



The Effects Of Unripe Pawpaw Seeds (*Carica Papaya*) Extract On The Histology Of The Testis Of Guinea Pigs

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ABSTRACT

The antifertility effect of unripe paw-paw seeds (*Carica papaya*) on the testes of adult male guinea pigs was studied. Oral doses of the unripe paw-paw seeds extract at 220mg/kg bodyweight, 330mg/kg body weight and 44mg/kg body weight were administered orally for 7 days. Histological observation at low dose of 220mg/kg showed reduction in the interstitium and in the numbers of spermatozoa in the lumen of the tubule. At high dose of 440mg/kg body weight, there was degeneration of the basement membrane of the tubules, erosion of the interstitium and degeneration of tails of the spermatozoa in the lumen of the tubule. Our results suggest that unripe pawpaw seeds extract is cytotoxic to the testes of adult male guinea-pigs and may cause oligospermia in these animals.

Keywords: Antifertility; Pawpaw seeds; Male guinea-pigs; Testis

Carica papaya is a plant found in the tropics and subtropics. The unripe fruits is used in the treatment of diverse kinds of diseases (Tona et al., 1998, Imao et al., 1998; Starley et al., 1999; Hewit et al., 2000, Eno et al., 2000; Sripanidkulchai et al., 2001)

The seeds contain oleanolic glycoside (76%-78% oleic acid in oil of seeds) which has been implicated as antifertility agent in male rats (Das, 1980). Recently Cherian (2000) has reported that chymopapain which is present in the unripe fruit may be a potential infertility agent. *Carica papaya* has been reported to also have anti-oxidative activity (Osato et al., 1993), proteolytic and anti-microbial activity (Starly et al., 1999; Sripanidkulchai et al., 2001).

Literature is replete with evidence of the anti-fertility effects of paw-paw seeds in laboratory animals (Das, 1980; Chinoy and George 1983; Lohiya and Goyal 1992; Chinoy et al., 1994 Lohiya et al., 1994; Udoh and Kehinde 1999, Lohiya et al., 1999; Lohiya et al., 2000)

This study was designed to determine the effect of administration of high doses of *carica papaya* on the testis of guinea-pigs for a duration of one week.

MATERIALS AND METHOD

Adult male guinea pigs weighing between 400g and 600g were used in this study. The animals were randomly divided into four (4) groups coded Po, P1, P2, P3. Unripe paw-paw seeds were sun dried to a constant weight and then pounded into fine powder with a grinder. The active ingredients

of the paw-paw seeds were extracted in a soxhlet apparatus-using methanol as solvent. 200g of the dried powdered paw-paw seeds was emptied into a thimble and inserted into the extraction chamber of the soxhlet apparatus. The dried powdered paw-paw seeds were then extracted for 8 hours using methanol as the extraction solvent. The extract was then concentrated into a residue of 56g. After, it was diluted into a concentration of 0.11g per ml to obtain a stock solution using normal saline.

The experiment groups of animals P1, P2, and P3 received graded doses of 220mg, 330mg, and 440mg of the stock of the extract per kilogram body weight of the animals respectively per day for a duration of seven (7) days. The extract was administered orally using an orogastric tube. The control group (Po) received corresponding quantity of normal saline as placebo.

At the end of the treatment period of seven (7) days, the animals (control and experimental) were sacrificed by decapitation in batches. The testes were dissected out and fixed in 10 percent normal saline and later in Bouin's fluid. The tissues were processed for histological examination and photomicrographs were taken.

RESULTS

Under the light microscope, the testes of animals of the control group (Po) showed well defined seminiferous tubules lined with tall columnar epithelial cells. In between the seminiferous tubules was the interstitium containing the Leydig cells. The epithelium was made up of Sertoli cells and various spermatogenic cells, while the lumen was filled with spermatozoa. Group P1 animal, which received the

220mg/kg body weight, showed erosion of the interstitium and reduction in the number and presence of spermatozoa in the tubules when compared with control.

At the 330mg/kg body weight, distortion of the basement membrane and degeneration of the epithelium were also observed. The lumen of the tubules were seen to contain cell debris(Fig. 1,2,3).

All these effects were more pronounced in the group P3 animals, which were treated with 440mg/kg dose. Their testes also showed degeneration of the basement membrane of the tubules, erosion of the interstitium and degeneration of tails of the spermatozoa in the lumen

DISCUSSION

The apparent reduction of spermatozoa and flagella as observed in this study may be indicative of reduced fertility capacity of the spermatozoa .

The spermicidal effect of carica papaya has been shown to be dose dependent (Lohiya et al., 2000). These finding are consistent with previous studies (Lohiya et al., 1999) Udoh and Kehinde 1999) .

In this study, the extract induced degeneration of the sertolic cells and Leydig cells especially at the high dose. These cells are associated with androgen biosynthesis, which is essential in spermatogenesis. This is consistent with previous reports on degeneration of germinal epithelium (Chinoy and George 1983; Chinoy and Pranga-Geetha, 1984; Udoh and Kehinde, 1999). Degenerative changes such as presence of debris in the lumen of tubules were also observed. This is consistent with the report of Udoh and Kehinde (1999) and Lohiya *et al.*, (1999).

These results, thus suggest that unripe pawpaw seeds extract may be cytotoxic to the testes of guinea pigs and may cause oligospermia in these animals. Consequently infertility may present.



Fig. 1 Control Group



Fig. 2 220mg/kg body weight

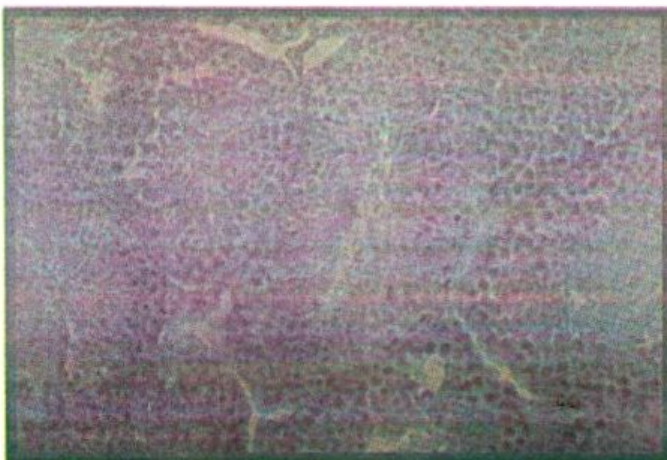


Fig. 3 330mg/kg body weight

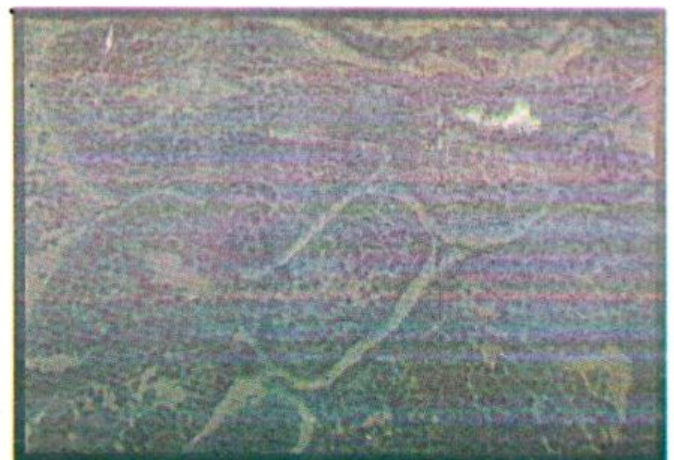


Fig. 4 440mg/kg body weight

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