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Short Communication

Evaluation of androgenic activity of *Mucuna pruriens* in male rats

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Methanolic extract of *Mucuna pruriens* seed was tested for their possible androgenic activity in Wister male albino rats. The methanolic extract of *M. pruriens* plant was gavaged separately into 2 group of rat at similar doses of 1000 mg/kg b.wt and 1500 mg/kg b.wt for 30 days. At the end of the treatment, the animals were killed and the blood, testis, epididymis, seminal vesicles and prostate were collected for biochemical analysis. The methanolic extracts of *M. pruriens* significantly increased the relative weight of the testis, serum and testicular testosterone level, testicular cholesterol level, protein level in the testis and epididymis, and epididymal alkaline phosphatase activity. The methanolic extracts of *M. pruriens* possess androgenic activity.

Key words: *Mucuna pruriens*, testosterone, androgenic activity.

INTRODUCTION

Mucuna pruriens Linn. (Fabaceae), commonly known as 'Cowhage plant' or 'Kapikacho' or 'Kevach' in Hindi, is the most popular drug in the Ayurvedic and Unani system of medicines in China and in India. Its different preparations (from the seeds) are used for the management of several free radical-mediated diseases, such as rheumatoid arthritis, diabetes, atherosclerosis, nervous disorders and male infertility (Rajeshwar et al., 2005; Suresh et al., 2009). There are reports that seed powder of *M. pruriens* helps in some way against stress, it increases secretion of semen and it acts as a restorative and an invigorating tonic or aphrodisiac in diseases characterized by weakness or loss of sexual power (Kumar et al., 1994; Suresh et al., 2009).

A clinical study confirmed the efficacy of the *M. pruriens* seeds in the management of Parkinson's disease by virtue of their L-DOPA content (Bell et al., 1971; Manyam et al., 1995; Molloy et al., 2006). *M. pruriens* has been shown to increase testosterone levels (Amin et al., 1996), leading to deposition of protein in the muscles and increased muscle mass and strength (Bhasin et al., 1996). Androgens are the main hormones implicated in male sexual behavior. However, there is dearth of information on the androgenic activity of *M. pruriens* seed. The present study was undertaken to evaluate a possible androgenic effect of this plants (Noumi et al., 1998).

MATERIALS AND METHODS

Animals

Male Albino rats of Wistar strain, weighing 150 □□170 g (3 – 4 months old), were used in the study. The rats were housed in the plastic cages of size 14" x 9" x 8" (6 rats in each cage) in a well ventilated room at 22 ± 2°C with 12 h light/dark cycle. All rats had free access to a standard diet (Sai Durga Feeds from Bangalore, India) and tab water *ad libidum*. The study design was approved by "Animals ethic committee" of J. J. College of arts and science, Pudukkottai, India.

Extract preparation

Preparation of extract: Seed of *M. pruriens* were collected from local region through authenticated Dr. P. Mani, Siddha Clinic, Pudukottai, India. Seed were shade dried and powdered using laboratory mill. The powdered seed were extracted with 70% methanol in a Soxhlet apparatus and obtain a solid viscous brown mass, which is "crude extract". This crude extract was used for present study.

Experimental protocol

Eighteen rats were divided at random into three groups of 6 animals

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Table 1. Effect of methanolic extract of *Mucuna pruriens* seed on weights of reproductive organs (g/100 g body weight, mean±SE) in male rats.

Group (n = 6)	Testis (mg)	Epididymis (mg)	Seminal vesicles (mg)	Prostate (mg)
Control	0.55 ± 0.04	0.16 ± 0.02	0.26 ± 0.03	0.13 ± 0.08
1000 mg/kg b.wt	0.58 ± 0.02*	0.18 ± 0.02	0.26 ± 0.04	0.14 ± 0.03
1500 mg/kg b.wt	0.64 ± 0.03*	0.20 ± 0.02	0.31 ± 0.02*	0.17 ± 0.02*

*P < 0.05 compared with control.

