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EFFECTS OF SUPPLEMENTATION *CINNAMON CASSIA* AND *ZINGIBER OFFICINALE* POWDER ON REPRODUCTIVE PERFORMANCE OF BROILER BREEDER MALE

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Abstract

Cinnamon leaf and Ginger rhizome are used medicinally and to examine the effect of them powder extract on male reproductive system there for the powder were add to drinking water, the treatments of male broilers breeder ROSS308 are as treatment1 drinking water without any additive (control) ,treatments 2and 3 add of cinnamon and ginger 500 mg/L of drinking water, treatments 4 and 5 add of cinnamon and ginger 1000 mg/L of drinking water, supplementation start in 26wk and end in 44wks age at levels. Ejaculate volume, sperm concentration, Counts, movements, motility and abnormality where the main parameters were study. There were a significant increase ($P<0.05$) in ejaculate volume (ml) and sperm concentration (10^9 Ml), movements (%) and a significant decrease ($P<0.05$) in motility and abnormality (%), for the treatment of cinnamon and ginger. Therefore our results refer to that extract of and cinnamon and ginger conceder as pro-fertility properties in male broiler which might be a product of both its potent antioxidant properties and androgenic activities.

***Key words*:** broiler breeder, cinnamon, ginger, reproductive performance.

Introduction

The most of the new research about use of antibiotic aimed to minimized or prevent the use of certain antibiotics and hormones as stimulant for growth in the animal feed in many European countries and America as a result of the harmful effect of them on human health due to the accumulation of remnants of these substances in animal products, as well as consumer awareness of health towards the use of natural materials, Ginger and cinnamon was used in a variety in human drags as anti-oxidant for treatment of many diseases (Anderson, 2008). Also, it was used in animal feed and poultry as antioxidants and as stimulant for growth (Suriya *et al*., 2012).Ginger has the properties of sex hormones and in particular hormones androgenic properties (Kamtchouing *et al*., 2000). (Sultin *et al*., 2008) used it in reducing the age of puberty in female of domestic rabbits. (Grzanna *et al*., 2005) noted that the ginger oil's has a role in the conservation & protection of the DNA from oxidation by hydrogen peroxide (H_2O_2) and the protection from the harmful effects of the reactive oxygen species (Rajeev *et al*., 2006; Yang *et al*., 2006). The importance action of antioxidants by protecting the DNA from damage is by improving the quality of sperm and thus increase the rate of fertility in humans. In a another study found by (Khaki *et al*., 2009) that supplementation of 100 mg / kg body weight / day OF ginger had increased the percentage of alive sperm vitality and massive motility and in addition to that increase the concentration of testosterone in rats. As well as that cinnamon leaf, ginger roots did not appear so far to have a negative impact on animal or human health when it was used by human on daily basis.

Materials and Methods

Extraction of Plant Material

The *Zingiber officinale* rhizome and *Cinnamon cassia* leafs were purchased from local commercial sources and shade dried at room temperature before being pulverized with an electric grinder. The extracts were then obtained by maceration method 100gm with 1 liter of distilled water for 48 hours to obtain a final powder concentration of 100 mg/ml. as stated in the way of (Harbone *et al*., 1973).

Birds and Experiment Design

The experiment was conducted in poultry farm by using 45 male (9 male /treat) of the broiler breeder Ross 308 at the age of 24 weeks and the experiment period were to 48 wks. of old. The birds were numbered, use of cages of dimensions (150 × 50 × 55) cm for but birds in it, and the treatments are: -

1. The first treatment (T1) is a control were the birds provided with a drinking water (without any supplementation).
2. The second treatment (T2) treating with supplementation powder extract of cinnamon leaves 500 mg/L of drinking water.

3. The third treatment (T3) treating with supplementation powder extract of ginger rhizome 500 mg/L of drinking water.
4. The fourth treatment (T4) is treating with supplementation of powder extract of cinnamon 1000 mg /L of drinking water.
5. The 5th treatment (T5) is treating supplementation addition of powder extract of ginger rhizome 1000 mg /L of drinking water.

