TOXICOLOGICAL AND HAEMATOLOGIC ACTIVITY OF ABRUS PRECATORIUS ON ALBINO RATS, RATTUS NORVEGICUS

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INTRODUCTION

In most families in India and probably in many other countries too, man is the dominant factor in decision making in almost all spheres of life including family planning and family size. Studies show that a vast majority of men in urban areas who are educated and aware of available technologies, control their fertility by choice. Yet, no minipills or fully reversible herbal method is available for men. Although India was the first to launch National Family Planning Programme as early as 1952 in order to curtail the population menace, 16% of currently married women in the country have an unmet need for family planning, 8% women want child spacing without contraceptive use, while the other 8% do not want any more child but without the use of contraceptive (Behal 2001).

As per the National Family Planning Survey (1998-1999), 25% of total family planning programme had an unmet need, and the contraceptive prevalence rate in the country is only a moderate 49.2%, with female sterilization accounting for 34.2% and the currently available male methods accounting negligible.

Currently men's involvement in regulating family size is negligible, as there is an argument that they do not have sufficient contraceptive choices to adopt, compared to their female counterparts. For regulation of male fertility, the various steps in reproduction that lead from sperm production in the testis to sperm
egg interactions and fertilization in the female genital tract need to be considered. According by the biomedical options available in control of male fertility are limited to (1) inhibition of spermatogenesis at the level of testis, (2) inhibition of sperm maturation at the level of epididymis, (3) inhibition of sperm transport at the level of vas deferens, (4) inhibition of sperm deposition in the female genitalia, and (5) inhibition of sperm egg interaction at the level of female reproductive tract, (Griffith 1999). The option available to men are limited to condoms, periodic abstinence, withdrawal and male sterilization. Survey among married men in developing countries indicate that only 4% of men use condoms, 4% undergo vasectomy, 3% use periodic abstinence and 4% use withdrawal in which periodic abstinence and withdrawal have higher failure rates and are often practiced with other contraceptive measures. (Population report -1999).

Current trials is speculated that men’s participation in family planning would increase, if there are wider choices of contraception available to them, which should be safe, effective, and economical and that it should provide long term and completely reversible contraception, preferably free of surgery with greater acceptability rate. One of the main problems encountered in development of a male contraceptive is the fact that it is necessary to achieve azoospermia or make all the sperm non-functional, since it is believed that even a single functional
spermatozoon is adequate for fertilization. Azoospermia could be easily achieved by interfering with production of testosterone which is indispensable for spermatogenesis, but the same could interfere with libido which is unacceptable (Sriraman & Rao, 2001).

A number of approaches including the use of hormone or non-hormone with sites of action in the testis and epididymis, and non-occlusive devices that have either a chemical or mechanical effect on spermatozoa as they pass along the vas deferens, are being investigated; these approaches may interfere with sperm function either in the testis, epididymis or in other parts of the male reproductive tract, and are intended mainly to affect sperm production directly or render the spermatozoa infertile without affecting the circulating testosterone level. Most of the approaches have reached the stage of clinical testing, but none of them has so far reached the stage of acceptability or commercialization for public utility (Rajalakshmi and Sharma 2001).

The discovery of a herbal contraceptive is need of the hour because herbal contraceptive have little side effects and are easily available every where. Thus, a herbal male contraceptive having reversible effect can become the only answer to the population explosion and the threats, world is facing to this high rapid increase individuals.

Sinha et al. (1990) has reported Abrus precatorius to be a potent contraceptive and abortificant among females even if only
one seed is given. Our previous studies have shown that this plant shows its anti-fertility effects on male albino rats when administered orally in the form of crude drug as well in the form of chloroformic, alcoholic and aqueous extracts.

Bansal et al. (2004) have reported degeneration in spermatogenic cells and an increase in testicular cholesterol, lipids and sialic acid with alcoholic extract of Abrus precatorius suggesting its effects on steroidogenesis. The preliminary studies on contraceptive effects of Abrus precatorius on male albino rats has shown encouraging results and it is probable that a successful male oral contraceptive pill can be developed from seeds of this plant. It could only be possible if the herb does not show any toxic side effect. Since haematological studies can provide a clear picture of the general health of an organism and any drug can only be successful if it does not cause any harm to the person/organism using it. Thus the present study the toxicological effects of seeds of this plant on blood and renal tissue of albino rats has been undertaken for the present work.
REVIEW OF LITERATURE

The rapid increase in the birth rates has encouraged the adoption of birth control methods on a very large scale. This, in turn, has led to the setting up of research programmes and the generation of the information in regard to the safety, efficacy and the side effects of the contraceptives in use. The most indepth studies and researches on the family planning methods and contraceptives started in late 1970s and early 1980s, has seemed to have entered a new phase in recent time.

adminstrating leaf extract of *Vinca rosea*, Bansal et al. (1996, 1997) reported antifertility effect of *Trigonella foenum graecum* and *Astrakantha longifolia* seeds and also observed contraceptive effects of *Canscera decussata* in male albino rats. Yum (1995) observed shortening of spermatozoa on administration of *T. wilfordii*.

