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## Review on Efficacy of Garlic and Onion on Performances, Blood Profile and Health Status of Broiler Chickens

By Melaku Mulugeta Dagne

*Jimma University of Agriculture and Veterinary Medicine*

**Abstract-** This seminar aimed to review the use of herbal growth promoting factor in poultry production which is acceptable among chicken producers to enhance productivity and control diseases. In poultry production, many alternatives have been investigated to replace antibiotics without any loss of productivity or negative influence on health. One possible way to solve this problem is searching of different plants which have positive influences on growth performance, carcass quality and cholesterol content of the blood without any residual effect on consumers. Garlic and onion are among the most popular plants widely used on the world. In farm animal's different research had been reported on efficacy of onion and garlic as best alternatives of antibiotics in decreasing blood cholesterol, high density lipid and triglyceride, enhancing growth performances, due to, antimicrobial properties of both plants. Garlic and onion contain active ingredients, which have an ability to alter broiler performances. Being the case, Garlic and onion can replace one of the most promising alternatives to antibiotic. However, report of many others, on dose and efficacy of both plants were not consistent. Therefore, future work will be expected to get accurate result on appropriate dose and rate of effects on broiler.

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## I. INTRODUCTION

The use of phytobiotic as alternatives to antibiotic growth promoters in animal diets is still an interesting approach. The herbs and some compound in them could act similar to antibiotics. This compound reduced the growth of some harmful bacteria in the gastrointestinal tract of animals. This can results in a higher efficiency in the feed utilization, higher weight gain and better feed efficiency (Bedford, 2000). Know a days, herbs are considered as best animal growth promoters due to, the controversial effects of antibiotic resistant bacteria and residual effects on the consumers (Nasir and grashorn,2006; Burgat,1999).

Also, Public bodies such as the American Heart Association gave recommendation concerning consumer's health on possible relationship between dietary fat and coronary heart disease. Phyto-additives are obtained from medicinal plants or plants extract and are being used on a wide range, by humans as well as

by animals, including poultry. Recent studies tried to show the effects of phyto additives usage in all farmed animals. Consequently, many researches work focused on searching alternative plants and strategies for animal growth promoters and immune development. Onions and garlic are among the most important plants which have a positive influence on animal growth performance and disease prevention.

Garlic (*Allium sativum*) and onion (*Allium cepa*) are belong to the family Liliaceae and the genus *A. llium* (Ebesunun *et al.*, 2007) are among the common medicinal plants used as growth promoters (Ali and Zahran, 2010). Both are contain bioactive substances like, sulphur-containing organic compound known as diakyl polysulfides which possess antimicrobial activity, antimicrobial, antioxidant and antihypertensive properties on both humans and animals (Sivam, 2001, Tsao and Yin, 2001; Kumar *et al.* 2010). These compounds can improve healthy level off gut through decreasing harmful microbial population (Lee *et al.*, 2003).

There are suggestions that essential oil found in herbs can facilitates digestion; these may be reason that spices and herbs will positively affect food digestion, increases Body weight and other organs by improving the nutrient absorption. Also, as it mentioned by many researchers; using of onion as additives resulted in increasing of feed intake. Being the fact, effect of onion and garlic on animal performance probably is due to antibacterial and antifungal effects originated from some of their compounds. Goodarzi *et al.* (2013) reported that Using onion in diet can reduce the blood glucose (hypoglycemia), can stimulate nervous system for higher feed intake. Onion contains sulfur organic compounds including S-Methylcysteine sulfoxide and Sallylcysteine sulioxide. These compounds are related to decreasing of blood lipid, liver protein and glucose. Onion could improve growth performance of chicks due to content of organosulphur compounds (An *et al.*, 2015). According to report of (Horton, *et.al.*, 1991; Elagib *et al.*, 2015) Garlic are also similar effects on animal performances; Carcass and organ characteristics of broilers. Spices and their extracts have lipotropic effects, Some of the active components in spices affect lipid metabolism through fatty acid transportation. This can increase the lipid utilization and decrease abdominal fat (Cross *et al.*,

**Author:** Melaku Mulugeta is MSc Student in Animal Production at Jimma University College of Agriculture and Veterinary.  
e-mail: melakumulugeta11@gmail.com

2007). Know days, diferant works had been reported on positive effect of garlic and onion on growth performance, meat quality, health condition and blood profile of animals. During the last few decades, garlic and onion have received tremendous attention to their wide range of therapeutic properties and great health benefits as functional food (Hasler, 1998; nagourney, 1998).

