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Contraceptive Effects of Aqueous Extract Ofcarica Papaya (Linn.) Seed on Seminal Profile of Swiss Albinomice

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Abstract: ***Administration of aqueous extract of Carica papaya seed at 0.1 ml (50mg /kg/BW/day) of male albino mice for 10 to 30 days by oral route cause significant decrease in sperm count during 10(P<0.001), 20 (P<0.001) and 30 (P<0.001) days of treatment than control. Sperm motility also decrease in treated mice significantly (P<0.001) than the control group of mice after 10, 20 and 30 days of treatment. The seminal pH also decline significantly in treated group of mice than the control group of mice. However sperm mortality increased significantly (P<0.001). Similarly the abnormality of spermatozoa is increased significantly (P<0.001) in treated group of mice in comparison with control group of mice. Due to significant decrease in sperm count, sperm motility and seminal pH as well as increased in sperm mortality and abnormality of spermatozoa it is concluded that aqueous extract of Carica papaya seed alter the seminal parameter of mice and that causes infertility among the treated group of mice.***

Keywords: *Carica papaya*, Sperm Count, Sperm Motility, Sperm Mortality, Sperm Abnormality, Antifertility

1. Introduction

Over population has become a national problem with grave consequence for future. Regulation of population growth is an issue of national concern. Hence there is need to adopt various fertility control method by both sex of human subject. Mostly women are contraceptive users. Man use lesser contraceptive devices than women due to limited resources with less assurance. As plants are the natural source of antifertility agent. So it is logical to use plant derived herbal contraception. For this reason aqueous seed extract of *Carica papaya* (Linn.) is used to observe antifertility effect in male mice. *Caricapapaya* belonging to family Cariceacea and originated in Central America. The fruit, leaves, seeds, bark and latex of this plant have medicinal values. The seed extract of *Carica papaya* have been used in herbal medicine for treatment of various type of disease. It is reported that *Carica papaya* seed extract have antibacterial (Sasidharan et. al. 1982), antioxidant (Zhou et al 2011), immunomodulatory (Mojico-hensaw et. al. (2003), and antidiabetic properties (Oboh et al 2013). *Carica papaya* seed also possess antifertility properties. Chinoy et. al. (1995) reported antifertility, antiimplantational and abortificient effect of *Carica papaya* seed extract on female rat. It was also reported that *Carica papaya* seed extract induced long term reversible azospermia in languor monkey (Lohiya et. al. 2002).

The present study was undertaken in order to estimate the antifertility effect of aqueous extract of *Carica papaya* seeds on sperm count, sperm motility, sperm mortality, seminal pH and abnormality of spermatozoa.

2. Material and Method

Carica papaya seed were obtained from locally purchased ripe fruits during rainy season. Fruits that were orange yellow greenish in color and free from any defect were selected. The fruits were cut into two halves and the seeds were removed. The seed were washed with water. Unripen seed were discarded and the washed seed dried at room temperature for 7 days. After 7 days the dried seed were ground to coarse powder with the help of blender. Then the powdered sample was kept in clean closed glass containers till preparation of extraction.

The 40 g fine powder of papaya seed was dissolved in 200 ml of distilled water and kept for 24 hours at room temperature. It was frequently shaken to dissolve the powder properly. Then the mixture was filtered using filter paper. The filtrate was preserved in refrigerator till experimental period.

24 adult (age 12-14 week), healthy Swiss albino (*Mus musculus)* of 25 gram to 30 gram weight were selected for present study. These mice were procured from the animal house of University Department of Zoology, T. M. Bhagalpur University Bhagalpur. All mice maintained under control and hygienic condition in well ventilated room with 10 hours photoperiod (7 am to 5 pm) along with 25±2˚ temperature. Every mice were provided bread, seasonal vegetable, germinated seed, milk and tap water ad libitum.

Mice were randomly divided into 2 groups control group and treated group. The body of all experiment and control groups of mice were weighed prior to the treatment. Treated mice were fed 0.1ml aqueous extract of *Carica papaya* seed at the rate of 50mg/kg Body Weight. Control group were fed same amount of distilled water with similar exposure like treated group. The oral feeding is done by gastric catheter. 6 mice of each group were sacrificed after the exposure of 10, 20 and 30 days. Mice was killed by the cervical dislocation. Each mice was operated. Testis and cauda epididymis were exposed and kept in sterilized watched glass. The cauda epididymis were Separated from both of the testis and tinged with 2ml of normal saline then teased the cauda epididymis of each mice. The suspension were mixed through a metallic net to avoid any other tissue contamination. Sperms counts were done with the help of hemocytometer after the method

of Eliasson (1975). Motility of spermatozoa were observed after the methods of Tijee and Oentoeng (1968). Seminal pH was measured by the pH paper procured from Merck limited Worli, Mumbai. For the study of abnormality of spermatozoa, a film of semen was prepared on slide. These films on slide were fixed in methanol. Then this slide were stained in eosine for 40 minutes. The films were washed in tap water and after drying slide was studied under microscope to see abnormality of spermatozoa.

Statistical Analysis
Student's t-test was applied for the test of significance.

