation, identification and characterization of a vitamin B12. The year is 1948. Further research in this area showed that different feed ingredients, including mushrooms, dried mushrooms, some as growth promoters in broiler diets with vitamin B12 Alone were stronger. Active part in promoting the growth of fungus, mold, antimicrobial activity is shown. In 1950, for the use of antibiotics as additives in animal feed was approved. A total of 32 veterinary prescription using of antimicrobial compounds in feeds for broilers has been approved in the United States.

Eleven compounds as growth promoters (AGP) Listed fifteen listed for the treatment of coccidiosis and six for other purposes mentioned. Seven of these compounds, such as bacitracin, chlortetracycline, Erythromycin, lincomycin-novobiocin. Oxy tetracycline and penicillin in human medicine is used. In the poultry industry, bacitracin, chlortetracycline, Penicillin, tylosin And virginiamycin Some antibiotics used as growth promoters is important. Bacitracin is often used in diet and growth of starter. Virginiamycin And other antibiotics on the growth and retreat of most diet is used (Fan, M. and J. Chen, 2001). Feed additives, antibacterial used to control *Clostridium perfringens* Linked NCrotic Diarrhea in broilers. However, currently used to prevent the immune system to control NCrotic Diarrhea in broilers. Feed additives to share more than simply increasing the body weight (Fang, J.Y., 2003).

Possible mechanisms of action of antibiotics growth promoter Possible mechanisms of growth promoter action of antimicrobials The mechanism by which antibacterial agents improve growth performance is not known, but several theories have been proposed: 1) Because they thin the small intestinal epithelium, nutrients

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are more efficiently absorbed 2) Nutrients are spared because competing microorganisms are reduced; 3) The different microorganisms responsible for subclinical infections are reduced or eliminated; 4) There is a reduction in production of the growth-depressing toxins or metabolites by intestinal microflora emergence of antimicrobial resistance has its roots in the use of antimicrobials in animals and the subsequent transfer of resistance genes and bacteria among animals, animal products and the environment (Hammer, K.A., 1999). Extra-chromosomal genes were found responsible for these antimicrobial resistant phenotypes that may impart resistance to an entire antimicrobial class. These resistance genes have been associated with plasmids which are large, transferable, extra-chromosomal DNA elements. Other DNA mobile elements, such as transposons and integrons, are present on plasmids. These DNA mobile elements transmit genetic determinants for antimicrobial resistance mechanisms and may cause rapid dissemination of resistance genes among different bacteria (Haroun, E.M., 2002).

Multiple of bacteria to antimicrobial drugs has increased the need for new antibiotics and antibiotic or older. Yoshimura and colleagues. Researchers showed that fecal enterococci from feces of chickens in broiler and layer farms were isolated resistant to ampicillin, clindamycin, erythromycin, streptomycin, tetracycline and tylosin A. The resistance was repeated enterococcal isolated from broiler farms compared to those of the plantations layer. Enterococcus faecium (E. faecium) And Enterococcus faecalis isolated from cloacal Three flocks of turkeys fed virginiamycin Showed that a higher percentage of quinupristin - dalfopristin Resistance is the oldest of the herd that is 100% resistant.

### Materials and METHODS

Seven medicinal plants including Zinziber officinale Rhizome (ginger), Cinnamomum cassia bark (cinnamon), Piper nigrum Fruit (black pepper), turmeric rhizome of turmeric (Curcuma longa), thymus vulgaris Thyme Leaf, Laurus nobilis Leaves (bay leaves), Syzgium aromaticum Fruits (cloves), were used in these studies. These herbs have antibacterial activity against various strains of bacteria.

After drying at 370 C 24 hours of grinding and honing machines and plant material was ground (Thomas Wiley Laboratory Mill, Model # 4, screen size 1 mm) Made for the laboratory. Exposure to sunlight was avoided to prevent loss of active components.

Selected from powdered plant material was extracted using 80% ethanol extraction Wasting a liter of fluid was mixed with 200 g of powdered plant material.