Onion bulbs have numerous organic sulphur compounds, flavonoids and phenolic acids with proven antibacterial, antioxidant and hypo lipidemic efficacy (Melvin Joe et al., 2009; Srinivasan et al., 2004). The serum cholesterol was significantly decreased by dietary dehydrated onion in experimentally hypercholesterolemic rats (Vidyavati et al., 2010). Goodarzi et al. (2013) reported that the beneficial influence of onion extract on the growth performance in meat-type broiler chickens. Supplementing of onion as feed additives in broilers chicken leads the positive influence on body weight, feed conversion efficiency, and average daily feed intake of broilers chicken(Aji et al. 2011; Goodarzi et al. 2013).

Garlic is the herb known for its flavor and pungency and most widely quoted for medicinal properties (hertog, 1998; nagourney, 1998; osman, 2005) also, it is positive influences in enhancing performances of animals. Brzóška et al., (2015) stated that garlic extract, given continuously in commercial feed as a feed supplement, caused a significant improvement in the body weight of broilers and their parameters while reducing bird mortality during the rearing period. Therefore, this seminar paper aimed to review effects of garlic and onion in growth performances, lipid metabolism and others blood profile of broiler chicken.

## II. LITERATURE REVIEW

### a) Back ground of garlic and onion

Onion (*Allium cepa*) and garlic (*Allium sativum*) are belongs to genus *Allium* which have includes about 550 species. A few of these are important as food plants and as drugs in folk medicine, notably onion and garlic are the two most important plants having positive effects on both humans and animals. Bulbs of allium contain flavonoids and sulphur containing compounds; Flavonoids present in the bulbs and leaves of alliums are very effective antioxidants with variable biochemical functions (Hertog and katan, 1998, Wardlay, 1999, evans, et.al, 1995). Garlic and onion has several beneficial actions including antihypertensive, antithrombotic, antibiotic and anti-carcinogenic effects (Vigneshpriya and krishnaveni, 2016).

Allicin and its derivative compounds which found in onion and garlic are the main active substances responsible for the hypolipidemic and hypo cholesterolemic effects in animal body (Osman, 2006).

Studies have shown that saponins and flavonoid are able to reduce level of serum cholesterol and arteriosclerosis severity, diabetes (Lanzotti, 2005).

The primary sulphur containing constituents in both plants are the S-alkyl-L-cysteine sulphoxides (ACSOs), such as (a) Methiin and alliin (b) allicin (c) diallyl sulphide (DAS), and diallyl disulphide (DADS). These compounds provide to garlic and onion their characteristic odor and flavor, as well as most of their biological properties. Review of *Bisen and Emerald, 2016 indicated that* Garlic and onion extracts posses many therapeutic properties including antimicrobial, antiviral, antifungal, anti-protozoal, toprotective, cardioprotective, anti-inflammatory, neuro protective, anti-amnesic, anti carcinogenic antimutagenic, antiasthmatic, immuno-modulatory, hypolipidemic, anti-hypertensive, anti-diabetic and antioxidant

### b) Effect of garlic and onion on different parameters of chicken

#### i. Growth performance

Using of plants extract as growth promoters was one of the main issues of broilers industries in past two decades hap to now, as soon as the use of antibiotics banned from animal diets due to, its negative effects on consumer health different authors was reported work done on different plants like garlic and onion, their efficacy as alternatives of antibiotic

*Ramiah et al. (2014) demonstrated* that dietary supplementation of garlic, may improve the growth performance of broilers. other authors reported that the positive effect of garlic supplement in broilers feed diets (Kim et al. 2009; Park, 2008; Ordialez, et al, 2016). The group of the birds fed the diet containing 3% garlic powder attained the highest hot weight, dressed weight, breast weight, fleshed breast weight and fleshed breast percentage(Eligab, 2013)

