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A COMPARATIVE STUDY BETWEEN GINGER AND PROPOLIS ON SEMEN QUALITY OF MALE RABBITS

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ABSTRACT

Infertility is one in all the key health problems in life, and approximately half-hour of infertilities are thanks to a male factor. Ginger (*Zingiber officinale*) has been consumed since antiquity and is thought to play diverse biological roles including anti-oxidation, anti-inflammation, hypolipidemia, anti-carcinogenesis, anti-nausea, antithrombosis, and antibacterial process. Propolis also induces the activation of antioxidant enzymes. This study was designed to analyze the and therefore the therapeutic effects of administration of ginger and propolis individually compared to manage on semen quality of male rabbits. Fifteen mature male rabbits were randomly divided into three groups of 5 rabbits each. Group 1 served as control. However, group 2 got propolis (50mg/kg body weight) and group 3 got ginger (100mg/kg). Animals were orally administered the doses of propolis, ginger daily for 12 weeks. Semen was collected weekly for 12 weeks. Semen quality were evaluated. Results showed that semen quality was increase. Propolis and ginger essentially expanded BW, RTW, testosterone levels and semen characteristics. In spite of the actual fact that both medications had prevalence in comparing with control, most semen characteristics were way better ($P<0.05$) for propolis than ginger treatment.

KEYWORDS

Ginger, Propolis, Semen quality and Rabbits.

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INTRODUCTON

Ginger (*Zingiber officinale Roscoe*, Zingiberacae) is one among the foremost commonly utilized flavors round the world, particularly within the South-Eastern Asian nations. Ginger is additionally a therapeutic plant that has been broadly utilized in Chinese, Ayurvedic and Unani-Tibb solutions, since relic, for a large cluster of afflictions that incorporate joint pain, stiffness, sprains, strong throats, issues, obstruction, heartburn, heaving,

hypertension, dementia, fever, irresistible illnesses and helminthiasis (Ali *et al*, 2008)[1]. Ginger (*Zingiber officinale*) has been consumed since antiquity and is understood to play diverse biological roles including anti-oxidation, anti-inflammation, hypolipidemia, anti-carcinogenesis, anti-nausea, antithrombosis, and antibacterial process (Stoilova *et al*, 2007)[2]. Morakinyo *et al*, (2010)[3] detailed that co-administration of watery ginger extricate with arsenite was found to protect against antagonistic alter inside the organ weight, weaken the diminish in spermcapacities, improve plasma regenerative hormones level along with expanded cancer prevention agents exercises and decreased peroxidation. Qureshi *et al*, (1989)[4] detailed that ginger extract essentially expanded the sperm mortality and sperm substance within the epididymis and vas respect without creating any spermatotoxic impact. Aqueous extract of common ginger was found to increase weight of testes, the serum testosterone level and epididymal α-glucosidase activity in male rats (Kamtchouing *et al*, 2002)[5].

Khaki *et al*, (2009)[6] detailed that organization of ginger essentially expanded sperm rate, practicality, motility and serum add up to testosterones in rats.. The effect of ginger and its extracts were attributed to antioxidant activity of its major ingredients namely Zingerone, gingerdiol, Zingiberene, gingerols and shogoals (Zancan *et al*, 2002)[7].

Barrenness is one of the major wellbeing issues in life, and roughly 30% of infertilities are due to a male figure (Isidori *et al*, 2006)[8]. A few conditions can meddled with spermatogenesis and decrease sperm quality and generation. More variables such as medicate treatment, chemotherapy, poisons, discuss contaminations and deficiently vitamins admissions have hurtful impacts on spermatogenesis and sperm typical generation (Mosher and Pratt, 1991)[9]. A few considers have detailed that cancer prevention agents and vitamin A, B, C, and E in eat less can protects perm DNA from free radicals and increment blood test is obstruction steadiness (Jedlinska *et al*, 2006)[10]. These days ginger rhizome (*Zingiber officinale R.*, family: Zingiberaceae), is utilized around the world as a flavor. Both antioxidative (Sekiwa *et al*, 2000)[11] and androgenic action of (Kamtchouing *et al*)[5] *Z.officinale* were detailed in creature models. All major dynamic fixings of *Z. officinale*, such as Zingerone, Gingerdiol, Zingibrene, gingerols and shogaols, have antioxidant action (Zancan *et al*, 2002)[7]. Other than, other analysts appeared that ginger oil has dominative defensive impact on DNA harm initiated by H_2O_2 and might act as a forager of oxygen radical and may be utilized as an antioxidant (Grzanna *et al*, 2005)[12].