The experiment was start after two weeks of adaptation of birds to the new environment & this period was considered as the adjustment period and at the age of 24 weeks the plant extracts was introduce by supplementation them in the drinking water for 24 hour.

Semen Collection

Semen samples were collected from birds five times per week and for two consecutive weeks to ensure daily production estimate of the actual sperm (Reviers *et al*., 1972) at the same time (8 am). The semen samples were collected at the age of (28, 32, 36, 40 and 44) wk. Semen samples from birds were collected by standard procedure described by (Burrows *et al*., 1972). Semen parameters (ejaculate volume, sperm count, massive movements, alive & dead sperm %) were done according to standard procedure described by (Allen *et al*., 1955, Lake *et al*., 1978).

Statistical Analysis

Data from experiment were analyzed as a randomized complete block design with the three replicates (3 male each). Means were separated using Fisher's protected least significant difference (P< 0.05). The results were expressed as mean ± S.E.M (standard error of means) and was analyses by sas (Sas, 2011)

Results

Ejaculate Volume (ml)

The effect of powder extract of ginger and cinnamon on ejaculate volume of broiler breeder males Ross308 as shown in table 1, there is a significant (P< 0.05) increase in the rate of ejaculate volume compared with control treatment, especially the treatment of powder extract of ginger T5 compared to other treatment in all experiment periods. While there was no significant difference between the treatments but it show significant increase in ejaculate volume as compare to control.

Sperm concentration (10^9/ml1)

The results in table (2) indicate the scale described the existence of significant differences (P <0.05) in the concentration of sperm in the semen parameters between the powder extracts of ginger, cinnamon and the control treatment. Ginger treatment T5 results a significant increase of sperm concentration in all periods compared to other. There was no significant difference between other treatments but there were a significant differences with the treatment of control (P <0.05).

Massive Movement of Sperm (%)

From the results of table (3) the existence of significant differences (P <0.05) in the percentage rate of the movement's collective sperm between the totals of powder extracts of ginger, cinnamon, compared with the treatment of control, the treatment T5 had a higher rate of massive movement compared to other treatments and all treatment were significant differences (P <0.05) in the percentage rate of the movement's compared to control.

Dead sperm (%)

The results in table (4) shows the existence of significant differences (P <0.05) in the proportion of sperm dead between transactions powder extracts of ginger, cinnamon and control, as recorded treatment T5showed the lowest reached in all periods (13.36±0.76 , 10.54±1.65 , 8.55 ± 0.35 , 8.55 ± 0.35 , 8.45 ± 0.76 and 7.54 ± 0.43) compared to all treatments

Abnormal Sperms (%)

The results shown in Table (5) a significant differences (P <0.05) in the proportion of abnormal sperms in the semen between transactions powder extracts of ginger, cinnamon and the control treatment being of recorded treatment T5show lower rate of sperm abnormal, amounting to (10.42±1.34, 9.54 ± 1.65, 7.32 ± 0.58, 6.43 ± 0.53, 5.32 ± 0.36) in while the control treatment recorded the highest percentage of abnormal sperm (14.24±0.45, 13.43±0.47, 13.12±1.34, 12.23±1.54, 11.28±1.56). As indicated in table (5) a significant differences (P <0.05) between the periods in all the transactions had registered the highest percentage of deformed sperm during the periods of age (28wk) compared to another for the treatment of control and treatment of ginger, cinnamon, with the survival results of the recorded results and less moral superiority to the rest of the transaction for treatments on control treatment.

Table 1 : Effect of cinnamon& ginger extract on ejaculate volume (ml) of broiler reeder male Data are presented as mean ± SE.

Age / Wk	T1	T2	T3	T4	T5
28	0.354±0.015 c	0.421±0.058 b	0.466±0.056 b	0.435±0.043 b	0.510±0.056 a
32	0.366±0.032 c	0.457±0.022 b	0.490±0.044 b	0.465±0.056 b	0.570±0.033 a
36	0.365±0.053 c	0.460±0.053 b	0.510±0.036 b	0.470±0.035 b	0.610±0.052 a
40	0.370±0.023 c	0.470±0.032 b	0.515±0.043 b	0.475±0.062 b	0.625±0.012 a
44	0.375±0.022 d	0.476±0.033 c	0.520±0.033 b	0.480±0.054 Bc	0.650±0.037 a

Letter a, b, c and d refer to different between treatments at significant level P< 0.05

Table 2 : Effect of cinnamon& ginger extract on sperm concentration (10^9/ml) of broiler breeder male.