Toghyani et al (2011) noted that garlic and cinnamon are usually used as flavoring agents, there was the assumption that applying the foregoing spices in broiler diets may leave an influence on meat flavor and tenderness. *Brzóška et al., (2015)* reported that, incorporation of Garlic feed additives at the levels of 1.00, 1.50 and 2.25 ml kg<sup>-1</sup> of diet increased the body weight of chickens at 42 days by 1.0, 3.5, and 5.8%, respectively, with control group. in contrast Pourali et al. (2010) reported that garlic supplementation at 0.2, 0.4, 0.6, and 1.0% had negligible influence on growth performance also, Horrion et al (1991); Onibi et al. (2009) Fadlalla et al. (2010), reported that garlic powder had no significant effect on the body weight gain and feed conversion ratio of birds.

#### ii. Lipid metabolism

Onion and garlic are lipotropic effects containing sulfur organic compounds including S-*Methylcysteine sulfoxide* (SMCS) and S-*allylcysteine*

suiloxide (SACS) is related to decreasing of blood lipid, liver protein and glucose. It is well known that dietary onion effectively lowers serum cholesterol levels in experimental rats as well as in humans. The decreased levels of blood cholesterol have been reported in rats fed normal diets with onion (Bakhsh and Chungtai, 1985) and high sucrose diet with onion essential oil (Adamu et al., 1982). As well as, in farm animals different research had been conducted on efficacy of onion and garlic as best alternatives of antibiotics in decreasing blood cholesterol, high density lipid and triglyceride due to, antimicrobial properties of both plants. Goodarzi et al. (2013) demonstrated that broilers receiving 30 g/kg onion had a significantly higher HDL and lower triglyceride concentrations compared to control groups. Hypocholesterolemic effects with dietary onion may be attributed to decreased cholesterol secretion from liver, or to increased uptake of high density lipoprotein (HDL) uptake into liver. Ordialez et al. (2016) reported that, positive effect of red onion (*Allium cepa*) and lemongrass (*Cymbopogon citratus*) on lipid oxidation and acceptability of deboned Milkfish (*chanos chanos*) were assessed.

In contrast, Sklan et al. (1992) reported that found no significant difference in hepatic cholesterol in chicks fed diet with onion. Toghyani et al. 2011 reported that the reduction of serum LDL and raising HDL cholesterol by increasing garlic powder inclusion had been observed. Garlic has a dose-dependent inhibition effect on hepatic  $\beta$ -hydroxy- $\beta$ -methylglutaryl coenzyme A

(HMG-CoA) reductase, cholesterol 7 $\alpha$ -hydroxylase, and fatty acid synthetase; diets containing an equivalent of 1, 2, 4, 6, and 8% garlic reduced serum cholesterol by 18, 21, 21, 24, and 25%, respectively (Qureshi et al., 1983 cited by Toghyani, et.al, 2011). Using of herbs as growth promoters in animal diet may not show any residual effects on consumers. An et al. (2015) reported that, using the onion extract used as feed additives in broilers has non toxic effects and safe as feed additives at an inclusion rate of 0.5% without having adverse effects on physiological responses. The concentrations of serum free cholesterol and triacylglycerol were significantly decreased in groups fed diets with onion extract.

Dietary garlic supplementation can reduce lower palmitic acid, SFA, serum and meat cholesterol content and increase unsaturated fatty acids (UFA) in chickens (Qureshi et al., 1983). Inhibition of cholesterol synthesis by garlic supplementation is due to, abundance of Compounds like allyl-disulfide or allyl-sulfhydryl groups (Singh and Porter, 2006). An et al. (2015) concluded that, onion extract may be able to use as substitute for in-feed antibiotics because the growth performance in chicks fed diet with onion extracts and could have beneficial effects in reducing the levels of blood free cholesterol and triacylglycerol of White mini broilers. Inclusion of garlic and onion in broiler diet affects lipid metabolism in the blood were listed in table (1).

