

## DIAZEPAM LIKE EFFECTS OF HERBAL EXTRACT *ACACIA TORTILIS* GROWING IN KSA ON LOCOMOTOR ACTIVITY IN MICE

Waheeb D. M Alharbi and Aisha Azmat\*

Department of Physiology, Faculty of Medicine Umm-Al-Qura University Makkah, Saudi Arabia.

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**\*Correspondence for  
Author**

**Dr. Aisha Azmat**

Department of Physiology,  
Faculty of Medicine Umm-  
Al-Qura University  
Makkah, Saudi Arabia.

### ABSTRACT

**Aims:** *Acacia Tortilis* belong to Fabaceae. In *Acacia Tortilis* lack of essential oils can be an advantage in search for safe and effective medicines. In present study the effect of the *Acacia Tortilis* leaves extract were evaluated on locomotor activity. **Study Design:** Effect of *Acacia* on locomotor activity **Place and Duration of Study:** Department of Physiology, Faculty of Medicine, Umm Al Qura University, Makkah. Saudi Arabia. This study was performed between January 2012 and May 2012. **Methodology:** The Aqueous extracts of the leaves were prepared. Two Different doses of the extracts (400 and 800 mg/Kg) were administered either orally (p.o.) or intraperitoneally (i.p.) in the mice and locomotor activity were evaluated in mice in open field

at different doses. **Results:** The spontaneous locomotor activity measured in the open field test after the administration of *Acacia Tortilis* leaves (400 and 800 mg/Kg) extract, was not modify significantly. Although high dose of Extract (800 mg/Kg) when administered intraperitoneally (i.p) was found to affect locomotor activity significantly ( $P < 0.05$ ) in mice this effect is comparable with positive control Diazepam (DZP; 1.3 mg/Kg) which was found to decrease the locomotor activity (Square crossed by mice) significantly ( $P < 0.05$ ). **Major conclusion:** The present study suggests that intraperitoneal administration of *Acacia* significantly decrease the motor activity in open field test. The results suggest that low doses or oral (p.o.) administration is ineffective while high doses decrease the locomotor activities. This property of *Acacia* leave extract is comparable with DZP.

## 1. INTRODUCTION

Many common drugs were derived from plant-based sources. For example, aspirin from willow bark and Digitalis from foxglove flowers. The current research all over the world is focused on various herbs. It is important to conduct scientific analysis for the effects of different plants and herbs present in our society. *Acacia Tortilis* present in Kingdom of Saudi Arabia belong to family fabaceae, common name *acacia* gum <sup>[1]</sup>. Literature survey of *Acacia* reveals that the leaves of acacia exhibit anthelmintic <sup>[2]</sup>, antimicrobial <sup>[3]</sup> and antibacterial activities <sup>[4]</sup>. The leaves posses different significant activities like cytotoxic and hemolytic <sup>[5]</sup>, antioxidant and antigenotoxic <sup>[6]</sup>, analgesic, anti-inflammatory and anti-platelet <sup>[7]</sup>, Free radical scavenging <sup>[8]</sup>, phytochemical, antiproliferative and DNA damage-protecting activities <sup>[9]</sup>, anti diabetic action <sup>[10]</sup> and hypoglycemic and hypocholesterolemic activity <sup>[11]</sup>. Keeping these views in mind it is important to conduct scientific analysis for the physiological, pharmacological and biochemical effects of *Acacia Tortilis* present in Makkah. The present study, therefore, aims aimed to screen the extract of *Acacia Tortilis* on locomotor activity of mice growing in Makkah because it has not yet been explored.

## 2. MATERIALS AND METHODS

### 2.1 Plant Material

*Acacia Tortilis* leaves were collected from Arafat Makkah, Kingdom of Saudi Arabia in October 2011. Fresh leaves were collected from the shoots of Acacia. Plant taxonomist, Dr. Kadry Abdel Khalik, of Umm Al-Qura University identified and authenticates the plant specimen.

### 2.2 Experimental Animals

42 Male and female albino mice (21–25 g) were purchased from King Abdul Aziz University Jeddah for conducting the experiments. Mice were randomly divided into 6 group having 7 mice in each. Mice were kept in the animal house for seven days prior to experimentation. They were fed with standard diet and free access to water. The animals were exposed to alternate cycle of 12 h of darkness and light each with 23±1 °C temperature.

The experimental protocol was followed according to Guidelines for Care and Use of Laboratory Animals in Biomedical Research (2010). All experimental Procedure was approved by review board of departmental research committee.

