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ORIGINAL RESEARCH ARTICLE

Anti-Stress Effect of *Abutilon muticum* in Albino Rats by Swim Endurance Test

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ABSTRACT

Methanolic extract of seed of Abutilon muticum was investigated on anti-stress activity in whister Albino Rats. The animals were subjected to acute physical stress (swim endurance stress model) to gauze anti-stress potential of the extract. Stimulation of hypothalamus pitutary adrenal axis in stressful condition alters plasma glucose, cholesterol, triglycerides. There is also alteration in blood cells counts. Pretreatment with extract significantly ameliorate the stress induced variations in these biochemical levels and blood cell counts in acute stress models. The results in present research indicate that methanolic extract of Abutilon muticum extract has significant adaptogenic activity against a variety of biochemical and physiological perturbations in stress models.

Key words: Anti-stress,swim endurance, *Abutilon muticum*.

1. INTRODUCTION

Abutilon muticum (Family Malvaeae) is perennial herb or shrub, stellate pubescent leaves 2-16 cm across, ovate to orbicular, irregular and minute to coarsely serrate or subentire or crenate. Usually cordate at base, obtuse to acute or shortly acuminate at apex pubscent on both sides, scabrous above hairy and velvety beneath. Many branched erect, stout and aromatic herb about 0.5 – 2 m tall.

Abutilon muticum (Malvaceae) is found throughout tropical and sub tropical regions of India this is commonly known as Karandi, Balbij in hindi. This is small herb found throughout India and grows on waste and barren land along road sides. The various parts of plant claimed to have several traditional medicinal properties. The whole plant is studied for anti inflammatory, immuno stimulating effect, piles and gonorrhea treatment. Root and bark are used as aphrodisiac, anti diabetic, nervine tonic, and diuretic. Seeds are used as aphrodisiac, in treatment of urinary disorders. The plant is reported to have analgesic, hypoglycemic, hepatoprotective, hyperlipidemic activity. Also reported in the literature isolation of sesquiterpine lactone, isolation of Gallic acid, eugenol wound healing and anti bacterial activity. The present study is an attempt to validate anti-stress activity of *Abutilon muticum.*

Stress is a biological response to aversive conditions such as injury and emotional disturbances that tend to threaten the homeostasis of the organisms. Stress is involved in the pathogenesis of a variety of diseases that includes psychiatric disorders such as depression and anxiety, immune suppression, endocrine disorders including diabetes mellitus, male impotence, cognitive dysfunction, peptic ulcer, hypertension and ulcerative colitis. Medical plants have been found to posses several phytochemical active compounds which possess wide range of biological activities that are responsible for the observed curative effects of herbal medicines.

2. MATERIALS AND METHOD

The plant was collected from local area of Melghate forest and authenticated by official agency. The shade-dried seeds of plant pulverized to reduce to 60 meshes, powder was charged into soxhlet apparatus and extraction was carried out using petroleum ether, diethyl ether, chloroform, ethyl acetate and methanol. For water a simple decoction was prepared.

2.1 Phytochemical screening:

Phytochemical analyses of above mentioned different extracts were carried out to test for the presence of various chemical constituents [14,20]. The extract with presence of maximum number of phytochemicals of pharmacological importance i.e methanolic extract of *Abutilon muticum* were selected for further study**.**

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2.2 Experimental animals

Adult wister albino rats (150-200g) of either sex were used for the study. The rats were fed with standard pellet and water *ad libitum*. The animals were maintained under standard 12-hr light / dark cycle throughout the study. The study protocol was approved by IAEC.

2.3 Acute oral toxicity study

Acute toxicity study was performed in healthy albino rats (150-200gm) as per guidelines (AOT 425) suggested by the Organization for Economical Co-operation and Development (OECD). From this data and pilot study reports; three different doses 100, 200 and 400 mg/kg were selected for this study.

2.4 Swim endurance test

30 rats were randomly divided into 05 groups, each containing 06 rats and were treated as mentioned in (**Table 1**).