Table 1: Effect of feeding onion and garlic on lipid metabolism

Item	Garlic level (mg kg <sup>-1</sup> )				SE	References
	Control	100	1000			
Plasma cholesterol	127.9 <sup>a</sup>	131.7 <sup>a</sup>	122.2 <sup>ab</sup>		3.05	
Plasma HDL cholesterol (mg/dL <sup>-1</sup> )	101.4 <sup>a</sup>	109.8 <sup>a</sup>	102.7 <sup>a</sup>		3.05	Horton et al 1991
Item	Control	Antibiotic	10 g/kg Onion	30 g/kg Onion		
tryglyceride	120.67 <sup>a</sup>	111.25 <sup>ab</sup>	104.25 <sup>ab</sup>	95.75 <sup>b</sup>	7.59	Goodarzi et, al,2013
Low density lipid	36.75	32.75	30.50	41.75	6.77	
	Control	antibiotic	2kg	4g/kg		
Triglyceride	50	49	49	47	7.39	
Total cholesterol	156	151	149	146	8.73	Toghyani et al, 2011

iii. *Gastro intestinal development*

Inclusion of herbs in poultry diet initiates development and enzymatic activities of intestinal morph metric structure. Allicin content of allium family have ability to change the physiological activities of chicken. Allicin in garlic promotes the performance of the intestinal flora thereby improving digestion and enhancing the utilization of energy, leading to improved growth had been reported by (Pourali *et al.* 2010; okoleh and adeolu, 2014). Different researchers reported that positive effects of garic and onion on gut improvement. Ramakrishna *et al* (2003) also suggested that garlic supplementation enhances the activity of pancreatic enzymes and provides an environment for better absorption of nutrients Structure of intestinal mucosa reflects the health condition of intestine. Reported that the largest villus height in duodenum was observed in 1.5% Garlic supplemented group as compared to villus height. Using of garlic improved the villus height: crypt depth ratio compared to all other treatments. Saeid *et al.* (2013), who also reported the improved intestinal morphological characteristics like villi length and small crypts in birds receiving 0.5% garlic powder containing diet as compared to control.

iv. *Intestinal micro-flora*

The microbial population in the gastrointestinal tract of poultry plays an important role in normal digestive processes and health maintenance (Woods et

al., 1999). Issa, et.al, (2012) noted that, improvement of total tract digestibility in broilers fed different levels of GP was probably due to herbal effects in increasing the microbial population especially the number of bacteria such as *E. coli*, *Clostridium* spp. and *Enterococci*. In order to increase growth performance of animals; concentration of the beneficial microorganism in animal gut are major determinant. Thus, researchers reported that, supplementation of allium species in broilers diet as alternatives of antibiotics May leads proliferation of beneficial micro organisms.

As cited by (Issa et. al 2012) The active principles of essential oils act as a digestibility enhancer, balancing the gut microbial ecosystem and stimulating the secretion of endogenous digestive enzymes and thus improving growth performance in poultry was reported by (Lovkova, et.al, 2001;Williams and losa, 2001;Cross et.al, 2007). As alternatives of antibiotics, herbs and photogenic products can control and limit the growth and colonization of a variety of pathogenic and nonpathogenic species of bacteria in chicks' gut. This may lead to a greater efficiency in the utilization of feed, resulting in increased growth and improved feed efficiency (Bedford, 2000). The Lactobacilli spp. population in birds supplemented with onion at the level of 30 g/kg was significantly higher than control birds listed in (table 2.) and birds supplemented with 10 g onion/kg at 42 days (Goodarzi et al. 2014).

