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Research Article

EVALUATION OF SPERMICIDAL ACTIVITY OF AQUEOUS ROOT POWDER EXTRACT OF BUTEA MONOSPERMA (FAMILY: FABACEAE)

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ABSTRACT

This study was designed to assess the spermicidal property of aqueous extract of Butea monosperma root powder. We applied different concentrations of the extract and determined the effect on sperm motility using the in vitro immobilization assay. The result showed that at 160 mg/ml, there was an instant immobilization of all the spermatozoa on application of the extract. At a concentration of 80 mg/ml, the sperm motility were 8.20 ±0.10, 8.80 ± 0.51 , 9.63 ± 0.15, 9.50 ±0.28, 9.34 ± 0.44 , 9.17 ± 0.41 at 0, 15, 30, 60, 120 and 180 seconds respectively. Similarly, at 40 mg/ml, 20 mg/ml and 10 mg/ml, reduced sperm motility in a concentration - and time- dependent manner was observed. In conclusion, this Study shows that the crude extract of Butea monosperma root powder possesses spermicidal activity.

Keywords: contraceptive, herbal medicine, Butea monosperma root, spermicidal.

INTRODUCTION

Rapid population growth has caused serious problem in economic growth and human development in the developing countries [1]. Accordingly, population control is of immense importance for individual and national welfare. The search for an oral contraceptive agent to control human fertility is as old as recorded history. Even though an extensive variety of synthetic contraceptive agents are available, these cannot be used constantly due to their side effects [2]. Due to these side effects, an approach was pursued to identify new antifertility agents from natural sources. Numerous indigenous drugs have been described in folkloric. Many plant preparations are reported to have antifertility regulation properties and only a few have been tested for such effects. However, so far no single plant is available which can be developed into a potent antifertility agent [3]. Herbal medicine is a major component of all indigenous people's traditional medicine and is so important that assessing the health care systems in developing countries suggested that common medicinal plants could be utilized as substitutes for drugs to reduce overdependence on importation of allopathic drugs. However, there is need for proper scientific verification of their efficacy and systemic effects, particularly on reproduction. Herbal contraceptives are in popular demand because they are cost effective, readily available from local sources and have fewer side effects. However, herbal medicines may impair fertility in male and female animals or humans. Whilst some medicinal plants tested for

their antifertility properties caused reduction in sperm counts and altered the motility of the sperm cells, others altered hormone levels and the histoarchitecture of the testis. Many plants used as contraceptives or sterility agents decrease spermatogenesis [4], impair implantation [5] or are spermicidal [6]. Some research findings have confirmed the spermicidal properties of Cestrum parqui[7], Carica papaya[8] and Hymenocardia acida[9]. Global search for antifertility agents as an alternative to resolve population explosion has continued to receive attention especially in developing countries. For decades, efforts have been made to develop safe and effective contraceptives from natural sources. Plants having folkloric reputation have been identified and evaluated for their contraceptive efficacy. In recent years, there is a renewed interest in the control of fertility by using plants as male contraceptives. The genus Butea includes Butea monosperma parviflora, Butea minor and Butea superba widely distributed throughout India. is extensibly used in Ayurveda, Unani and Homeopathic medicine and has become a cynosure of modern medicine. The plants of this genus are well known for their colouring matters. Commonly Butea monosperma is used astonic, astringent, aphrodisiac and diuretics. Roots are useful in filariasis, night blindness, helminthiasis, piles, ulcer and tumours. It is reported to possess antifertility, aphrodisiac and analgesic activities. Flowers are useful in diarrhoea, astringent, diuretic, depurative, tonic, leprosy, skin diseases, gout, thirst, burning sensation and treatment of hepatic disorders, viral hepatitis, diarrhea, depurative and tonic also good source of flavonoids. The contents of flowers are Butein, Butrin, Isobutrin, Plastron, coreipsin, and Isocoreipsin . Isolation of medicarpin with antifungal activity from this part of the plant has also been reported. From the flowers of this plant species the flavonoids Butin, Butein, Butrin, Isobutrin, Palasitrin, Coreopsin, Isocoreopsin, Sulphuresin, Monospermoside, Isomonospermoside and 7,3,4-trihydroxyflavone have been isolated. The Euphane triterpenoid 3a-hydroxyeuph-25-ene and the alcohol 2, 14-dihydroxy-11, 12- dimethyl-8-oxo-octadec-11-enylcyclohexane has been isolated from the stem. The Imide palasimide has been isolated from the pods of this plant species. (10) The aim of the present study was to evaluate the spermicidal property of aqueous extract of Butea monosperma root powder.