Age / Wk	T1	T2	T3	T4	T5
28	3.33± 0.03 c	3.68 ± 0.05 b	3.77±0.05 ab	3.71±0.06 ab	3.98±0.04 a
32	3.40±0.06 c	3.74±0.04 bc	3.88±0.07 b	3.80±0.04 b	4.22±0.03 a
36	3.56±0.04 c	3.83±0.06 bc	3.95±0.04 b	3.88±0.06 b	4.55±0.07 a
40	3.65±0.05 c	3.97±0.03 bc	4.22±0.08 b	4.15±0.05 b	4.78±0.08 a
44	3.33± 0.03 c	3.68 ± 0.05 b	3.77±0.05 ab	3.71±0.06 ab	3.98±0.04 a

Data are presented as mean ± SE. Letter a, b, c and d refer to different between treatments at significant level P< 0.05

Table 3 : Effects of cinnamon& ginger extract on sperm massive motility (%)of broiler breeder male

Age / Wk	T1	T2	T3	T4	T5
28	70.33±3.22 b	71.54±4.66 b	75.43±5.34 ab	73.33±3.65 b	77.44±4.76 a
32	73.54±4.55 c	76.43±6.37 bc	77.65±6.87 b	77.43±7.67 b	81.23±6.45 a
36	74.76±3.76 c	78.46±5.65 b	79.51±4.33 b	78.34±7.53 b	83.55±2.32 a
40	75.45±3.32 c	79.54±5.43 b	81.55±3.44 b	80.22±2.43 b	85.44±7.56 a
44	76.22±6.82 c	80.43±7.43 b	82.55±4.66 b	82.43±2.44 b	87.45±3.65 a

Data are presented as mean ± SE. Letter a, b, c and d refer to different between treatments at significant level P< 0.05

Table 4 : Effect of cinnamon& ginger extract on dead sperm (%) of broiler breeder male

Age Wk	T1	T2	T3	T4	T5
28	19.33±1.32 A	18.33±2.85 a	16.33±2.54 a	17.33±2.41 A	13.36±0.76 b
32	17.65±2.65 A	14.44±1.77 a	14.86±1.33 a	14.34±1.54 A	10.54±1.65 b
36	16.32±2.21 A	12.43±1.65 a	12.15±0.47 a	12.68±1.87 A	8.55 ± 0.35 b
40	14.64±1.76 A	11.33±1.65 a	11.21±1.33 a	11.92±1.34 A	8.45 ± 0.76 b
44	15.43±2.43 A	11.12±0.55 b	10.33±1.38 b	10.65±1.43 B	7.54 ± 0.43 c

Data are presented as mean ± SE. Letter a, b, c and d refer to different between treatments at significant level P< 0.05

Table 5 : Effects of cinnamon& ginger extract on abnormal sperm (%) of broiler breeder male

Age Wk	T1	T2	T3	T4	T5
28	14.24±0.45 A	14.74±1.43 a	11.22±1.48 ab	12.35±1.36 Ab	10.42±1.34 b
32	13.43±0.47 A	11.13±1.23 ab	10.44±1.33 b	11.45±1.66 B	9.54 ± 1.65 b
36	13.12±1.34 A	11.65±1.32 a	9.88±1.58 bc	10.44±1.38 B	7.32 ± 0.58 c
40	12.23±1.54 A	10.23±1.83 ab	8.78±1.45 b	9.74±1.32 b	6.43 ± 0.53 c
44	11.28±1.56 A	9.43±1.28 ab	8.12 ±1.87 b	8.76±1.54 b	5.32 ± 0.36 c

Data are presented as mean ± SE. Letter a, b, c and d refer to different between treatments at significant level P< 0.05

Discussion

In this study, the result of adding water extracts of each cinnamon and ginger produce a significant increase (P<0.05) in semen ejaculate volume, number of sperm in the ejaculate and massive sperm movement, a significant decrease (P<0.05) in dead sperm and abnormal sperm.