Table 2. Biochemical changes in the serum, testis and seminal vesicle of *Mucuna pruriens* seed treated rats.

Group (n = 5)	Serum testosterone (ng/ml)	Testicular testosterone (ng/g)	Proteins (mg/g)		Fructose (µmol/g)	Cholesterol (mg/g)	α-glucosidase (mU/g)
			Epididymis	Testis			
Control	0.5 ± 0.2	4.0 ± 0.7	0.2 ± 0.0	0.4 ± 0.0	4.7 ± 0.6	3.2 ± 0.1	4.4 ± 0.1
700 $mg.kg^{-1}.day^{-1}$	3.0 ± 0.1*	9.1 ± 0.7*	0.3 ± 0.0	0.5 ± 0.0	8.2 ± 0.6	6.6 ± 0.2*	7.0 ± 0.7*
800 $mg.kg^{-1}.day^{-1}$	2.5 ± 0.1*	7.9 ± 0.9*	0.3 ± 0.0	0.6 ± 0.1	8.6 ± 1.7	7.6 ± 0.4*	6.3 ± 0.5**

*P < 0.05; **P < 0.01 compare with control.

each. The two treated groups were gavaged 1 ml of either plant extract (Doses: 1000 mg/kg b.wt, 1500 mg/kg b.wt) or the controls, 1 ml of distilled water per day, both for 30 days. Animals were sacrificed on day 31 by decapitation. Blood samples were collected and the serum was prepared and kept at -20°C for biochemical analysis. The prostate, seminal vesicle, left testis and epididymis were excised, freed from the attached fat and connective tissue and kept at -20°C as well.

The serum and testicular testosterone levels were determined by radioimmunoassay (WHO, 1991) using testosterone 125I kit. The total protein level was determined in the sexual organs (testis and epididymis) by method of Lowry et al. (1951). Fructose level in the seminal vesicle and epididymis were estimated by the method of Lindner and Mann, (1960) and an activity of alkaline phosphatase in the epididymis was determined by method of Malymy and Horecker (1966). The cholesterol level in the testis was determined by method of Zaks (1957).

Statistical analysis

The results were expressed as mean ± SEM. The significance of differences was analyzed using Student's t-test, P < 0.05 was considered as significant.

RESULTS AND DISCUSSION

The methanolic extract of *M. pruriens* seed extract caused a significantly increased (P < 0.05) in the weight of testis, seminal vesicle and prostate (Table 1). Doses of (1000 mg/kg b.wt and 1000 mg/kg b.wt) *M. pruriens* seed extract did not alter any significant in the level of fructose in seminal vesicle and epididymis. Administration of *M. pruriens* extract (1500 mg/kgb.wt) treated rat significantly increased (P < 0.05) the level of protein in testis and epididymis (Table 2). *M. pruriens* seed extract induced a significant increase (P < 0.05) in the level of serum and testicular testosterone, significant increase (P < 0.05) in the level of cholesterol in the testis and also increased (P < 0.05 - 0.01) the activities of alkaline phosphatase in the epididymis (Table 2).

The increased in the weight of the accessory sex organs caused by the plant extract was probably the result of increased secretary activity, which was supported by an increase in the activities of alkaline phosphatase in epididymis, protein level in the testis and epididymis as indicated in the present study (Table 2). Increase in the weights and secretory activity of these androgen-dependent organs could be due to the increased in androgen biosynthesis shown by the significant increase in serum and testicular testosterone level in the *M. pruriens* seed extract treated rats (Suresh et al., 2009). Result also revealed a significant increase in testicular cholesterol, the starting material for androgen biosynthesis (Carreau, 1996; Watcho et al., 2001).

In conclusion, the methanolic extract of *M. pruriens* seed extract has an androgenic activity. Further studies are warranted to isolate the active principles of the plants and to clarify their mechanism of action.

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