Propolis could be a resinous common item collected from splits within the bark of trees and leaf buds which are improved with the salivary proteins of honeybees. It has picked up notoriety and was utilized broadly in sound drinks and nourishments to move forward well-being and anticipate infections such as aggravation, heart infection, diabetes and indeed cancer. Propolis has a few organic properties such as anti-inflammatory, anticancer, antioxidant, anti-microbial and antifungal exercises (Banskota *et al*, 2000)[13]. Propolis contains a number of minerals such as Mg, Ca, I, K, Na, Cu, Zn, Mn and Fe as well as many vitamins like B1, B2, B6, C and E, and a number of greasy acids. In expansion, it contains a few chemicals as succinic dehydrogenase, glucose-6-phosphatase, adenosine triphosphatase and corrosive phosphatase (Tikhonov and Mamontova, 1987)[14].

Propolis, too contains more than 300 biochemical constituents, counting generally a blend of polyphenols, flavanoid aglycones, phenolic corrosive and their esters, and phenolic aldehydes and ketones, terpenes, sterols, vitamins, amino acids (Khalil, 2006)[15]. The antioxidant movement of propolis is primarily ascribed to its flavonoid substance, that's competent of rummaging free radicals and in this manner assurance against lipid peroxidation (Yousef and Salama, 2009)[16]. Propolis too actuates the enactment of antioxidant chemicals such as superoxide dismutase (Jasprica *et al*, 2007)[17] and catalase (CAT) (Sobocanec *et al*, 2006)[18] against free radicals. It has been illustrated that propolis gives assurance against barrenness by making strides sperm generation, motility, number

and quality, and expanded the method of steroidogenesis and subsequently testosterone generation (Yousef and Salama, 2009)[16]. Russo *et al*, (2006)[19] uncovered that propolis ensures sperm DNA from the oxidative harm caused by thiobarbituric corrosive.

MATERIAL AND METHODS

In this study ginger was gotten from Predominant Nourishment and Detailing by Jarrow Equations, Los Angeles, USA. Propolis was provided from California Wellbeing Items, Inc. 11577W. Olympic Bivd. Los Angeles, and CA90064. Male rabbits (age of 6-7 months and beginning weight of 2.917 ± 28.9Kg) were utilized. The creatures were separately housed in stainless steel cages. Bolster and water were given advertisement libitum. They were nourished on a commercial apportion pellets comprising of 30% Berseem roughage (*Trifolium alexandrinum*), 25% yellow maize, 26.2% wheat bran, 14% Soybean dinner, 3% molass, 1% calcium chloride, 0.4% sodium chloride, 0.3% blend of minerals and vitamins and 0.1% methyonine.

To determine the effects of administration of ginger and propolis individually compared to control on semen quality and testosterone levels of male rabbits, 15 mature male rabbits were randomly divided into three equal group of 5 rabbits each. Group 1 served as control. However, group 2 were given ginger (100mg/kg body weight) and group 3 were given propolis (50mg/kg body weight), respectively. The doses of the ginger and propolis were calculated according to the animal's body weight on the week before dosing. The tested doses for ginger and propolis were given every other day for 12 weeks.

Rabbits were watched twice every day and weighed week by week within the morning some time recently having get to bolster and water. Every day bolster admissions was recorded week by week and semen collection was carried out week by week and proceeded all through the 12 weeks exploratory period. Bucks were subjected to semen collection by taking a female to the buck. Semen was collected in a graduated test tube connected to the fake vagina. Response time was recorded from the minute of subjecting a doe to the buck and completion of erection; it was measured in seconds employing a stopwatch. After expulsion of the gel mass, ejaculate volume was recorded. Beginning hydrogen particle concentration (pH) of semen tests was determined just after collection employing a pH paper (Universalindikator pH 0-14 Merck, Merck KgaA, 64271 Darmstadt, Germany).

