



Positive effect of *Cinnamomum zeylanicum* on sperm and red blood cells count in *Mus musculus*

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Abstract: In today's world, it seems to be very beneficial in using herbs as medicine than to use artificial chemicals, as it's having fewer side effects compared to chemicals used as medicine. Cinnamon is one of the most ancient species used as spices and in medicine too. Having anti-oxidant, anti-inflammatory, anti-tyrosinase and anti-diabetic properties its extract is very beneficial in our day-to-day life. It proves very healthy effect to combat with several health hazards. The antioxidant properties of cinnamon show a positive effect on sperm and blood, cells count. Infertility is one of the most contentious health issues in modern medicine. Cinnamon shows good results in interfering with the spermatogenesis process and affecting the quantity and quality of sperm.

Key Words: Blood cells, Cinnamon, Infertility, Male, Sperm count.

1. INTRODUCTION:

Cinnamomum zeylanicum Is one of the most ancient species used in Asian cuisine (Abdelgadir A A et.al.,2021 & Abeysekera W P K M et.al.,2013). Due to its Antioxidant, anti-inflammatory, anti-tyrosinase, and anti-diabetic properties, its extracts have been shown to help limit the advancement of disease pathologies. *C.zeylanicum* has its distinct variations, making it necessary to distinguish it from other cinnamon species (Elgammal E et.al.,2020and Dinizdo Nascimento L et.al.,2021). The main compounds found in the essential oils of cinnamon are phenolic compounds such as cinnamaldehyde, eugenol, carvacrol, cinnamic acetate and thymol. Because of their active functional groups in the structures, cinnamaldehyde and eugenol act as the main bioactive antioxidant compounds found in *C.zeylanicum* extract specifically cinnamon metabolite, being used for medicinal purposes.

Antioxidants are chemicals or compounds that slow or stop the oxidation process by preventing free radical damage. They can easily interact with free radicals by oxidation and the process can take place in single or multiple steps. Antioxidants can also interact with Transitional metals by transferring single electrons, hydrogen atoms, or chelating them. Furthermore, antioxidants can be found in both extracellular and intracellular contexts as in enzymatic and non-enzymatic forms in a biological system (Abeysekera W P K M et.al.,2013; Kitazuru E R et.al.,2004 and Nimse S B et al.,2021). The equilibrium of free radicals and antioxidant defense mechanisms is vital in health expectations in terms of oxidative stress mitigation. Free radical-induced oxidative stress mitigation (Arusha S M et.al.,2020; Castrol JC et.al.,2020; Ranjbar A et.al.,2021 and Ghosh T et. al.,2015). Free radical-induced oxidative stress has been linked to several chronic diseases, including cancer, osteoporosis, diabetes, and coronary artery disease.

Furthermore many studies using extracts from various parts of the tree have been conducted to assess the antioxidant properties of *C. zeylanicum* (Abeysekera W P K M et.al.,2013& Ranjbar A et.al.,2021). Multiple studies have revealed the total antioxidant capacity and its positive effects, including a drop in blood lipid peroxide levels due to improving hepatic antioxidant, Enzyme activities (Wilson L,2015 and Borzoei A et. al.,2018), as well as a reduction in the risk of male infertility and inflammatory defense (Arisha S M et.al.,2020 and Castro J C et.al.,2020). Infertility is one of the most contentious health issues in modern medicine. Male variables, such as hormonal issues and decreased sperm quality and quantity. It also interferes with the spermatogenesis process, affecting the quality and quantity of sperm.



2. METHOD AND MATERIALS:

2.1. Experimental Animal:

Twenty adult *Mus musculus*, 6 weeks old weighing 30±5g, were obtained from the House of zoology department of Tilka Manjhi University Bhagalpur, Bihar. All mice were housed in temperature-controlled rooms under 30±5 °c. All animals were treated in accordance with the principles of laboratory animal care. All mice were fed a standard diet and water. Thereafter the male mice (n=20) were randomly divided into two groups, a control group(n=10)and the cinnamon group (n=10). The cinnamon group received 5 ml/kg \ day of cinnamon aqueous extract by gavage method, for 28 days. The Control group was administered with normal food and distilled water.

2.2. Preparation of cinnamon aqueous extract:

About 3-3.5, years old *Cinnamomum zeylanicum* (bark of cinnamon of family Lauracea) were obtained from the local market of Bhagalpur, Bihar. Cinnamon (bark) obtained from the market was ground into fine powder .50 grams of cinnamon powder were dissolved in 500ml of distilled water and boiled for 3 hrs. at low temperature and then after leaving for 1hour, filtered through filter paper. Each mice were administered daily for 28 days.

