

The effects of aspirin and fenugreek seed on the testes of white mice

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Summary:

Background: Fenugreek seeds are used as food ingredient in traditional medicines; also aspirin is an incredible chemical with many useful benefits in the medical field. The objective was to study the effect of aspirin and fenugreek on testes of mice.

Method: 20 white male mice weighing (18-23gm) were divided into four groups 5 each. Group 1, represented control, group 2, mice treated with fenugreek seed (100mg/KgB.W), group 3 mice treated with aspirin (10mg/Kg B.W), group 4 mice treated with aspirin and fenugreek seed for 21 days. Body weight and testes weights were recorded. Histopathological examination of testes was carried out.

Results: a significant decrease ($P<0.05$) in body weight of mice treated with aspirin when compared to the other groups. A significant decrease ($P<0.001$) in testicular weight of mice treated with aspirin as compared to control and other groups was noted. Structural changes in testes have shown that: aspirin administration caused a decrease in seminiferous tubules diameter associated with increase in connective tissue between them and basement membrane thickness of seminiferous tubules. While fenugreek seed reverse these changes.

Conclusion: fenugreek seeds exhibited antioxidant property that could ameliorate the alternations induced in mice treated with aspirin. Further studies are needed to be done on mammals to support our findings.

Key word: aspirin, fenugreek, testes mice

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Introduction:

Fenugreek has been used as cooking spice and flavoring agent for centuries (1). It is used as an abortifacient (2) antispasmodic, externally for, boils, galactagogue (3), appetite stimulant, blood cleansing, laxative, tonic (4) demulcent, emollient, expectorant, and aphrodisiac (5). The deflated seeds are rich source of steroids (6). However, studies on fenugreek seeds (7) and its extract (8) have been reported to affect the fertility in male and female rabbits. Aspirin is one of the most famous, cheapest, available and widely used drugs in the world with a wide range of therapeutic uses including the treatment of inflammatory joint diseases, and prevention of thrombosis due to its anti-inflammatory, analgesic antipyretic and antiplatelets effects (9). One of the areas of aspirin that has not been widely experimented on, its effect on the reproductive system of males and females. Studies on its reproductive effect are very vital to avoid unnecessary complications. The aim of this study was to clarify the role of fenugreek seed on the testes of white mice that are treated with aspirin.

Materials and Methods:

White male mice (18-23gm) were used for the study. They were maintained at a temperature of $23\pm 2^{\circ}\text{C}$,

under 14:10 light dark cycle. Animals were housed in plastic cages and the bedding material used was fine Sawdust, which was kept dry and changed every other day.

Those mice were divided into four groups 5 mice each:

1. First group (control) was treated (oral route) daily with 0.1ml of distilled water. Twice/day for 21 days.
2. Second group: was experimented with aspirin (10mg/kg B.W) (1000mg of aspirin powder in 5ml distilled water followed by decimal serial dilutions) for 21 days in two occasions.
3. Third group: was experimented with 100mg of fenugreek seed (1L distilled water to 50gm powder fenugreek seed) for 21 days on two occasions.
4. Fourth group: was experimented with aspirin 5mg/kg BW) and fenugreek seed (100 mg) daily for 21 days on two occasions.

Mice were weighed at the beginning of the experiment, and then at weekly intervals and at the end of experiment; the weight was expressed in gram. The testis from each group were excised and fixed in Bouin's solution for 48 hours. The sections obtained were stained with haematoxylin and eosin dyes. Histopathological examination of testes was carried out. Data analysis is done using ANOVA, lowest significant difference (L.S.D.) and correlation were used to assess the significance between the studied groups.

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Results:

The effects of aspirin and fenugreek seed on body weight (g) of mice are shown in figure (1). The increase in body weight in mice treated with fenugreek seed as compared with control animals, was statically non-significant ($P < 0.05$). However, there was a significant decrease ($P < 0.05$) in experimental group 3 when compared with experimental group 2 and control. The mice treated with fenugreek seed and aspirin (group 4) showed significant increase in body weight when compared with group (3).

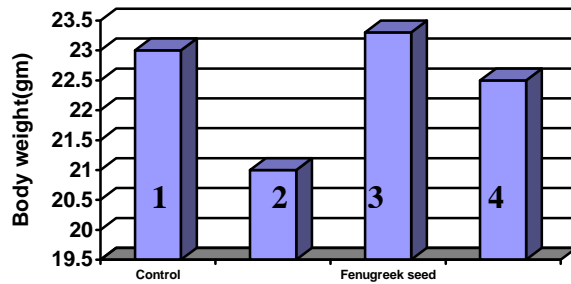


Figure (1): The effect of aspirin and fenugreek seed on body weight (g).

Figure (2) shows the changes in the weight of mice testes when compared to control group. There was a highly significant decrease ($P < 0.001$) in testicular weights of mice (group 3) when compared with control and other groups.

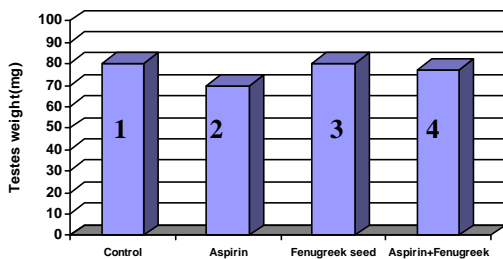


Figure (2): The effect of aspirin and fenugreek seed on testicular weight (mg).

