ABORTIC EFFECT OF PAPAYA (*Carica Papaya*) IN FEMALE MICE

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Abstract: Medicinal plant *Carica papaya* was used to investigate whether this plant has any effect on abortion. The research work was undertaken to study the abortic effect of papaya in mice. A group of female mice at the age of 4 to 5 weeks were mated with their male counterpart and mating was confirmed by vaginal fluid examination under light microscope following 8 hrs of mating. Female mice were then separated and fed normal diet supplemented with green papaya juice at a rate of 33.33 and 36.66 ml papaya juice per 100 gm normal feed for first five days and then for rest sixteen days of mating, respectively. The experimental female mice showed positive test during first 3 days (pregnancy test) and showed negative test during 14 to 16 days as confirmed by hand palpation. This result suggests that the extract of *Carica papaya*; an available cheap source in Bangladesh can be used as an alternative drug component for abortion and may also be used as preventive measures of pregnancy. It may be considered that the green papaya juice that used as abortion aid in the present experiment might be utilized for making abortic pill at low cost. However, identification of actual pill compound and its preparation and marketing needs further research.

Key words: Abortion; Mice; Papaya; Pregnancy

Introduction

The embryo abortion experiment conducted in mice to control the birth rate with an objective to use in future as human reference. The experiment is a preferable one because till to date several abortion methods have been developed where risks are associated and now-a-days people cannot depend upon present conventional methods of abortion.

Papaya is commonly cultivated and planted in garden as edible fruit throughout Bangladesh (Kiritikar & Basu, 1983). It is succulent, indehiscent, 1-celled, with numerous seeds, the blank portion is enclosed in sweet mucous pulp, and covered with a loose hyaline skin or arillus; testa thick, brittle. Young fruits and leaves are very rich in a colorless, turning milky white on drying, latex also contains a mixture of digestive enzymes, called papine. Fruit is a rich source of vitamins, pectins and carotinoids (Gani, 1998).

In case of pregnancy detection in mice, formation of the plug is important, but is not essential for pregnancy in mice (Campean *et al.*, 1980). However, Cukierski *et al.* (1991) demonstrated that the plug appears to be an essential factor in determining whether pregnancy occurs after natural matings in mice.

There may be some physical or psychological complications with an abortion viz. blood loss, infection, damage to organ, psychological trauma (many women are relieved afterwards; others feel a sense of loss and a need to mourn. Women who have had mixed feelings leading up to the abortion may need more time to deal with their decision afterward). (Source: http://www.w-cpc.org/abortion/physical.html).

The experiment was conducted to overcome various problems, which is related with the embryo abortion mentioned before. If abortic pill could be available, it would have the following advantages:

- Low cost pill, it would be able to cause abortion without blood loss, infection and damage to organ and psychological trauma. It can be an easiest method of embryo abortion than any other method, because of the availability of papaya.
- There would be no chance to prolapse the vagina. It can also be used as an effective birth control element.

Literature reveals so far that, little research works for exploring new abortic aid was undertaken. Therefore, the present research work was conducted to study the abortic effect of papaya in female mice. Papaya may be used as a component of abortic pill and if successful retention of result is possible, it could be used as abortic pill.

Materials and Methods

This study was conducted at Animal Biotechnology Laboratory of Biotechnology Discipline, Khulna University, Khulna Bangladesh. Mice were collected from the laboratory of International Center for Diarrhoeal Disease Research, Bangladesh (ICDDRB).

Domestically raised albino female mice of 5-7 weeks of age were used in the experiment, which included 10 female, and 6 male mice. Sexually mature male mice those exhibited prominent scrotum and sexually mature female mice those exhibited a prominent double row of nipples were selected for the experiment.

Maintenance of mice: Male and female albino mice weighing 20-25 gm were obtained from a random-bred colony of mice which were maintained on diet supplemented with flour, lentil, oil cake, powder milk, soybean oil and molasses. The animals were housed in colony rooms with 12 hours dark and rest 12 hours light at a temperature of 25 ± 2° C and had free access to feed and drink.

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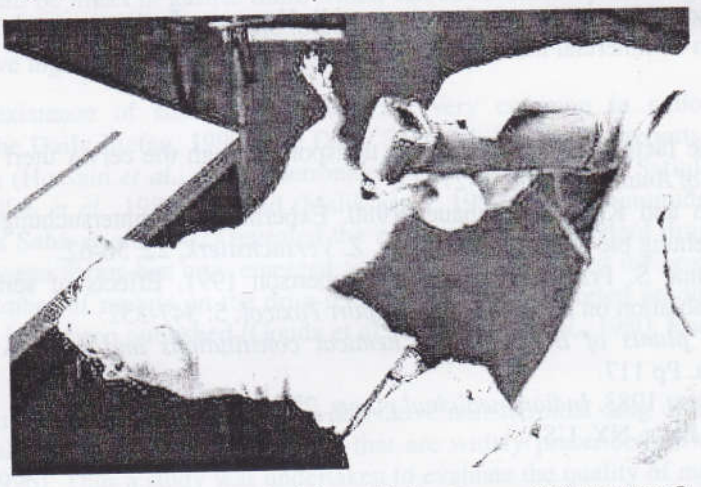
The feed of the normal nourished mice contained different ingredients, which fulfilled the needs of nutrients and also caused the normal growth rate of mice. The normal feed was given to the mice before mating. After mating, the green papaya fruit juice was mixed with the normal feed in specific doses. The feed administered to the mice was standard in the subsequent experiment before mating. Juice extract from *Carica papaya* of fixed volume was mixed with normal feed that was provided to the female mice after mating.