The mixtures were kept for 2-5 days in tightly sealed vessels at room temperature at 220C, protected from sunlight, and mixed several times daily with a sterile glass rod. This mixture is filtered through muslin cloth and the residue, if necessary, adjusted to the required concentration (500 ml of 80% ethanol for the residue of 200 g of powdered plant material) with the extraction fluid for further extraction. Further extraction of the residue was repeated 3-5 times until a clear colorless supernatant extraction liquid was obtained indicating that no more extraction from the plant material was possible.

The extracted liquid was subjected to rota-evaporation (Brinkmann rotavapor, Model # R) or water bath evaporation (Precision shaking water bath, model #25) to remove the ethanol. Either method is good depends on the quantity of extraction fluid, for more quantity, water bath evaporation is used. To concentrate the larger quantity of aliquote, water-bath evaporation was used. Rota evaporation was used to concentrate the smaller quantity of extract. A 250 ml aliquot of extracted liquid was subjected to rotaevaporation for 3-4 h. The water bath temperature was adjusted to 700 C. The semisolid extract produced was kept in the deep freezer at -800C overnight and then subjected to freeze drying for 24 hrs at 200 millitorr vacuum.

Bath to evaporate water, 3000 ml to 3500 ml of fluid extract container was placed. At 700 C Boiling water bath for a period of 7-10 hours per day for 2-3 days until a semi-solid state, the liquid extract was obtained. Evaporation was continued to prevent charring The compounds are extracted. Approximate volume of liquid, semi-solid at that time - 200 ml. The water level in a water bath to 1/4 Human height is set the speed to 27 to 32 oscillations per minute Shaker set. Semisolid extract produced was frozen and then freeze-dried to completely remove the ethanol and water extracts AT-600C At 200 millitorr Vacuum. This method was then weighed and extracted in 220 C At desiccators Stored until further use.

Inhibition of microbial growth was tested by using the paper disc agar diffusion method [8], while the MIC was determined by the dilution (both micro and macro) method. Standard aseptic microbiological methods were followed throughout this antibacterial study.

#### **Disc Diffusion Method for Antibacterial Activity:**

This method was used to assay the plant extracts for antimicrobial activity. The plant species and type of extract tested are shown in Table 1, while the bacteria are listed in Table 2. Entire surface of agar plate was inoculated with the culture of bacteria. The paper discs soaked in each of the test solutions containing different extract solutions at varying concentrations, as well as the standard drug solution (an antibiotic which is used as a feed additive) and the control-blank were placed separately in each quarter of the plate under aseptic conditions.

Multiple plates were (four replications) done for each of the extract was done. The plates were then maintained at room temperature for 2 h allowing for diffusion of the solution. All plates were then incubated at 37°C for 24 h and the zones of inhibition were subsequently measured in mm (Kivcak, B. and T. Mert, 2002).

**Table 1:** List of plant material and type of extracts tested

Plants	Parts of plant investigated	Extract type
<i>Cinnamomum cassia</i>	Bark	80% Ethanol
<i>Curcuma longa</i>	Rhizomes	80% Ethanol
<i>Laurus nobilis</i>	Leaves	80% Ethanol
<i>Piper nigrum</i>	Fruits	80% Ethanol
<i>Syzygium aromaticum</i>	Fruits	80% Ethanol
<i>Thymus vulgaris</i>	Leaves	80% Ethanol
<i>Zingiber officinale</i>	Rhizomes	80% Ethanol

Of the 7 plants tested, only those that showed antibacterial activity (Cinnamon and Thyme) against some of the selected poultry pathogens were selected for further tests to calculate their MIC by dilution method. This test was performed in sterile 96-well microplates and macroplates.

**Table 2:** List of the bacteria tested in this study.

Bacterial Strains	Gram strain type	Details of the bacterial strains used
<i>E. coli</i>	Negative	Untyped isolates collected at Shenandoah Valley, through Vet Med School, Virginia Tech.
<i>S. typhimurium</i>	Negative	MTCC <sup>2</sup>
<i>E. faecium</i>	Positive	ATCC <sup>1</sup> 19434
<i>E. faecalis</i>	Positive	ATCC <sup>1</sup> 19433

**Table 3:** Antibacterial activity of specific concentration of medicinal plant extract compare to control by disc diffusion method.