MATERIALS AND METHODS

The Butea monosperma root were collected local area of Warangal Forest were washed, air dried at room temperature, pulverized and stored in airtight container until required. One hundred grams of powdered material was soaked in 500 ml of 70% ethanol and stirred intermittently for 48 hours at room temperature. The material was filtered using sterile cotton wool and What's man (No.1) filter paper; the residue was re-suspended in the same amount of solvent and then filtered three more times. The filtrates obtained were dried at room temperature under the electric fan to obtain a crude extract. The extracts were stored in airtight containers at 4^0C until needed.

Animals

White albino male rats (Wistar strain) were kept in poly propylene cages under room temperature, with 12-hour light and 12-hour dark cycle and were allowed to acclimatize for two weeks. The animals were provided commercial feed and clean water freely. Protocols for this experiment were in accordance with the guidelines on the care and well-being of research animals [11] and were approved by the Ethics Committee.

Experimental design

The rats were anaesthetized using diethyl ether. A scrotal incision was made to exteriorize the testis and epididymides. The epididymides were carefully dissected out of the testes and blotted free of blood. To prepare sperm suspension, epididymal sperm were obtained by teasing the cauda epididymides placed in prewarmed beaker containing 2 ml of physiological saline (maintainedat 37 °C). Sperm suspension obtained from each rat was used for the in vitro immobilization activity as previously described [6]. Briefly, ten micro litres of the plant extract dissolved in physiological saline solution at varying concentrations (1%, 2%, 4%, 8% and 16 %) were mixed with epididymal sperm suspension (1:1 v/v) and tested for their effects on sperm motility. A drop of the evenly mixed sample was immediately placed on a clean and dry glass slide covered with cover slip and mounted on a prewarmed stage. This slide was then examined under the binocular microscope (Olympus, Japan)

at magnifications of x10, x40. At least five fields were rapidly examined and 100 spermatozoa were counted. For the control, 10 µl of physiological saline was used instead of plant extract. The motility of spermatozoa was observed at various time intervals (15, 30 60, 90, 120 and 180 seconds).

Statistical Analysis

The results were analyzed and expressed as mean ± S.E.M using Graph Pad Prism Version 3.0 for Windows (Graph Pad Software, San Diego, California).

RESULTS

The effect of aqueous extract of Butea monosperma root on sperm motility at different times (duration in seconds) is shown in Table 1. The extract caused significant decreases ($P < 0.05$) in spermatozoa motility in a concentration-dependent manner. An instant immobilization of spermatozoa was observed when 16% concentration was applied.

Table 1: Effect of Butea monosperma root extract on spermatozoa motility (expressed as percentage). Data are expressed as mean ± S.E.M.

Concentrations	0 seconds	15 seconds	30 seconds	60 Seconds	120 seconds	180 Seconds
Normal saline	75.70 ± 1.56	74.70 ± 1.90	73.70 ± 1.25	70.08 ± 2.34	66.21 ± 2.75	61.30 ± 2.90
10 mg/ml	26.90 ± 0.00	26.90 ± 0.00	26.53 ± 0.37	25.68 ± 0.90	25.00 ± 0.97	23.85 ± 1.40
20 mg/ml	20.10 ± 0.30	20.50 ± 0.40	20.23 ± 0.35	19.58 ± 0.70	17.58 ± 2.07	16.05 ± 2.28
40 mg/ml	12.70 ± 0.00	13.10 ± 0.40	12.43 ± 0.71	12.40 ± 0.55	11.90 ± 0.52	11.43 ± 0.63
80 mg/ml	8.20 ± 0.10	8.80 ± 0.51	9.63 ± 0.15	9.50 ± 0.28	9.34 ± 0.44	9.17 ± 0.41
160 mg/ml	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00

DISCUSSION

The present study evaluated spermicidal properties of aqueous extract of Butea monosperma root and revealed a concentration-dependent reduction ($P < 0.05$) in the motility of sperm cells (Table 1). A similar study on the extract of Hymenocardia acida stem bark caused instant immobilization of the rat epididymal spermatozoa at 10 % concentration [6]. However, the extract of Butea monosperma root immobilized sperm cells immediately on application at 16% concentration. The result of the present study is in agreement with the findings of Lohiya and others [5] who showed that partially purified compounds of ethyl acetate sub-fractions of Carica papaya seeds when administered at 2% concentration reduced motility of spermatozoa. An impaired motility was reported as index of spermicidal activity of Achyranthes aspera and Stephania hernandifolia [4]. As was observed with Cestrum parqui[5], Most plant derived spermicides which caused sperm immobilization in animals and humans were confirmed to contain saponins [12]. The extract of Butea monosperma root revealed the presence of saponins and other phytoconstituents (data not shown). The result of this study showed that aqueous extract of Butea monosperma root has spermicidal effect. However, the efficacy of Butea monosperma root as spermicidal agent need to be further investigated.

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