Table 2: Effect of garlic and onion supplementation on microbial population

Variable	Controll	Antibiotic	Dietary Element		References
			virginiamycin	10g/kg onion 30g/kg of onion	
E.Coli	7.35	5.45	6.98	6.43	Goodarzi, 2014
Lacto Bacilus	4.98	5.53	5.05	5.68	

v. *Immune status*

Incorporations of onion in chicken diet induce positive effects on weight of lymphoid organs like, bursa of fabricius and spleen was listed in (table 3 ) due to, the active components of onion which have antibacterial, antintiviral, antifungal, anti inflammatory and antioxidant activities reported by (Lampe, 1999; Ibrahiem *et al.* 2004). Yamamoto and Glick (1998) the synthesis of immunoglobulins was higher in chicken with larger Bursa. Dafwang *et al.* [1995) reported that the effects of onion and garlic on immunoglobulins were similar to antibiotics. Garlic and cinnamon have potential broad antimicrobial activities, but, some authors reported that, none of the immune related parameters measured including antibody titers, lymphoid organs' weight, was neither positively nor negatively stimulated(Toghyani et al 2011; Jafari et al. 2008).

Table 3: Effect of garlic and onion on lymphoid organ

	Con trol	Antibiotic	10 g/kg Onion	30 g/kg Onion	SEM1	References
Bursa	0.137 <sup>d</sup>	0.165 <sup>b</sup>	0.149 <sup>cd</sup>	0.190a	0.010	Goodarzi <i>et al</i> ,2013
Spleen	0.111 <sup>b</sup>	0.139 <sup>ab</sup>	0.138 <sup>ab</sup>	0.148a	0.005	
	controll	0.3% of	0.5%			
Bursa of Fabricius (g/100 g)	0.32	0.29	0.33		0.02	<i>An et al. (2015)</i>
Spleen (g/100 g BW)	0.12	0.16	0.15	0.12	0.01	
parametres	control	3% garlic	5% garlic			
bursa	1.36	1.18	2.14	±0.42		Eligab <i>et.al</i> , 2013
spleen	1.67 <sup>a</sup>	1.01 <sup>b</sup>	1.23 <sup>b</sup>	±0.12		
thymus	5.81	6.02	6.19	±1.62		

Abcd; letter subscript indicates, significance difference among the treatments  
 BW: body weight

vi. *Carcass quality*

Inclusion of herbal products have been used as growth promoters the ingredients found in herbs used as digestion stimulants and facilitates growth of broiler chicken, therefore effect of onion and garlic extract on body weight gain, feed conversion efficiency had reported by (Frankic *et al.*, 2009; Jo *et al.* 2009; Goodarzi *et al.*, 2013)

Aji *et al.* (2011) also reported that inclusion of garlic and onion in chicks feed diet had been shown high body weight gain than control. Where as It has been appeared that inclusion of onion and garlic into broiler diets did not have adverse effects on feed intake so that effect of onion and garlic on different parameters of broiler chicken was indicated in table(4)

Table 4: Effect onion and garlic on carcass yield of broiler chicken

Treatment		Controll	25mg/d/bird	50mg/d/bird	100mg/d/bird	References
<b>onion</b>	LWkg	1.95±0.38	2.20±0.19	2.41±0.11	2.57±0.13	
	DWkg	1.39±0.27	1.53±0.15	1.69±0.10	1.83±0.16	<u>Slyndra,2011</u>
	Carcass yield%	71.28	69.5	70.12	72.2	
<b>Onion</b>		<b>controll</b>	<b>.3%</b>	<b>.5%</b>	<b>SEM</b>	
	Final BW (g/bird)	890.6a	882.0 <sup>ab</sup>	880.3 <sup>ab</sup>	3.78	
	BW gain (g/d/bird)	25.1 <sup>a</sup>	24.8ab	24.7 <sup>ab</sup>	0.13	<i>An et al. (2015)</i>
	Carcass%	67.32	66.3	66.3	0.47	
<b>Garlic</b>	LWkg/bird	2.04±0.29	2.15±0.21	2.37±0.17	2.65±0.09	Slyranda, 2011
	DWkg/bird	1.43±0.23	1.51±0.26	1.66±0.20	1.85±0.11	
	Carcass yield%	70.1	70.23	71.12	71.2	
	level	<b>controll</b>	<b>3%</b>	<b>5%</b>	<b>Se</b>	
<b>Garlic</b>	IBWg/bird	47.90	45.10	48.60	±1.04	<u>Eligab,2013</u>