Medicinal Plants	Concentration/disk	Antibacterial activity			
		<i>E. coli</i>	<i>S. typhimurium</i>	<i>E. faecalis</i>	<i>E. faecium</i>
<i>Z. officinale</i>	130mg	Negative <sup>1</sup>	Negative	Negative	Negative
<i>C. longa</i>	130mg	Negative	Negative	Negative	Negative
<i>C. cassia</i>	130mg	20.75 ± 0.144	20.73 ± 0.144	20.75 ± 0.204	Negative
<i>S. aromaticum</i>	66.6mg	Negative	Negative	Negative	Negative
<i>P. nigrum</i>	130mg	Negative	Negative	Negative	Negative
<i>L. nobilis</i>	66.6mg	Negative	Negative	Negative	Negative
<i>T. vulgaris</i>	30mg	19.25 ± 0.141	Negative	21.5 ± 0.288	20.75 ± 0.288
Tween-80	-	Negative	Negative	Negative	Negative
Distilled Water	-	Negative	Negative	Negative	Negative

<sup>1</sup>"Negative" refers to no antibacterial effect of corresponding medicinal plant to the mentioned bacterial strain at mentioned dose.

**Table 4:** Minimum inhibitory concentration (MIC) of different extracts and bacitracin by dilution method.

Test material	Bacteria	MIC mg/ml
<i>Cinnamomum cassia</i>	<i>E. coli</i>	≤ 31.25 mg/ml
<i>Cinnamomum cassia</i>	<i>S. typhimurium</i>	≤ 31.25 mg/ml
<i>Cinnamomum cassia</i>	<i>E. faecalis</i>	≤ 31.25 mg/ml
<i>Cinnamomum cassia</i>	<i>E. faecium</i>	ND
<i>Thymus vulgaris</i>	<i>E. coli</i>	≤ 62.5 mg/ml
<i>Thymus vulgaris</i>	<i>S. typhimurium</i>	≤ 250 mg/ml
<i>Thymus vulgaris</i>	<i>E. faecalis</i>	≤ 31.25 mg/ml
<i>Thymus vulgaris</i>	<i>E. faecium</i>	≤ 31.25 mg/ml
Bacitracin	<i>E. coli</i>	≤ 560 µg/ml
Bacitracin	<i>E. faecium</i>	≤ 1120 µg/ml
Bacitracin	<i>E. faecium</i>	≤ 1120 µg/ml
Bacitracin	<i>S. typhimurium</i>	≤ 1120 µg/ml

The microdilution was performed in 96-well microtiter plates with U-shaped wells while the macrodilution technique as described by the National Committee for Clinical Laboratory Standards was followed (Kone, W.M., 2004). In brief, the cultures were diluted in Mueller-Hinton broth at a density adjusted to a 0.5 McFarland turbidity. The final inoculum was 5 x 10<sup>5</sup> CFU/ml of bacterial colony. Controls with 0.5 ml of only culture medium or others with plant extracts were used in the tests. The wells were filled with 100 µl of sterile H<sub>2</sub>O and

100 µl of the plant extracts were added to the wells by serial two fold dilution from the suspension of plant extract stock solution. Each well was inoculated with 100 µl of 0.5 McFarland standard bacterial suspension so that each well got  $5 \times 10^5$  CFU/ml. The plates were covered, placed in plastic bags and incubated at 37°C for 24 hrs. In this study, the MIC was the lowest concentration of plant extracts that exhibited no growth of the organism in the wells by visual reading.

Diet 1 - No added plant extract or antibiotic (Negative control).

Diet 2 - Contained BMD (50 g/ton) (Positive control).

Diet 3 - Basal diet plus low level of cinnamon extract (290 gm/100 kg of feed).

Diet 4 - Basal diet plus high level of cinnamon extract (580 gm/100 kg of feed).

Diet 5 - Basal diet plus low level of thyme extract (290 gm/100 kg of feed).

Diet 6 - Basal diet plus high level of thyme extract (580 gm/100 kg of feed).

There were 16 pens assigned to both Treatments 1 and 2. Eight pens were assigned to each of the other treatments. Effectively, there were three levels of each extract: 0, low, and high. The low dose was equivalent to the in-vitro antibacterial response equivalent to the normal level (50 g/ton of feed) of bacitracin added to broiler diets while the high level was twice that dose. Body weight by pen and feed consumption were recorded at 1, 2 and 3 wks of age. Weight of the birds were determined to make sure equals between the treatments. Feed and water were provided ad lib.

