Antifertility Activity in the Acetone Extracts of *Datura metel*, L Seeds on Female Mouse

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Abstract

The present study shows the antifertility activity in the acetone extracts of *Datura metel* L. in female albino mouse. The crude extract of *Datura metel* seeds were administered orally to the female mouse (25 gm of body weight) in the concentration of 0.5%, 1% and 2% respectively. Control was maintained using NaCl solution. After 15th day of treatment the female mouse was mated with the normal male mouse in the ratio of 1:3. After 10 days of mating they were dissected and observed the number of implantation sites in the uterine horns. The results stated that the females treated with 2% seed extracts caused cent percent anti-implantation activity followed by 1% and 0.5% seed extracts caused 40% and 80% anti implantation activity respectively. The results of the present study concludes that the seed extracts of *Datura metel* L may be recommended as a good source of antifertility inducious compounds with minimal side effects after testing in the other human models.

Keywords: *Datura metel*; Antifertility; Female mouse

Introduction

Since the dawn of civilization, the man used to maintain health and to treat various diseases with the help of herbal medicine. Generally, the herbal medicines are used by the primitive and traditional peoples across the world. The primitive man had used plants as prophylactic and therapeutic aids to health. The Vedas mentioned that more than 20000 plants and some animal products are used by the peoples for the preparation of drugs. Among these, most of the drugs are derived from vegetable sources [1]. The medicinal value of 700 plants was described by Charak-Sumhira and Susruta-Sumhira in their book Charak and Susruta [2]. According to the estimation of WHO, approximately 80% of the people in developing countries rely chiefly on traditional medicines for primary health care needs. It is assumed that 20000 to 30000 species of higher plants are used as medicines in various parts of the world. Chandhoke [3] suggested that the *Datura* lactones isolated from *Datura squereifolia* and its chemical compounds were evaluated for antifertility effects in female albino rats. Kamath and Rana [4], observed the strong anti-implantation and uterotropic activity of *Calotropsis procrea* extracts in ethanol against the female rat reproduction at 250 mg/kg dose. The present study is an effort to find an alternative source to control birth rate by using the extracts of *Datura metel* dissolved in acetone.

Material and Methods

Selection of plant

*Datura metel*, L is called as apple of peru. An annual herb occurring in waste lands and it is identified using the flora of the Presidency of Madras [5]. It is a herbaceous, erect, dichotomous herb. The stem of the plant is fleshy, soft, greenish, tap root system. The plant *Datura metel* (Figure 1) was selected based on the information given by Varian [6]. It is a very important medicinal plant for various diseases [7].

Preparation of seed extract

Seeds of *Datura metel* were collected from the mature fruits, and then it was dried in a shade and powdered. 2.5 gm of powder was taken and extracted in soxlet apparatus using acetone for 8 hours. Excess solvent was allowed to evaporate and it was stored in refrigerator for further use.

Selection of animal

Sexually mature and reproductively active male and female mice (20-25 gm weight) were purchased from supreme aquarium, Sivakasi, Tamil Nadu and maintained under controlled condition of light (12 hours) and temperature (24°C ± 3°C) (Figure 2).

Drug preparation

0.5 gm of concentrated seed extract was diluted with 100 ml of distilled water (i.e) 0.5% drug. Similarly 1% and 2% drug was also prepared.

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Received May 28, 2012; Accepted July 20, 2012; Published July 25, 2012


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Drug treatment

Animals were divided into 4 groups based on normal estrous cycle and each groups contained 5 mice. The drug treatment were given as follows

Ist Group – Saline Control
(0.5 ml of 0.87% w/v NaCl solution/25 gm body weight of mice)

IInd Group
0.5 ml of 0.5% Crude drug/25 gm body weight of mice)

IIIrd Group
0.5 ml of 1% Crude drug/25 gm body weight of mice)

IVth Group
0.5 ml of 2% Crude drug/25 gm body weight of mice).

Saline water and drug were administered orally every day morning 9.30 am for 15 days. Body weight of mice in each group was taken before and after the treatment period.

Determination of antifertility activity

After 15th day of treatment the female mouse were allowed to mate with normal Bal b/c male mouse in separate cages in the ratio of 1:3 and it was confirmed by testing the vaginal plugs. After 5 days of mating, the mated females were sacrificed at the 10th day and dissected for the observation of number of implantation sites on both uterine horns.

Statistical analysis

Data collection in this experiment in different experimental setup were subjected to the determination of mean, standard error and students ‘t’ test [8].

Results and Discussion

The present study shows that, the effect of antifertility was varied in the various concentrations of Datura metel seed extracts dissolved in acetone. Rao [9], studied the antifertility effect of crude extract of Solanum xanthocarpum in the male rats. The administration of aqueous extract of Solanum lycocarpum fruits in male swiss mouse causes toxic effect on its reproductive system [10]. In our study, the females treated with 2% seed extract caused 100% antiimplantation activity, the same trend was also observed by Kamath and Rana [4]. They showed that the root extract of Calotropis procera cause 100% antiimplantation activity. The 0.5% and 1% seed extracts caused 40% and 80% antiimplantation activity and the seed extract also served as abortifacient agent, the same result was observed by Uchendu et al. [11], he reported that the triterpenoid glycoside from Dalbergia saxatilis in female wistar rats. Lohiya et al. [12,13], studied the administration of crude seed extract of Carica papaya in rats on the reduction of fertility and the motility of sperm. It was found that the sperm motility was suppressed and the numbers of abnormal sperms were increased. In this study, all the treatments were given to five replicates, however, the number of implantation was found to be high in control animals (Figure 3), whereas, it has to be gradually decreased in the increasing concentration of Datura metel seed extracts in the tested animals. There is no implantation in the mouse treated with 2% Datura metel seed extracts (Figure 4 and Table 1).

The Datura metel seed extracts of 0.5% and 1% shows the 60% and 20% abortifacient action (Figures 5 and 6). Comparatively, the early abortifacient action is noticed as low as (20%) in case of animals treated with 1% seed extract of Datura metel. The same trend was observed in the plants Maerua subcordata and Cordia nevelli causes the abortifacient action [14,15]. Estrogen and progesterone is necessary for implantation and any disturbance in the level of these hormones may cause infertility in female mouse [16].

<table>
<thead>
<tr>
<th>S. NO</th>
<th>Drug Treatment</th>
<th>No of female mouse used</th>
<th>No of implantation</th>
<th>% of antiimplantation activity</th>
<th>% of Early abortifacient action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>5</td>
<td>5</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>2</td>
<td>Seed Extract (0.5%)</td>
<td>5</td>
<td>3</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>3</td>
<td>Seed Extract (1%)</td>
<td>5</td>
<td>1</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>4</td>
<td>Seed Extract (2%)</td>
<td>5</td>
<td>Nil</td>
<td>100%</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Table 1: Effect of Datura metel seed extract on implantation in female mouse.
This study proved that, the acetone extracts in the seeds of *Datura metel*, L. possessed antifertility activity and considerable attention is being made for the development of bio safe remedy to control the birth rate of mouse by modifying the reproductive functions of females. The present observation reveals that 100% implantation was observed in control group. This may be due to the normal supply of steroid hormones for their implantation activity.

**Conclusion**

This study shows that, the acetone seed extracts of *Datura metel* has the effect to control the female mouse fertility. Further, the present study concludes that the seed extracts of *Datura metel* may be recommended as a source of antifertility inducious compounds with minimal side effects after testing on humans.

**Acknowledgement**

Authors are grateful to Vijay Clinical Laboratory Madurai, for their neat sectioning of the animal samples.

**References**