Table 1: Treatment schedule for Swim endurance test

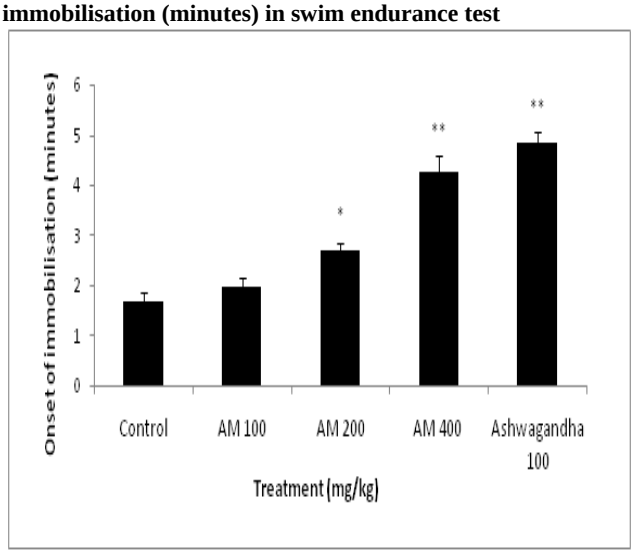
Group No	Treatment	Dose
I	Control (Vehicle)	1 ml/kg p.o.
II	*Abutilon muticum* (AM-100)	100mg/kg p.o.
III	*Abutilon muticum* (AM-200)	200mg/kg p.o.
IV	*Abutilon muticum* (AM-400)	400mg/kg p.o.
V	Ashwagandha powder	100 mg/kg p.o.

All treatments were given orally for the period of 10 days and on 11th day; the animals were forced to swim in swim test apparatus water at room temperature up to height of 25 cm. Rats were allowed to swim until they were immobilised and the moment they immobilised was considered as the endpoint and they were removed (Lakshmi and Sudhakar, 2009). Onset of immobilisation was considered for statistical analysis.

3. RESULTS

Preliminary phytochemical analysis of the methanolic extract of seeds of *Abutilon muticum* (AM) revealed the presence of alkaloids, carbohydrates, steroids, tannins and flavanoids.

Fig 1: Effect of AM extract and Ashwagandha on onset of immobilisation (minutes) in swim endurance test



*Results are expressed as mean ± SEM. (n = 6). Data was analysed by one way analysis of variance (ANOVA) followed by Dunnett's 't' test. *P<0.05, **P<0.01.*

Table 2: Effect of Abutilon muticum extract for Swim endurance test

Group No	Treatment (mg/kg)	Mean duration of Swimming Time (in min.) Mean± SEM Onset of immobilization (minutes)
I	Control (Vehicle)	1.47 ±2.0
II	*Abutilon muticum* (100)	2.0 ±2.0
III	*Abutilon muticum* (200)	2.51 ±2.0
IV	*Abutilon muticum* (400)	4.24 ±2.0
V	Ashwagandha powder (100)	4.45 ±2.0

The results showed that AM-200, 400mg/kg and reference standard Ashwagandha 100 mg/kg significantly delayed of the onset of immobilisation. Moreover, AM 400mg/kg and reference standard Ashwagandha 100 mg/kg were found to be equally significant (p<0.01) whereas 200mg/kg of AM extract was found to be less significant (p<0.05) in this regard. The dose 100mg/kg of AM extract was found to be ineffective.

4. DISCUSSION

Rats when forced to swim in a restricted space become immobile after an initial period of vigorous activity indicating the stress. Pretreatment with adaptogen increase swimming endurance in rats. Increase in total swimming time of *Abutilon muticum* treated rats showed significant improvement in the swimming time.

A variety of biological activities including Anti-stress activity were reported with flavonoids, tannins and phenolic glycosides. *Abutilon muticum* contains biologically active chemicals that include flavonoids, saponins, alkaloids, proteins, fixed oils and proteins. The anti stress activity may be due to the presence of these constituents where as standard drug *Ashwagandha* an established adaptogenic drug too contains glycosides, steroids and flavoniods.

Abutilon muticum is the next common species found in the Vidharbha region having medicinal value [15]. The limited scientific validation of its traditional claim suggested its potential antimicrobial and antioxidant effect [16]. The validation of antioxidant claim, usefulness of *Abutilon muticum* to combat stress and role of oxidative stress as major determinant in variety of pathological states [17] have made it worthwhile to investigate antistress and adaptogenic effect of *Abutilon muticum*. The recent reports have also shown that there is continuous increase in stress and strain with modernisation of life, which in turn may result into various serious disorders like hypertension, hyperlipidemia, gastric ulcers, hypoglycemia, behavioural depression, sexual dysfunction, immunosuppression, endocrine disorders including diabetes mellitus etc [17,19] .

The pharmacological evaluation of *Abutilon muticum* in a stress model revealed that *Abutilon muticum* at the dose of 200 and 400 mg/kg is effective and equipotent in parameters recorded. The significant increase in onset of immobilisation suggested improvement in behavioural despair which resembles state of human depression [18].

These results encourage towards possible use of *Abutilon muticum* as a patient friendly alternative to the present pharmacotherapy (Satoskar *et al*, 2009; Rang *et al*, 2003). The long term stress which indicates chronicity, unpredictability and inability to escape from stressor called chronic stress has more widespread effects in alteration at physiological, biochemical and neurochemical level.

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