abce subscript letter indicates they have significance difference towards the row  
 BW=Body weight, LBW=live body weight, FCR= feed conversion ratio  
 CW=Carcass Weight. FBW=Final body weight

c) *Characteristics of garlic and onion*

i. *Antimicrobial activity*

Garlic and onion have been used for centuries in several societies against parasitic, fungal, bacterial and viral causing pathogens. As mentioned in review articles of (Corzo-Martínez et al.2007) chemical characterization of sulphur compounds has allowed the plants to have antimicrobial effects against paracite, bacteria, protozoa, fungi and viral infection. Allicin, ajoene and other organo-sulphur compounds from garlic are also effective antiprotozoals. Antiparasitic properties of onion extracts towards different strains of Leishmania and T. vaginalis have been reported as well (Saleheen et. al, 2004). In addition to inhibitory effects against pathogenic bacteria, onions and garlic have been found to promote beneficial microorganisms.

The organosulfur compounds are believed to possess anti-inflammatory, anti-allergic, anti-microbial, and anti-thrombotic activity by inhibition of cyclooxygenase and lipoxygenase enzymes (Block et al., 1997). Onions and garlic contain fructooligosaccharides (FOS), prebiotics which are non-digestible ingredients fermented by bifido-bacteria in the body that help maintain the health of the gut and colon (Gibson, 1998). Onions are composed of 2.8% FOS (wet wt.) and 1.0% FOS in garlic (National onion association, undated) whereas, (Oligosaccharides have been proposed as a key food ingredient for the future. Also, according to review of ( Corzo-Martínez et al, 2007) garlic and onion could be added like functional ingredients into “fast foods”, highly consumed products in the present society, providing them antioxidant compounds, as quercetin, prebiotics compounds(FOS), or mineral nutrients, such as selenium, to prevent nutritional deficiencies. The anti-oxidative effects of onions have been associated with a reduced risk of neurodegenerative disorders, cancer, cataract formation, ulcer development and prevention of vascular and heart disease through inhibition of lipid peroxidation and lowering of low density lipoprotein (Shutenko et al., 1999), Hertog and Katan, 1998;

Sanderson et al., 1999; Suzuki et al., 1998; Frémont et al., 1998; Aviram et al., 1999; Kaneko and Baba, 1999).

ii. *Antioxidant properties*

According to (Noureddine, 2005) biological properties of Allium extracts possessed variable but, interesting antioxidant activities. These properties were significantly correlated to total phenolics content which was high in red, purple onions and garlic. However, in addition to phenolic compounds, sulfur compounds could be involved in the assessment of the antioxidant properties. Heat treatment reduced the antioxidant activity of the extracts; however, heating should be carefully considered when Allium plants are used in food preparation or cooking for antioxidant protection (Noureddine, 2005).Antioxidant activity from a high intake of fruits and vegetables has been reported to prevent alteration of DNA by reactive oxygen species. Flavonoids, ever-present in the herbs, whereas their antioxidative effects has been widely studied (Hertog and Katan, 1998). Onions are known to contain anthocyanins and the flavonoids quercetin and kaempferol (Rhodes and Price, 1996).

Quercetin have beneficial effects against many diseases and disorders including cataracts, cardiovascular disease as well as cancer of the breast, colon, ovarian, gastric, lung, and bladder. In addition to quercetin, onions contain the phyto-chemicals known as disulfides, tri-sulfides, cepaene, and vinyl dithiins. These compounds have a variety of health-functional properties, including anticancer and antimicrobial activities (national onion association, <https://www.Onions-usa.org/all-about-onions/onion-health-research>). Onions contain *more* polyphenols than even garlic or leeks, and are one of the best sources of a type of polyphenol called flavonoids, especially the flavonoid quercetin. further, as reported by the National Onion Association, onions are considered a dietary anti-carcinogen and inhibitory effects of onion. (<http://www.ncbi.nlm.nih.gov/pubmed/17093154>)

Table 5: Summary of the antioxidant properties for garlic (Allium sativum L.) and red onion (Allium cepa L.)