Pressed sperm volume (PSV) was recorded. A powerless eosin arrangement (Blom, 1950)[20] was utilized for assessment of sperm concentration by the progressed Neubauer haemocytometer slide (GmbH+Co., Brandstwiete 4, 2000 Hamburg 11, Germany). Add up to sperm yield was calculated by duplicating semen ejaculate volume and semen concentration. Assurance of introductory fructose concentration in seminal plasma was carried out promptly after collection agreeing to Mann (1948)[21]. Appraisal of live, dead, and irregular spermatozoa were performed utilizing an eosin-nigrosine blue recoloring blend. The rates of motile sperm were evaluated by visual examination beneath low-power amplification (10×40) employing a phase-contrast magnifying lens. Add up to number of motile sperm was calculated by duplicating rate of motile sperm and add up to sperm yields. Add up to utilitarian sperm division (TFSF) parameter was moreover calculated as the item of add up to sperm yield by motility (%) by typical morphology (%) (Correa and Zavos, 1996)[22]. Blood tests were collected from the ear vein of all creatures each other week and were put instantly on ice. Heparin was utilized as anticoagulant and plasma was collected by centrifugation of blood at 860 Xg for 20 minutes, and was put away at -60 °C until utilized for investigations. Testosterone concentrations in plasma were measured by a basic strong stage chemical immunoassay utilizing horseradish peroxidase as a tracer (Equipar, By means of G. Ferrari, Saronno, Italy). Three rabbits from each bunch were chosen for butcher at the conclusion of the treatment period. The weight of testicles was recorded within the yielded rabbits.

Data were analyzed as a randomized plan utilizing the Common Direct Show strategy of SAS (1996)[23].

RESULTS AND DISCUSSION

The changes in body weight (BW), feed intake (FI), relative testicles weight (RTW) and the concentrations of blood plasma testosterone all through the 12-week exploratory period of bucks treated with ginger and propolis were summarized in Table No.1. Treatment with ginger and propolis caused increment ($p<0.05$) in BW and testosterone levels. Treatment with propolis alone caused a diminish ($p<0.05$) in FI, relative testicles weights compared with ginger and control gather. Information on semen ejaculate volume (EV), beginning hydrogen particle concentration (pH), reaction time (RT), packed sperm volume (PSV), sperm concentration (SC), total sperm output (TSO) of rabbits treated with ginger and propolis are displayed in Table No.2. Treatment of rabbits with ginger and propolis essentially increment ($P < 0.05$) the EV, PSV, SC, RT and TSO values compared to control bunch. On the other hand, the values of pH were diminished altogether as a Treatment of rabbits with propolis. The ginger and propolis treatment upgraded the semen volume, RT, pH, sperm concentration and add up to sperm yield in male rabbit (Table No.2). Information in Table No.3 speak to the cruel values of rabbit sperm motility (SM), total motile sperm (TMS), dead sperm (DS), unusual sperm (AbS), total function sperm fraction (TFSF) and beginning fructose (On the off chance that). Treated male rabbits with ginger and propolis altogether expanded ($P < 0.05$) the SM, TMS, TFSF and on the off chance that values compared to control gather. On the other hand, critical diminish in DS and AbS parameters was watched within the treated rabbits compared with control gather. Most semen characteristics were superior ($P<0.05$) for propolis than ginger treatment.

Discussion

The increase body weight observed in the present study due to treatment with ginger is agreements with Okoye *et al*, (2006)[24] and Omage *et al*, (2007)[25]. Also, Ademola *et al*, (2009)[26] reported significant increase in body weight gain (14.4%) of broilers fed ginger. They reported that increase in body weight gain of the broilers fed ginger indicates the positive nutritive effects of this natural feed additive. The results of the present study showed that *Zingiber Officinale* has a beneficial effect on male reproductive functions, semen characteristics and increased testosterone levels in rabbits. There were significant increase testis weight could therefore be due to increased androgen biosynthesis as evidenced by a significant increase in serum testosterone levels in the experimental rabbits (Table No.1, 2 and No.3). Androgens have been appeared to be essential for the improvement, development and typical working of the testicles and male adornment regenerative organs. Studies of Setty *et al*, (1997)[27] have shown that the level of testosterone is positively correlated with the weight of testis, epididymis, seminal vesicle and prostate glands. The increase in testes weight of rabbits treated with ginger (Table No.1, 2 and No.3) is consistent with the report of Kamtchouing *et al*, 2002)[5] who observed an increase inside the testicular weight of rats treated with *Zingiber Officinale* for 8 days with a concomitant increase in testosterone level. It is conceivable that the increased weight of the testes reflects a dual effect of increased testosterone levels and sperm contained in these organs.