Since the readings of control (distilled water) in the in vitro antibacterial studies of medicinal plant were zero, the data was analyzed by simple arithmetic means of the different extracts and standard error compared to the control. No other statistical test was applied to show significance since the extracts were either positive or negative for the antibacterial studies.

Data of the feeding trial were analyzed using ANOVA (SAS/STAT User's Guide 6.03, SAS Institute, Inc. Cary, NC) for body weight. Contrasts were used within type of diet to evaluate the effects of extract source and level. Linear equations were derived for each plant source with the basal diet (Treatment 1) used for each plant source. Where significant differences were found among treatments, comparisons among means were separated using a Duncan's Multiple Range test. Calculations were made using the General Linear model of SAS program (SAS Institute Inc., 1997). Significance implies  $P < 0.05$ .

## RESULTS AND DISCUSSION

Cinnamon Extract (CE) Antibacterial activity against bacteria *E. coli* Display, *S. Typhimurium* and *E. Faecalis* but no activity against *E. faecium*. The dose is shown in Table 3. Inhibition zone range from 21 to 29 mm (Table 3). Thyme extract (TE) Antibacterial activity against bacteria *E. coli* - *E. Exhibited faecalis* and *E. faecium* But no action against *S. Typhimurium* at doses of 3 and 4 can be shown by the disk diffusion method. However, the antibacterial activity against dilutions *S. Typhimurium* is indicated.

Range from 17 to 21 mm of inhibition zone (Table 3). MIC Of CE Testing for bacteria *E. coli* - *S. Typhimurium* and *E. Faecalis* less than 31.25 mg / ml (Table 4). MIC TE Against bacteria *E. coli* - *E. Faecalis* and *E. faecium* Ranged from 25 mg to 125 mg / ml (Table 5) and the *S. Typhimurium* 250 mg / ml, respectively. MIC The bacitracin test for bacteria *E. coli* - *S. Typhimurium* *E. Faecalis* and *E. faecium* Between 560 mcg to 1120 mcg / ml with a dilution method (Table 4).

Sequence in 21 feeds D Level (high HCE A) or low level (LCE) Cinnamon extract had no significant effect on body weight gain cure the remaining ( $P > 0.05$ ).

Table 5. Effect of dietary treatments on body weight gain (g) in broiler chickens

Similarly, the difference in body weight of 0-7 D - 7-14 Or 14-21 D For LCE Or HCE Treatment than any other treatment (Table 6).

Cumulative increase in body weight for 21 days LTE Treatment was different from the rest. However, the HTE Significantly reduced body weight compared to NC And PC ( $P < 0.02$ ) (Table 6). Body weight was significantly lower in the group HTE At 0-7 D ( $P < 0.003$ ) And 7-14 D ( $P < 0.05$ ), But in the period 14-21 D ( $P > 0.05$ ) Compared to NC And PC (Table 6).

Table 6. Effect of dietary treatments on feed consumption (g) In broilers 1 Cumulative feed LCE Or HCE To change NC And treatment PC In 14 or 21 D ( $P > 0.05$ ). Feed LCE And HCE Diet 7-14 D Or 14-21 D Not be compared with other treatment groups ( $P > 0.05$ ). Differences in feed intake between PC And NC In 14 or 21 D ( $P > 0.05$ ) There. HTE Does not change food intake compared with the group treated with ( $P > 0.05$ ).

Likewise no differences in body weight gain were found from 0-7 d, 7-14 d or 14-21 d for the LCE or HCE treatments compared to any other treatments (Table 6).

Cumulative body weight gain at 21 d for the LTE group was not different from the remaining treatments. However, HTE significantly reduced body weight compared to the NC and PC groups ( $P < 0.02$ ) (Table 6). A significant reduction in body weight gain was observed for the HTE group at 0-7 d ( $P < 0.003$ ) and 7-14 d ( $P < 0.05$ ), but not at the 14-21 d period ( $P > 0.05$ ) compare to the NC and PC groups (Table 6).