Sample	Phenolic content	References
Garlic	37.60 ±2.31 mg GAE/100g	
Red onion	53.43 ±1.72 mg GAE/100g	Che Othman, et.al,2011

GAE= .gallic acid equivalents (mg= milligram)

d) *Economic benefits of onion and garlic as feed additives*

In poultry industry feed additives have been widely used for long period of time as contrivance to increase animal productivity related to growth, feed

efficiency and health condition. About 80% of domestic animals have been fed synthetic compounds for the purpose of either medication or growth promotion (Lee et al., 2001). Cost of Feed accounts for 60-80% of the total expenses in poultry production. Any operation must

have clear targets how to optimize feed efficiency and reduce feed cost and work daily towards those targets (Zekic et al., 2010).

Recently, many researchers are working with searching herbal feed additives to replace antibiotics. Even, researches are conducted on different plants there should be accepted based on their feasibility in economic aspect.

As a result, economic feasibility of garlic and onions had been reported by different authors but it depends on amount plants, part of plant used and availability of plant parts to the area.

Zekic et al., (2014) concluded that the addition of commercial garlic powder in amount of 2% in broilers Chicken diet had significant influence on production performance, higher final body weight, as well as on the nutritive and technological quality of chicken breast meat.

Sylandra, (2011) revealed that treatment of birds with 25 mg and 50 mg of onion per day caused a reduction in their feeding cost. Conversely, 100 mg of onion increased the feeding cost of the birds. According to (Ashayerizadeh et al, 2009), feed is a major segment of production in poultry industry thus efforts are usually made in poultry industry to increase the efficiency of feed utilization to minimize per unit cost of production. This could be the direct consequence of the increased feed intake observed with feeding of onion at this dose level. While, Treatment of birds with garlic at all the dose regimens also caused an increase in the feeding cost of the birds when compared to the control birds, the highest increase being that with 100<sub>mg</sub> of garlic.

Boseleng (2012) revealed that the addition of 1.5% and 3% garlic on the sunshine chicken ration resulted to higher body weights and weight gain, better FCR and lower feed conversion ratio, and total feed cost to produce a kilogram in weight. Also, Okoleh and Adeolu (2014) demonstrated that, Inclusion of 14g per kilogram of diet garlic powder gave the least cost-benefit ratio, implying that it is the best diet from the economic point of view.

### III. CONCLUSION AND RECOMMENDATION

Onion and garlic are the most available plants widely used on the world for their therapeutic effect and medicinal value. Recently the use of both plants as growth promoting factors are well accepted among many commercial farms now days, onion and garlic could be used to improve the performance of broiler chickens however, more studies need to be done to establish the appropriate amount, age and other favorable conditions under which the best result can be achieved with these plant materials (Sylandra, 2011).

Garlic and onion supplementation in animal diets drastically decrease total serum cholesterol, Low density level and very low density lipoproteins (VLDL)

with significant increase in the level of high density lipoproteins (HDL). In other ways, in most of the studies on different percentage of inclusion had been reported differently. The choice for the low dose of onion and garlic used to decrease adverse effects of high dose garlic and onion reported by other researchers. Being the fact, garlic and onion was reported to cause hemolytic anemia at 4% level in feed (Oboh, 2004) while onion given at 5, 10, 14, 20 and 25% of meal caused hemolytic anemia, decreased packed cell volume, hemoglobin concentration and red blood cell. Onion and garlic should be used, with in diet, not only for their organoleptic characteristics but also for the potential and verified biological activities. Therefore, the works which had been reported on garlic concerning level of ingredients are variable whereas, Eligab, et. Al, (2013) indicated that, dietary inclusion of garlic in broiler diet at 3% dose shown high production performance with higher doses, while some of researchers indicated inclusion of garlic in broilers diet does not show any effects on production parameters of broiler chicken. Concerning the onion ingredients found in onion like phenolic compound and (fos) seems higher than that of garlic but, availability of information on onion was insufficient especially, using as growth promoters in animal diet. Therefore, further research will be intended for more evidences to get optimum level of garlic and onion which to be incorporated in broiler ration without any adverse effect on the products particularly focusing on onions.

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