The present results also indicated that ginger caused significant increases in ejaculate volume, sperm concentration, total sperm output, sperm motility, normal sperm, total motile sperm, total functional sperm fraction and semen packed sperm volume. While, significant decreases dead sperm, semen initial fructose, semen initial hydrogen ion concentration (pH) and reaction time. Khaki *et al*, (2009)[18] suggested that the capability of ginger to improve semen characteristics and increase testosterone levels and because it has antioxidative and androgenic activities. As an antioxidant, ginger has a useful effect on treating spermatogenesis disorder and poor sperm function. Hamza *et al*, (2006)[28] have illustrated that *Zingiber officinale* treatment expanded the exercises of testicular cancer prevention agents chemical and reestablish sperm motility of cisplatin-treated rats. Amin and Hamza, (2006)[29] found that *Zingiber officinale* have protective effects against cisplatin-induced testicular damage and oxidative stress in rats.

Ginger rhizome contains a wide assortment of both antioxidative (Sekiwa *et al*, 2000)[11] and androgenic action (Kamtchouing *et al*, 2002)[5]. The major dynamic phenolic fixings disconnected from *Zingiber officinale* (Zingerone, Gingerdiol, Zingibrene, gingerols and shogaols) have antioxidant action (Jorsaraei *et al*, 2008)[30]. Others reported that *Zingiber officinale* extracts have a potent androgenic activity in male rats (Amin and Hamza, 2006)[29].

The propolis neutralized on BW, FI, RTW and testosterone concentrations parameters are in understanding with El-Masoudy *et al*, (2011)[31] who found that propolis expanded the relative testis weight and lightened the negative impacts of chlorpyrifos. Moreover, Yousef *et al*, (2010)[32] found that the propolis through and through increases body weight and relative testis weight. Testicular weight was detailed to have a tall relationship with sperm save within the testis or epididymis and so a reflection of sperm generation (Adeyemo *et al*, 2007)[33]. The propolis expanded the level of testosterone in male rats uncovered to chlorpyrifos poisonous quality (El-Masoudy *et al*, 2011)[31] in male rabbits uncovered to triphenyltin poisonous quality (Yousef *et al*, 2010)[32], in male rats uncovered to aluminum chloride poisonous quality (Yousef and Salama, 2009)[16], and in male rats uncovered to profenofos harmfulness (Abu-Aita *et al*, 2012)[34].

With co-administration of propolis, the sperm concentration was interior and out made strides as compared to control creatures (Table No.2). This is often in agreement with past considers which specified that the organization of propolis caused noteworthy enhancement in sperm characteristics and male ripeness of rats uncovered to chlorpyrifos harmfulness (El-Mazoudy *et al*, 2011)[31]. Too, propolis might give security against fruitlessness by moving forward sperm generation, motility, sperm tally and quality in male rats uncovered to aluminum chloride poisonous quality (Yousef and Salama, 2009)[16]. This may be due to the free radical rummaging movement of propolis that secures sperm layer from the pernicious activity of oxidative assaults and decreases their barbituric corrosive receptive substances arrangement (Russo *et al*, 2006)[19]. Moreover, propolis actuates a noteworthy increment within the level of antioxidant proteins (Yousef and Salama, 2009)[16]. Co-administration of curcumin to monosodium glutamate treated rats expanded the sperm number (Sakr and Badawy, 2013)[35]. With co-administration of propolis, the semen characteristics were altogether improved as compared to control creatures (Table No.3). This is often in understanding with past thinks about which specified that the organization of propolis caused noteworthy advancement in sperm characteristics and male richness of rats uncovered to chlorpyrifos poisonous quality (El-Mazoudy *et al*, 2011)[31]. Moreover, propolis might give security against barrenness by progressing motility, sperm tally and quality in male rats uncovered to aluminum chloride poisonous quality (Yousef and Salama, 2009)[16]. This may be due to the free radical rummaging movement of propolis that ensures sperm layer from the pernicious activity of oxidative assaults and diminishes their barbituric corrosive responsive substances arrangement (Russo *et al*, 2006)[19]. Too, propolis actuates a noteworthy increment within the level of antioxidant proteins (Yousef and Salama, 2009)[16]. Fetouh and Azab (2014)[36] found that the everyday sperm generation diminished particularly due to gentamicin treatment with as compared to control bunch ($p<0.05$), and with co-administration of propolis, the everyday sperm generation progressed essentially as compared to gentamicin treated bunch.