**Table 5:** Effects of different dietary treatments on body weight gain (g) in broilers.

Dietary treatments	0-7 d	0-14 d	0-21 d	7-14 d	14-21 d
Negative (no antibiotic/extract)	84.23 ± 1.98 <sup>a</sup>	305.85 ± 5.62 <sup>a</sup>	665.29 ± 10.81 <sup>a</sup>	221.62 ± 4.48 <sup>a</sup>	320.27 ± 6.31 <sup>a</sup>
Positive (50 gm/ton of BMD)	91.24 ± 1.98 <sup>a</sup>	310.91 ± 5.62 <sup>a</sup>	671.34 ± 10.81 <sup>a</sup>	219.67 ± 4.48 <sup>a</sup>	321.67 ± 6.31 <sup>a</sup>
Cinnamon low (290 gm/100 kg feed)	86.13 ± 3.13 <sup>a</sup>	290.54 ± 8.89 <sup>ab</sup>	649.18 ± 17.10 <sup>a</sup>	204.41 ± 7.09 <sup>a</sup>	319.82 ± 9.98 <sup>a</sup>
Cinnamon high (580 gm/100 kg of diet)	86.36 ± 3.13 <sup>a</sup>	309.18 ± 8.89 <sup>a</sup>	670.29 ± 17.10 <sup>a</sup>	222.82 ± 7.09 <sup>a</sup>	321.76 ± 9.98 <sup>a</sup>
Thyme low (290 gm/100 kg feed)	86.36 ± 3.13 <sup>a</sup>	292.19 ± 8.89 <sup>ab</sup>	641.75 ± 17.10 <sup>ab</sup>	208.72 ± 7.09 <sup>a</sup>	310.55 ± 9.98 <sup>a</sup>
Thyme high (580 gm/100 kg of diet)	75.05 ± 3.13 <sup>b</sup>	279.18 ± 8.89 <sup>b</sup>	616.41 ± 17.10 <sup>b</sup>	204.13 ± 7.09 <sup>a</sup>	298.84 ± 9.98 <sup>a</sup>

<sup>1</sup>Means within column with no common superscript differ significantly (P < 0.05).

**Table 6:** Effect of different dietary treatments on feed consumption (g) in broilers1.

Dietary treatment	0-7 d	0-14 d	0-21 d	7-14 d	14-21d
Negative (no antibiotic/extract)	134.74 ± 2.05 <sup>b</sup>	426.20 ± 6.73 <sup>a</sup>	881.26 ± 13.01 <sup>a</sup>	291.45 ± 5.65 <sup>a</sup>	455.06 ± 7.57 <sup>a</sup>
Positive (BMD 50 gm/ton feed)	143.70 ± 2.05 <sup>a</sup>	435.68 ± 6.73 <sup>a</sup>	889.76 ± 13.01 <sup>a</sup>	291.97 ± 5.65 <sup>a</sup>	454.08 ± 7.57 <sup>a</sup>
Cinnamon low (290 gm/100 kg feed)	143.35 ± 3.24 <sup>a</sup>	438.39 ± 10.65 <sup>a</sup>	891.04 ± 20.57 <sup>a</sup>	295.04 ± 8.93 <sup>a</sup>	452.64 ± 11.97 <sup>a</sup>
Cinnamon high (580 gm/100 kg feed)	145.78 ± 3.24 <sup>a</sup>	436.14 ± 10.65 <sup>a</sup>	895.22 ± 20.57 <sup>a</sup>	290.36 ± 8.93 <sup>a</sup>	459.08 ± 11.97 <sup>a</sup>
Thyme low (290 gm/100 kg feed)	142.76 ± 3.24 <sup>a</sup>	422.99 ± 10.65 <sup>a</sup>	866.55 ± 20.57 <sup>a</sup>	280.23 ± 8.93 <sup>a</sup>	443.55 ± 11.97 <sup>a</sup>
Thyme high (580 gm/100 kg feed)	134.23 ± 3.24 <sup>b</sup>	406.57 ± 10.65 <sup>a</sup>	833.11 ± 20.57 <sup>a</sup>	272.34 ± 8.93 <sup>a</sup>	426.54 ± 11.97 <sup>a</sup>

<sup>1</sup>Means within column with no common superscript differ significantly (P < 0.05).