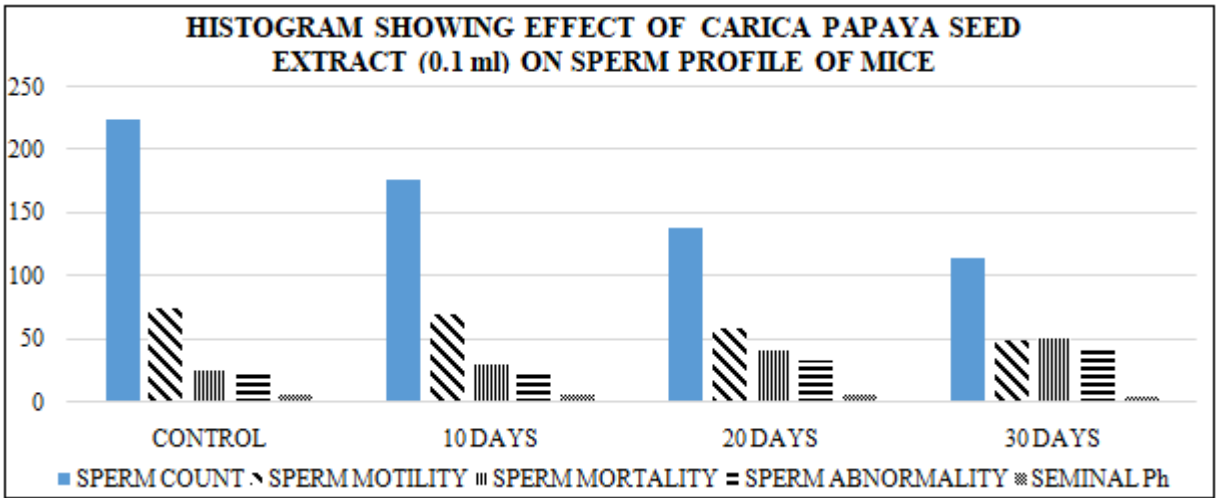
3. Result

The data represented in table 1 showing the effect of aqueous extract of *Carica papaya* seed on physical parameter of Sperm like sperm count, sperm motility, sperm mortality, seminal pH and abnormality of spermatozoa. The administration of *Carica papaya* seed extract caused significant decline (P<0.001) of sperm count of mice after 10 to 30 days of treatment then compared to control group of mice. The sperm motility and seminal pH also decline significantly (P<0.001) during 10 to 30 days treatment in treated group of mice than compared to control, However sperm mortality (P<0.001) and abnormality of spermatozoa increased significantly (P<0.001) in treated group than the control group of mice.

Table 1

Groups	Sperm Count (x10⁴ml)	Sperm Motility (In %)	Sperm Mortality (In %)	Sperm Abnormality (In %)	Seminal pH
Control (6)	224±2.77	74.5±0.84	25±0.94	22±0.97	7.3±0.84
10 Days Treatment (6)	177±1.41**	70±1.60*	30±1.60*	26±1.20*	6.4±0.86**
20 Days Treatment (6)	139±1.79**	59.33±1.25**	41±1.29**	34±1.23**	6.0±0.94**
30 Days Treatment (6)	115±3.86**	50±1.47**	51±1.29**	41±1.35**	5.4±1.11**

Data presented as Mean±SEM; *,** shows significance at 0.01 and 0.001 levels with value in control. Number within parenthesis denote number of samples.



4. Discussion

In this study it could be clearly demonstrated that sperm count decline significantly (P<0.001) in *Carica papaya* seed treated mice from 10, 20 and 30 days than the control group of mice. This may be due to seed extract interfere with steroid hormone biosynthesis, which result in impaired spermatogenesis (Lakhman et. al. 2013). Disturbance in steroid hormone biosynthesis as well as spermatogenesis may be effect the seminal quality of mice.

As indicated in table-1 sperm motility decreased significantly (P<0.001) in *Carica papaya* seed treated mice than the control group of mice. It may be due to the *Carica papaya* seed extract reduce the ATPase activity level in all tissue of mice (Hasim Basha et. al. 2013) it causes suppression of energy metabolism. If Atpase activity is decrease it suppress the motility rate of sperm, as ATP is the main source of energy of sperm and it is directly related to sperm motility. Total inhibition of motility was observed in human sperm after treatment of *Carica papaya* seed extract (Lohiya et. al. 2000). The*Carica papaya* seed extract also showinhibitory action on sperm motility in rats (Pathak et. al. 2013; Lohiya et.al. 2002)

The sperm mortality increased significantly in *carica papaya* seed treated group of mice than the control. Higher mortality rate in sperm of treated group of mice may be due to significant (P<0.001) decline in seminal pH. Low pH of epididymal fluid of bovine cause increased rate of mortality of spermatozoa (Acott and Carr1984).

In *Carica papaya* seed extract treated mice the number of abnormal spermatozoa increased significantly (P<0.001) than the control group of mice. Increased abnormality of spermatozoa in treated group of mice may be due to damage of sertoli cell (Maninvanan eta al 2009). For normal testicular function Sertoli cell plays important role in maintaining conducive environment for spermatogenesis. Damage in Sertoli cell may affect the maturation process of

spermatozoa, which leads to significantly (P< 0.001) abnormality of sperms.

The range of pH also declined significantly (P<0.001) in*Carica papya* treated group of mice than the control group of mice. It may be due to *Carica papaya* seed extract which affect the normal pH range. If pH range is decreased the medium of seminal plasma become acidic and in acidic pH sperms are highly fragile that causes higher rate of mortality.

The result obtained from present study shows that aqueous extract of *Carica papaya* seed causes decreased sperm count, sperm motility and seminal pH while sperm mortality and abnormality of spermatozoa increased significantly (P<0.001). The normal range of sperm count, sperm motility, seminal pH and abnormality of spermatozoa are essential factor for fertility. Any disturbance of such normal range of seminal quality may affect the fertility of mice. Thus such type of changes in seminal quality of *Carica papaya* seed treated group of mice show antifertility effects among them.

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