The main pharmacological actions of cinnamon are compounds isolated there from include immuno-modulatory, anti-tumorigenic, anti-inflammatory, anti-apoptotic, anti-hyperglycemic, anti-lipid emic and anti-emetic actions (Ting *et al*., 2006, ciftici *et al*., 2010, Mohamed & Shanoon, 2012). Ginger is a strong anti-oxidant substance and may either mitigate or prevent generation of free radicals. It is considered a safe herbal medicine with only few and insignificant adverse/side effects, All these effects may be attributed to the reason that ginger & cinnamon contain a broad spectrum of nutrients and chemical compounds that have a positive effect on the vital functions of a bird, It was found that ginger contains Capsaicin, Zingerone, Shagaols, gingerol, phenolic, curcumin, proteolysis, vitamin C and E, (Zancan *et al*., 2001; Sekiwa *et al*., 2000; Belewu *et al*., 2009). Also, cinnamon contains flavonoids, terponoids, thymol, carvacol and eugenol and vitamin E (Al-kassie *et al*., 2008; Huff *et al*., 2010).

It has been observed in many laboratory studies the ability of these compounds to break the chain reaction of oxidation from free radicals and scavenged for many types of free radicals such as superoxide and hydroxyl and proxyradical (Halliwell et al., 2005; Shanoon 2011, Shanoon & Jassim; 2012). As well as the polyphenols prevent the oxidation of enzymes that inhibits the oxidation free radicals (Leary *et al*., 2004). Also, the protection of DNA and plasma membrane and mitochondria of the sperm. Because the sperm is more vulnerable & sensitive to free radicals, because of the high concentration of unsaturated fatty acids in sperm membrane (Al-Daraji and Ibrahim 2007).

This explains the low percentage of dead sperm and abnormal sperm morphology and increase the rate of massive movement of sperm in all treatments treated with cinnamon and ginger. The present finding is similar to the result of (Khaki *et al*., 2009) in rats by adding of 100 mg / kg body weight / day cause an increase in the percentage of living sperm and massive

movement of sperm. Also increase in testosterone concentration. These findings are consistent with previous studies, each of Rajeev *et al*. (2006); Yang *et al*. (2006), who emphasized the act of antioxidants in protecting the DNA from oxidative damage, as well as improve the quality of semen and thereby increase the fertility of mice and humans, as noted by (Amin and Hamza, 2006) increase the activity of antioxidants in the testis and the movement of sperm in treated mice by alcohol extract of ginger at dose of 10 mg/kg of body weight for 26 days. In other studies pointed by (Han *et al*., 2004) that the ginger had a real antioxidant activity than that the done by vitamin E and C (Bölükbaşi *et al*., 2006). Also, an increase in the resistance of glutathione, (Dickinson *et al*., 2003), thereby reducing the lipid oxidation which lead to the deterioration of semen quality (Sekiwa *et al*., 2000). In a recent study, done by (Jarsia *et al*., 2007) who noted that the addition of ginger extract at concentration of (0, 1 and 0.2 and 0.4 and 0.6%) led to significant improvement in the qualities of the semen particularly significant decrease in the proportion of dead sperm and concluded that herbal actually brake or prevent the Lytic activity within semen fluid as antioxidant, especially camphene, which is one of the active compounds in cinnamon and ginger, which works antioxidant through his union with the free radicals. On the other hand it was found that water extracts of plants that rich in phenolic substances have a role in the prevention of decomposition oxidative fat (Kahkonen *et al*., 1999) the present findings indicates that water extracts decrease the oxidation of fat and lower the level of glucose in seminal fluid. Which is depleted by the living sperm (Pappas *et al*., 1993; Verme and Kanwar, 1998; Leeuwenburgh and Ji, 1996; Kraszewski *et al*., 2002), also it was observed in this study, this findings refers to the ability of ginger & cinnamon to influence the mechanisms of anti-lipid peroxidation, In previous study, it was observed that there is a positive correlation between the concentration of ginger & cinnamon & characteristics of semen (Zhang *et al*., 2003; Khaki *et al.,* 2009).

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