Cumulative feed consumption was not altered by LCE or HCE compare to the NC and PC treatments at 14 or 21 d (P > 0.05). Feed consumption of LCE and HCE diets was not affected at 7-14 d or 14-21 d compared to the other treatment groups (P > 0.05). There were no differences in feed consumption between the PC and NC groups at 14 or 21 d (P > 0.05). HTE did not change feed consumption compare to any other treatment group (P > 0.05).

Feed Efficiency At 21 d, there was no significant difference in cumulative feed efficiency of the HCE group compared to the PC and NC groups. However the LCE group had improved feed efficiency compared to the PC and NC groups (P < 0.03). Improved cumulative feed efficiency was found at 14 d for the LCE group compared to PC group (P < 0.02). There were no differences in feed efficiency at 14-21 d between the LCE or HCE groups compared to the PC and NC groups (P > 0.05).

**Table 7:** Effect of different dietary treatments on feed efficiency in broilers1.

Dietary treatments	0-7 d	0-14 d	0-21 d	7-14 d	14-21 d
Negative (no antibiotic/extracts)	0.624 ± 0.011 <sup>a</sup>	0.717 ± 0.007 <sup>a</sup>	0.710 ± 0.005 <sup>a</sup>	0.760 ± 0.009 <sup>a</sup>	0.703 ± 0.005 <sup>a</sup>
Positive (50 gm/ton feed)	0.634 ± 0.011 <sup>a</sup>	0.712 ± 0.007 <sup>a</sup>	0.710 ± 0.005 <sup>a</sup>	0.751 ± 0.009 <sup>a</sup>	0.708 ± 0.005 <sup>a</sup>
Cinnamon low (290 gm/100 kg feed)	0.598 ± 0.018 <sup>ab</sup>	0.662 ± 0.011 <sup>b</sup>	0.684 ± 0.008 <sup>b</sup>	0.694 ± 0.015 <sup>b</sup>	0.706 ± 0.009 <sup>a</sup>
Cinnamon high (580 gm/100 kg feed)	0.589 ± 0.018 <sup>ab</sup>	0.708 ± 0.011 <sup>a</sup>	0.704 ± 0.008 <sup>ab</sup>	0.767 ± 0.015 <sup>a</sup>	0.701 ± 0.009 <sup>a</sup>
Thyme low (290 gm/100 kg feed)	0.582 ± 0.018 <sup>ab</sup>	0.691 ± 0.011 <sup>a</sup>	0.695 ± 0.008 <sup>ab</sup>	0.748 ± 0.015 <sup>a</sup>	0.699 ± 0.009 <sup>a</sup>
Thyme high (580 gm/100 kg feed)	0.556 ± 0.018 <sup>b</sup>	0.685 ± 0.011 <sup>ab</sup>	0.692 ± 0.008 <sup>ab</sup>	0.748 ± 0.015 <sup>a</sup>	0.699 ± 0.009 <sup>a</sup>

<sup>1</sup>Means within column with no common superscript differ significantly (P < 0.05).

At 21 d, there was no significant difference in cumulative feed efficiency between the LTE or HTE groups compared to the PC groups (P > 0.05). In addition, no difference was noted at 14 d. There was no difference in feed efficiency for the period of 7-14 d, and 14-21 d between the LTE or HTE groups.

### Conclusion:

Antimicrobial effects of medicinal plants are well documented. Results from several studies provide evidence that in fact some herbs may be a potential source of antibacterial agents even against some of the strains resistant to antibiotics. In this study, using the disk diffusion method that extracts of cinnamon and thyme produces antibacterial activity against both gram-negative and gram-positive pathogens were observed. The results confirm previous studies have found. Cinnamon Extract (CE) Can be effective against bacteria *E. coli* - *S. Found typhimurium* and *E. Has faecalis*. This effect is in agreement with other researchers Antibacterial effects against *E. Coli*, however, in which we found differences in the concentrations of cinnamon extract antibacterial activity (Koul, I.B. and A. Kapil, 1993) there. Using the disk diffusion method, the concentration at which antibacterial activity was found to be much higher than that cited by the authors mentioned above. Results MIC Cinnamon dilution method in our study is the first to find out.