The papaya fruit was sliced into small pieces by using sharp knife. The collected juice was taken into a beaker and filtrated with Whattman filter paper and the volume of the juice was measured.
After 24 hrs of mating, the fruit juice was given to the female mice at a rate of 33.33 ml and 36.66 ml per 100 gm of normal feed for first 5 days and another 16 days respectively. Males were separated from females. Ten female mice were kept as control in five groups. The weight of each female was taken individually after first, second and third observation. The feed with papaya juice was supplied up to 21 days after mating.

Mating of male and female mice: During mating, the mice were maintained in-groups, each group consisted of a minimum of 5 females and 3 males in a cage. At the time of mating, the male and female mice were kept together. Mating was confirmed by visual observation or vaginal plug detection (Welch Allyn®, Skaneateles Falls) method or by visual vaginal fluid examination within 6 to 8 hrs following mating. During mating, mice had normal diet. After mating, female mice were separated and maintained separately with normal diet containing green papaya juice and extract.

Mating Test: Vaginal fluid was collected from female reproductive tract within 6-8 hrs of mating. Mating confirmation was done by collection and observation of vaginal fluid after staining under light microscope. The procedure of vaginal fluid collection was adopted from a standard protocol. (http://www.ahc.umn.edu/rar/MNAALAS/MiceRat.html#Vitals).
Examination of mice vaginal plug with the otoscope was done according to Welch Allyn®; Skaneateles Falls shown in Photograph 1.



Photograph 1. Examination of mice vaginal plug with the otoscope (Welch Allyn®, Skaneateles Falls).

After 14 days, positive pregnancy test was confirmed in control mice whereas; negative pregnancy was confirmed in experimental mice by hand palpation, respectively.

Results and Discussion

Abortic effect of papaya: The mating test was done immediately after mating e.g. after 8 hrs and was found positive. Pregnancy test which was carried out within 14 to 16 days after mating; the test was negative. The result shown in Table 1 describing the abortion status of female pregnant mice after supplementation with papaya juice in addition to normal diet. Table 2 shows the pregnancy rate of control pregnant mice supplemented with normal diet.

Table 1. The abortion status of female pregnant mice after supplementation with papaya juice in addition to normal diet.

Observation (after mating)	Average weight (gm)	Mating test immediately after mating (normal diet)	Pregnancy test within 14^{th} to 16^{th} days after mating (normal diet + papaya juice)	Abortion rate (%)
1^{st}	24	+ ve	- ve	100
2^{nd}	23			
3^{rd}	23			

Table 2. The pregnancy status of control mice supplementation with normal diet.

Control mice group (after mating)	Mating test immediately after mating (normal diet)	Pregnancy test within 14th to 16th days after mating (normal diet)	Abortion rate (%)
Mice -1	+ve	+ve	0
Mice - 2			
Mice - 3			
Mice – 4			
Mice - 5			

After mating within 16 hours, the vaginal fluid was collected individually from the reproductive tract of female mice on sterilized slide. The pregnancy was detected by palpation within 14-16 days after mating. The rate of abortion in control mice was zero and the rate of abortion in experimental mice was 100 %. In the present experiment, it was observed that, treated mice with green papaya juice showed 100% abortion rate whereas, the control mice showed 100% pregnancy rate. Mating was ensured by the presence of vaginal plug. It has been shown that the plug has an important role in transporting sperm through the cervix to the uterus (Blandau, 1945).

A concept arises from this research work that embryo nourished in placenta that contain amniotic fluid. Amniotic fluid has some structural configuration and with the help of this fluid placenta retains embryo. Orally administrative abortic pill may causes the structural break down of amniotic fluid. Therefore, the strength of amniotic fluid is decreased. For this reason, placenta cannot retain embryo and abortion may cause by this mechanism.

The present research work clearly indicates that green papaya juice or extract causes abortion in mice without causing any infection or health hazard. This low cost source pill component can be used as an alternative remedies of unwanted pregnancy in human as well. However, further research for preparation of such abortic pill in regard to commercial intervention would be worthy to investigate.

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