The testes of mice in the control group and mice treated with fenugreek seed showed normal features with successive stages of transformation of the seminiferous epithelium into spermatozoa with no sign of atrophy or toxicity with respect to pachytene spermatocyte, germ cells, leydig cell, or sertoli cells. Interstitial spaces contain few blood vessels and very few interstitial cells. (Figures 3-4). But the structural changes in the testes obtained from the experimental animals treated with aspirin (shown in Figures 5) included degenerative changes in the seminiferous tubules as shown by the presence of wide almost empty lumina and their diameter (longitudinal and transverse) was less than the control and other groups. The lining cells of the tubules appeared loose, there was an increase in the

amount of interstitial connective tissue that contains very few blood vessels.

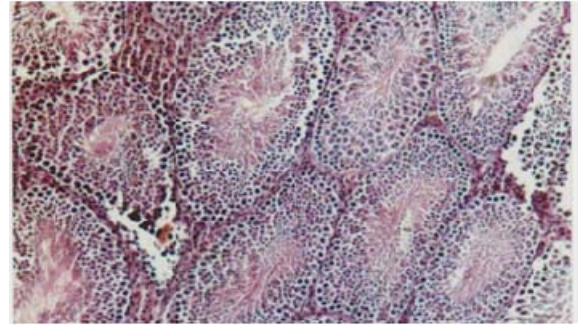


Figure (3): A Histological picture of the testes shows the seminiferous tubules of the control group (H&E X100).

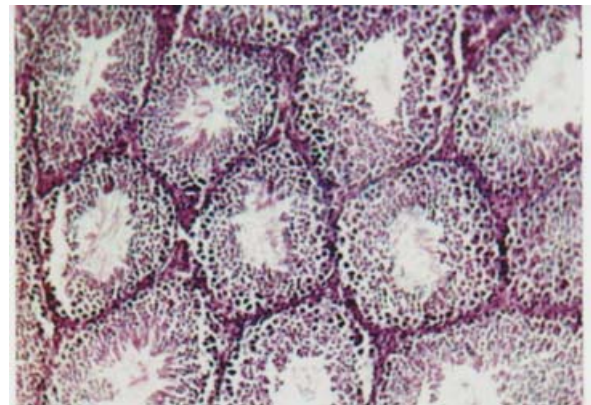


Figure (4): A Histological picture of the testes treated with aspirin and fenugreek seeds shows the seminiferous tubules (H&E X100).

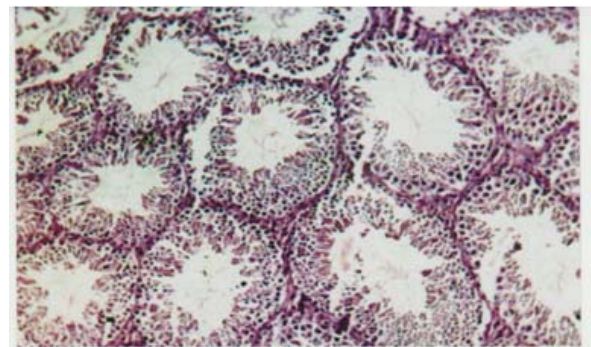


Figure (5): A Histological picture of the testes treated with aspirin shows the seminiferous tubules (H&E X100).

Discussion:

Fenugreek seeds are used as food ingredient in traditional medicines. The seeds are reported to contain lysine, phytic acid, 3 minor steroidal saponins, and galactomannans. These galactomannans have a unique structure and may be responsible for some of the characteristic therapeutic properties attributed to fenugreek (11, 12). A significant decline in mice body weights treated with aspirin has been noted in this study. Aspirin a cytotoxic agent affects organs metabolism and leads to significant decline in the growth rate of mice. Similar results were obtained by (Khan and Garland

et al) (13, 14) the reason for that is the loss of appetite caused by continuous administration of the drug (Garland et al) (14). Conversely, mice treated with fenugreek seeds showed increase in body weights, this result was due to fenugreek antioxidant property, which improves organ function (15). The decrease in testicular weights indicates that aspirin must have disturbed the mechanism that control testicular weights. It is well known that both FSH and LH are the hormones control testicular growth and weight (16). Ghosh and Das gupta (17), for instance have shown that aspirin cause disruption of spermatogonia. The structural changes in the testes may have been brought about either by a direct action of aspirin on these organs or centrally on their hormonal regulation; since aspirin is known to inhibit prostaglandins synthesis in various tissues including the reproductive system (18). Aspirin has been found to induce suppressions of hypothalamic PGE₂ with consequent decrease in gonadotropic pituitary hormones secretion, this interferes with the hormonal support of the testes and suppresses their capacity to synthesize testosterone. The significant reduction in the seminiferous tubules diameter, the increase in the number of tubules with empty lumina, the increase in the tubular basement membrane thickness and the increase of the hypovascular interstitial tissues that are devoid of testosterone producing interstitial cells; all these changes are reflections of the loss of hormonal support. Additionally, decrease in the amount of the secreted LH interferes with testosterone biosynthesis similar results were achieved by (Jackson and Ganony) (19,20). Fenugreek seed has estrogenic and androgenic effect that will lead to development of sex organs in male (8).

Conclusion:

Fenugreek seeds exhibit antioxidant properties and could ameliorate the alternations induced in mice treated with aspirin. Further studies are needed to clarify this issue by experiments done on other mammals.

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