2.3. Surgical Procedure:

For the collection of samples on day 28, treated animals were sacrificed according to the guideline of the ethical committee. And the caput and cauda were taken out for the further study of sperm count. Sperm counting was done in the sample obtained from caput and cauda. The material was diluted in normal saline. A small amount of eosine was added to the sample and sperm in the sample was counted. It was done by using Neubauer hemocytometer under the compound microscope (Souza et.al., 2004).

2.4. Estimation of R.B.C. count:

On day 28, a 5ML blood sample from each mice was taken out from the tail area to measure RBC count, estimated as per routine method, using a Neubauer hemocytometer. (Dacie J.V. and lewis S.M .,1975).

3. RESULT:

According to the result presented in table:1, there is a significant difference seen in sperm count and RBC count between the groups. Administration of 5ml/kg/mice, *C. zeylanicum* for 28 days significantly increased sperm count in the experimental group compared to controls.

Table 1: The effect of 5ml/kg/mice, *C. zeylanicum* on RBC Count. The experimental group in comparison to the control group. N= 10

Sl. No.	Control RBC Count	Treated with CZ RBC Count
01	4 Million/mm ³	9.28 Million/mm ³
02	3.98 Million/ mm ³	6.69 Million/mm ³
03	3.99 Million//mm ³	8.88 Million/mm ³
04	3.99 Million/mm ³	9.23 Million/mm ³
05	4 Million/mm ³	7.24 Million/mm ³
06	4.1 Million/mm ³	6.85 Million/mm ³
07	4.1 Million/mm ³	9.21 Million/mm ³
08	3.99 Million/mm ³	8.92 Million/mm ³
09	3.99 Million/mm ³	9.01 Million/mm ³
10	3.99 Million/mm ³	8.90 Million/mm ³
Average	4.013 Million/mm ³	8.421 Million/mm ³

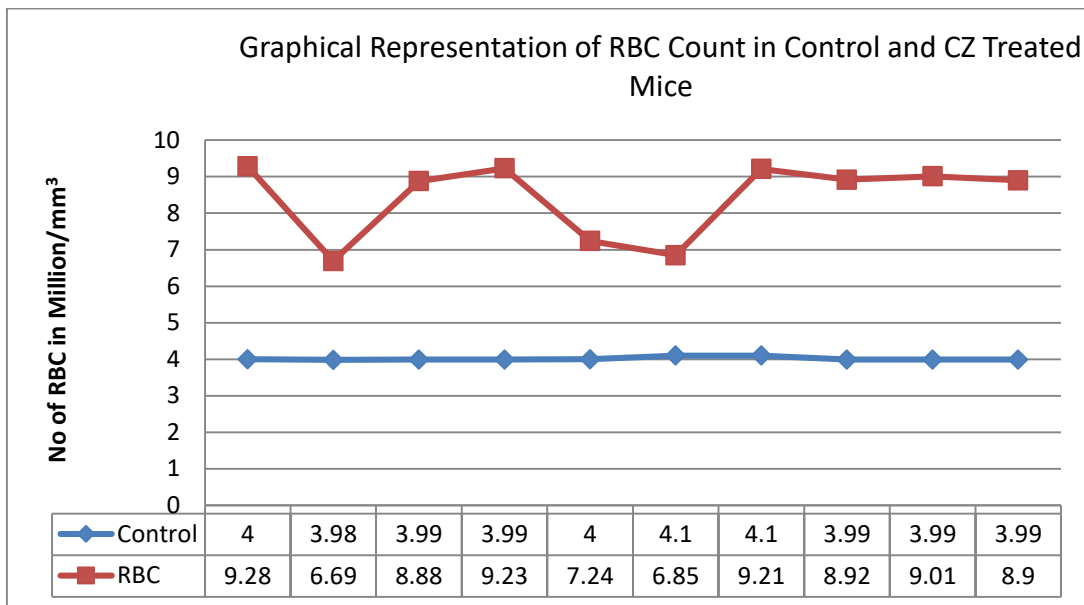
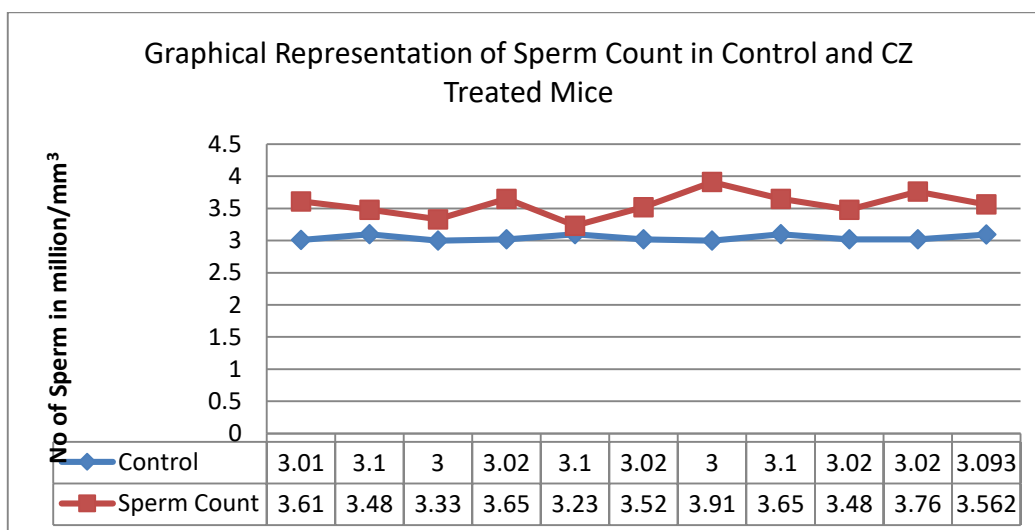