Some stray references are also available on the antifertility effect of *Andrographis peniculata*. Akbarsha et al. (1993) observed biochemical changes in testes and male accessory organs of albino rats on treatment with *Andrographis peniculata*.

Besides this, there are references available from Sinha et al. (1990) who observed antifertility effect of crude ethanolic extract of *Abrus precatorius*. Bansal et al. (2004) observed antifertility and antiandrogenic effect of *Abrus precatorius* on the gonads of male albino rats.

No systematic study has been done so far to study toxicological and Haematological changes caused on administration of seeds of this plant. Therefore the references of haematological alteration and toxic effects of renal tissue caused due to various toxicants have been cited for the present work.

The different blood parameters of control and effluent treated *O. mossambicus*. The total red and white blood cell counts, PCV and MCHC were found to be significantly reduced in *O. mossambicus* on exposure to different sublethal concentration of
the paper and pulp mill effluent. Similar observations were made by Sambisiva Rao et al. (1985) in fishes treated with pesticides, by Subramaniam et al. (1988) in fishes exposed to tannery effluents and by Singh and Singh (1982) in fishes reared in the medium containing heavy metals. The toxic chemicals of paper and pulp mill effluent reduced to RBC count and Hb content. This reduction was found to cause macrocytic anaemia as noticed in fishes by Morgan et al. (1980).

Panday et. al. (1979) and Subramaniam et. al. (1988) observed a decrease in the rate of oxygen consumption of fishes due to fall in RBC count and Hb content.

Srivastava and Aggarwal (1979) reported lymphopenia in Colisa fasciatu exposed to stressful condition on acute exposure to sublethal concentration of cobalt.

The decrease in clotting time and thrombo-cytopenic response has also been reported in salmonids subjected to chemicals arising from industrial effluent (Iwana et. al. 1976, MC ley 1973).
MATERIAL & METHODS

1. **Animals:** For the proposed study pure strains of sexually mature albino rats (Rattus norvegicus) will be procured from Hamdard (Delhi) or IVRI (Bareilly). These animals will be kept in laboratory condition on standard mouse pellet diet and water ad libitum.

2. **Plant Selected:** Seeds of *Abrus precatorius* will be collected by spot collection. It is commonly known as Jacquerity seed or Ratti. It is considered highly poisonous and from ancient period it is used as abortificiant. Beside several references are available which show antifertility effect of this plant.

3. **Preparation of Test Material:** Best quality seeds of *Abrus precatorius* will be collected. The seeds will be soxhlated to get chloroformic extract following the method of Chinoy and Geetha Ranga (1983).

The crude chloroformic extract shall be chromatographed over deactivated silica gel in a glass column to elute different fractions viz. aqueous or methanol etc. separately. The separated extract shall be dried and used after making different doses in olive oil.

4. **Doses and Duration of Treatment:** The extract will be administered orally in appropriate dose and the animal will be sacrificed at regular intervals.
5. **Histological Study:** Tissue (Kidney) will be fixed in Bouins solution for histological study.

6. **Haematological Profile:**

   Following haematological studies on experimental animals will be done –

   1. **TLC & DLC** –
      
      Total leucocyte count & differential leucocyte count will be done by TLC & DLC Method.

   2. **RBCs and WBCs**
      
      Will be counted by Neubaur's haemometer using Hayem's and Tuerk's solution as diluting fluids.

   3. **Hb estimation**
      
      Haemoglobin will be estimated by Colorimetric method.

   4. **PCV estimation**
      
      Estimation of Packed cell volume will be done by Wintrobe method (3000 rpm for 1 hr.)

   5. **CT&PT estimation**
      
      Estimation of Clotting Time and Prothrombin time will be done by Lee and White method.

   6. **MCH&MVC estimation**
      
      The mean corpuscular Haemoglobin. Concentration and Mean Cell Volume will be calculated.

   7. **Serum bilirubin**
Estimation of serum bilirubin will be done by colorimetric method using standard kit.

8. **SGOT, SGPT**
Estimation of SGOT, SGPT will be done by auto: analyser using standard chemistry.

9. **Acid and Alkaline Phosphatase**
Estimation of Acid and Alkaline Phosphatase will be done by Wootton method (1964)

10. **Blood Urea**
Estimation of blood urea will be done by colorimetric method using standard kit.

11. **Serum Creatinine.**
Estimation of Serum Creatinine will be done by using reagent kit in computerised semi auto: analyser.

12. **ESR- by wintrobe tube method.**

**Justification of use of the proposed plant**

The previous work done in this laboratory has also proved its antisperrmatogenic effect on male albino rat (Sharma (2002), Jindal (2004), Sharam (2005), Bansal (2006-07).

There are very good chances if the plant does not show any toxic effect which can be measured by Haematological parameters. Therefore this plant is selected for present study.
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