Thyme extract (TE) Showed antibacterial activity in their studies. This result supports the findings of many authors. Thyme can be effective against bacteria *E. coli* - *E. Found faecalis* and *E. faecium* But *S. Typhimurium* is the disk diffusion method. However, the dilution method TE Antimicrobial activities against *S. thypimurium* A. These changes may be due to the fact that using the disk diffusion method using a dose (30 mg) at lower dilutions (260 mg).

No anti-bacterial activity of extracts *C. Turmeric*, *Z. officinale* - *P. nigrum* - *L. nobilis* Or *S. aromaticum* Against the pathogens tested specific doses. Our results are inconsistent, with some researchers reporting that plants are high antibacterial activity against Gram-positive bacteria and gram-negative. These changes may be due to the dose used in this study, the method of extraction of medicinal plants, methods of study, antibacterial, genetic diversity of plant, plant age and environment.

The addition of sub-therapeutic levels of antibiotics increases the weight gain is to eat meat. Antibacterial activity of plant extracts used in this study in terms of in vitro The results showed any significant increase in body weight gain compared with the control is positive or negative. The results, however, were encouraged to negative control HCE In comparison, the use of HCE Above NC . In addition, TE Body weight was significantly. A.

The results of 21 experiments Nutrition D High level of cinnamon (HCE) Result in any significant changes in body weight gain compared to treatment PC No. The results encourage the use of 0-21 d Data NC Is lower (non-significant) than the means for HCE A. Although nonsignificant trend toward increased body weight in birds fed diets HCE Compared with NC Diet there. There are no other reports of this work have been published.

Dose-dependent effects LCE And HCE Increase in body weight in 7-14 days ( $P = 0.02$ ) There. These results suggest the need for further research on the effects of cinnamon as a food additive, it is possible to replace antibiotics in broiler diets is.

Conflicting evidence on the relationship between antimicrobial activity of oregano extract (TE) In vitro and its ability to increase lean body mass, when provided in the diet for 21 days, there is a broiler.

Thyme has anti-bacterial activity in vitro However, when added to a meat diet, body weight increased significantly during the feeding trial, 21 D ( $P < 0.02$ ) Is reduced.

There was conflicting evidence of the relationship between antibacterial activity of thyme extract(TE) in vitro and its ability to increase body weight gain when provided in the diet for 21 d in broilers.

Thyme had antibacterial activity in vitro, however, when added to the broiler diet, body weight gain decreased significantly during the 21 d feeding trial ( $P < 0.02$ ). These results are contradictory since addition of antibacterial compounds to broiler diets generally increases the body weight gain Thyme extract may possess active compounds that produce antibacterial activity in vitro, but it may also possess an active compound responsible for reducing the body weight in vivo. The thyme though produced antibacterial activity in vitro but when given in diet, might be losing its antibacterial activity because of action of different enzymes while the process of its digestion and absorption.

The decrease in the body weight induced by thyme may have implications with regards to obesity. A significant reduction in weight gain was observed at 0-7 d ( $P < 0.003$ ) and 7-14 d ( $P < 0.05$ ) but not at 14-21 d period ( $P > 0.05$ ). This may indicate that adding thyme in the diet from 14-21 d is not as effective in reducing body weight as it was from 0-7 and 0-21 d. The results of thyme in this study provide a strong basis for further research in obese subjects to reduce body weight. The reduction in body weight induced by thyme was observed without a change in feed consumption.

Feed consumption was not affected by the LCE or HCE compare to the PC treatment at 14 or 21d ( $P > 0.05$ ). Periodic feed consumption was also not affected at 7-14 or 14-21 d ( $P > 0.05$ ). This suggests that the CE did not cause a feed aversion.

Feed efficiency was found to be affected when the diet was supplied with LCE compared to the PC, NC or HCE ( $P = 0.03$ ). These results suggest that there is dose-dependent variation in the feed efficiency of HCE and LCE. Increasing the dose of cinnamon increased feed efficiency. This finding is important basis for the dose-dependent studies of cinnamon to find an alternative to AGP since Improved feed efficiency will decrease the

cost of production. Since HCE showed better feed efficiency than LCE, increasing dose of HCE may increase feed efficiency. However, we did not find any scientific reports to support these views.

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