Table 2 : The effect of 5ml/kg/mice, *C. zeylanicum* on sperm quantity. The experimental group in comparison to the control group. N= 10

Sl. No.	Control Sperm Count	Experimental Group Sperm Count
01	3.01 Million/mm ³	3.61 Million/mm ³
02	3.10 Million/ mm ³	3.48 Million/mm ³
03	3.00 Million//mm ³	3.33 Million/mm ³
04	3.02 Million/mm ³	3.65 Million/mm ³
05	3.10 Million/mm ³	3.23 Million/mm ³
06	3.02 Million/mm ³	3.52 Million/mm ³
07	3.00 Million/mm ³	3.91 Million/mm ³
08	3.10 Million/mm ³	3.65 Million/mm ³
09	3.02 Million/mm ³	3.48 Million/mm ³
10	3.02 Million/mm ³	3.76 Million/mm ³
Average	3.093 Million/mm ³	3.562 Million/mm ³





4. DISCUSSION:

The sperm count decline is a key sign of male infertility (S.G.kumar et.al.,2006). Infertility is one of the most contentious health issues in modern medicine. Male variables, such as hormonal issues and decrease sperm quality and quantity, are responsible for 30% of reported cases of infertility. Several disorders, such as coronary heart disease, diabetes melitus, and chronic liver disease, might interfere with the spermatogenesis process, affecting the quality and quantity of sperm (Shalabh MY and Mouneir SM,2010)). Antioxidants are considered important substances that contribute to the organisms general health. Polyphenols are dietary antioxidants that are linked to redox activity and have health benefits (Scalbert A et.al.,2005). Oxidative stress is a critical mechanism that plays a role in a variety of illnesses, including infertility and inflammations (Dragsted LO,2003) As a result, persons who use antioxidant supplements have fewer ailments two. Despite the fact that the pathophysiology of male infertility has remained a mystery, evidence suggests that antioxidative changes are likely to blame for abnormal spermatozoa function and fertilization capacity (Akinloye et.al,2005). ROS are unpaired electron free radicals that are by-products of metabolic and pathophysiologic processes (Agarwal A et.al.,2006). ROS most likely damaged the spermatozoa by oxidizing membrane lipid fragmenting nucleic acid, resulting in spermatozoa malfunction (Nabil H et.al.,2008). Plants are now utilized in the treatment of a variety of elements in a number of nations due to their high antioxidant content which is a common phenomenon in traditional medicine (Virgili F et.al.,2001). Antioxidants operate as oxygen scavengers, building to free radicals, chelating catalytic metals, and neutralizing the oxidation process (Khelen M and Tele B 2007). Low red blood cells can cause a variety of symptoms and health complications. various symptoms of having low red blood cells include fatigueness, dizziness, anemia, heart problem etc . low count can develop many serious problems in male and female both. The Previous study shows that cinnamon shows beneficial health effects, as anti-inflammatory properties, anti-microbial activity, blood glucose control, reducing cardiovascular disease and reducing the risk of colonic cancer (Ouattara B.et.al.,1997). This experimental study on mice has given a positive effect on blood count. As it shows tremendous growth in the number of blood count in cinnamon-treated mice.

As we know that study shows the various reason for male infertility still there is no clear evidence for it. But some evidence, shows that antioxidative changes are to a great extent responsible for the abnormal spermatozoa function and fertilization capacity (Shalabh MA and Mouneir son.,2010). Several studies have found that dietary antioxidants including vitamins A, B, C, and E preserve sperm DNA from free radicals while improving blood testes barrier integrity. Cinnamon reproductive benefits may be enhanced by its ability to increase testosterone secretion.(Khaki A et.al., and Jedlinska krakowska M et .al.,2006).

5. CONCLUSION:

The administration of 5ml/kg/day *C.zeylanicum* to *Mus musculus*, significantly increased the sperm count and RBC count. And this shows the positive and beneficial effect of cinnamon on sperm and blood cells. *C.zeylanicum* based on the above findings can be said to have good diseases preventing herbs. It may be beneficial to combat with blood and sperm-related problems.

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