Table No.1: The overall means (±SE) of body weight, feed intake, and relative testes weight and blood plasma testosterone concentration during treatment of male rabbits with ginger and propolis

S.No	Parameter	Groups		
		Control	Ginger	Propolis
1	BW (kg)	3.402 ± 28.2^{b}	3.648 ± 42.8^{a}	3.45 ± 0.03^{a}
2	FI (g/kg BW/day)	48.1 ± 1.50^{ab}	50.5 ± 1.01^{a}	46.6 ± 0.61^{a}
3	RTW (g/100 g BW)	0.207 ± 0.013^{b}	0.374 ± 0.015^{a}	0.19 ± 0.010^{b}
4	Testosterone (ng/mL)	1.59 ± 0.034^{b}	2.53 ± 0.130^{a}	2.603 ± 0.167^{a}

[abcd] Within row, means with different superscript letters differ significantly ($p < 0.05$)

Table No.2: The overall means (±SE) of EV, pH, RT, PSV, SC and TSO during during treatment of male rabbits with ginger and propolis

S.No	Parameter	Groups		
		Control	Ginger	Propolis
1	EV (ml)	0.74 ± 0.017^{b}	0.82 ± 0.018^{a}	0.94 ± 0.018^{a}
2	PH	7.7 ± 0.024^{b}	7.69 ± 0.038^{c}	7.4 ± 0.033^{c}
3	RT (sec.)	9.7 ± 0.90^{c}	3.23 ± 0.145^{c}	5.7 ± 0.51^{d}
4	PSV (%)	16.9 ± 0.20^{b}	17.6 ± 0.38^{a}	20.4 ± 0.27^{a}
5	SC	209 ± 2.0^{b}	319 ± 7.0^{a}	246 ± 4.0^{a}
6	TSO ($\times 10^{6}$)	166 ± 3.7^{b}	265 ± 9.5^{a}	231 ± 6.9^{a}

[abcd] Within row, means with different superscript letters differ significantly ($p < 0.05$)

Table No.3: The overall means (±SE) of rabbit SM, TMS, DS, AbS, TFSF and IF during treatment of male rabbits with ginger and propolis

S.No	Parameter	Groups		
		Control	Ginger	Propolis
1	SM (%)	64.1 ± 0.7^{b}	73.3 ± 0.9^{a}	76.4 ± 1.0^{a}
2	TMS ($\times 10^{6}$)	130 ± 2.7^{b}	197 ± 8.4^{a}	200 ± 6.9^{a}
3	DS (%)	34.4 ± 0.36^{b}	18.3 ± 1.11^{d}	22.0 ± 0.63^{c}
4	AbS (%)	21.4 ± 0.2^{c}	12.0 ± 0.4^{d}	14.0 ± 0.4^{d}
5	TFSF ($\times$106)	103 ± 7.2^{b}	168 ± 7.9^{a}	172 ± 6.8^{a}
6	IF (mg/dl)	231 ± 2.3^{b}	276 ± 3.7^{a}	250 ± 3.8^{a}

[abcd] Within row, means with different superscript letters differ significantly ($p < 0.05$)

CONCLUSION

Treatment of rabbit with ginger and propolis as verbal organization for 12 weeks semen collection might be valuable as a solid antioxidant and may have curiously applications in regenerative.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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