### 2.3 Preparation of Extract

*Acacia Tortilis* Leaves (10gm) were soaked and washed with plenty of water. For the preparation of 100mg/ml water extract of acacia, leaves were blended with 100 ml of distilled water than mix on shaking water bath at 40°C for thirty minutes <sup>[11]</sup>. After filtration the resultant (100 ml) filtrate was used for experiment. Two different doses (400 and 800mg/Kg) of Acacia filtrate was either administered orally (p.o.) or intraperitoneally (i.p.)

### 2.4 Locomotor activity assessed by Open field test (OFT)

The standard open-field area (30cm×30cm×15cm) was divided equally into nine squares. The open field was used to observe the locomotor activity of the mice <sup>[12]</sup>.

Six groups having 7 mice each were administered according to the following

Groups	Route of administration	Solution	Dose
Group I	Oral (p.o.)	Distilled water	10 ml/Kg
Group II	Oral (p.o.)	Acacia extract	400 mg/Kg
Group III	Oral (p.o.)	Acacia extract	800 mg/Kg
Group IV	Intraperitoneal i.p.	Acacia extract	400 mg/Kg
Group V	Intraperitoneal i.p.	Acacia extract	800 mg/Kg
Group VI	Intraperitoneal i.p.	Diazepam	1.3 mg/Kg

After 30 minute each mouse was placed in open field for 6 minutes and number of square crossed by mouse and rearing activity were counted.

### 2.5 Statistical Analysis

Results are presented as mean  $\pm$  S.E.M. Assessment of statistical significance was performed using one way analysis of variance followed by Tukey's tests for multiple comparisons. The level of significance was fixed at  $P < 0.05$ .

## 3. RESULTS

### 3.1 Effect of Acacia on Locomotor Activity

Non-significant effect on the locomotor activity of mice was observed ( $154.40 \pm 9.90$  and  $131.3 \pm 17.1$ ) when treated with Acacia (400 and 800 mg/Kg p.o.) respectively as compared to control ( $153.67 \pm 6.21$ ). However, DZP (1.3 mg/Kg) was found to decrease the locomotor activity (Square crossed by mice) and this decrease was statistically significant ( $84.00 \pm 6.94$ ;  $P < 0.05$ ). Although intraperitoneal administration of high dose of extract (800 mg/Kg) was

found to reduce the locomotor activity significantly ( $42.50 \pm 3.75$ ;  $P < 0.05$ ) than oral (p.o.) extract. While, extract (400mg/Kg) when administered intraperitoneally did not reduce locomotor activity significantly ( $P > 0.05$ ) as presented in Table 1.

Extract at the low and high dose (400 and 800 mg/Kg) administered intraperitoneally (i.p.). significantly ( $P < 0.05$ ) decreased the rearing activity while the high dose (800mg/Kg) of intraperitoneally (i.p.) route was decreased number of rearing more when compared with reference drug (DZP).

**Table 1. Effect produced by the oral (p.o.) and intraperitoneal administration of different doses of Acacia leaves extract on the total crossings and rearings number of mice exposed to the open field paradigm.**

	number of square crossed mean $\pm$ SE mean	Rearing mean $\pm$ SE mean
Control	$153.67 \pm 6.21$	$35.00 \pm 4.67$
Reference drug (Diazepam, 1.3mg/Kg)	$84.00 \pm 6.94$ *	$16.25 \pm 5.20$ *
Low dose p.o. (400mg/Kg)	$154.40 \pm 9.90$ **	$35.80 \pm 2.06$ **
High dose p.o. (800mg/Kg)	$131.3 \pm 17.1$	$31.67 \pm 6.84$
High dose i.p. (800mg/Kg)	$42.50 \pm 3.75$ ***	$1.500 \pm 0.866$ ***
Low dose i.p. (400mg/Kg)	$110.5 \pm 22.8$	$14.00 \pm 6.93$ ***

\* Indicated the significant difference between control and reference drug ( $P < 0.05$ )

\*\*Indicated the significant difference ( $P < 0.05$ ) between reference drug and low dose of extract (400mg/Kg)

\*\*\* Indicated the significant difference ( $P < 0.05$ ) between control and High dose of Intraperitoneally (i.p.) extract (800mg/Kg)

#### 4. DISCUSSION

In the Present study the effect of *Acacia Tortilis* was observed on locomotor activity by using open field test <sup>[13]</sup>. The effects produced by *Acacia* leaves extract at low and high dose (400mg/Kg and 800mg/Kg orally p.o. simultaneously) in mice by using open field suggested that these extracts when administered orally (p.o.) did not affect the spontaneous locomotor of mice (Table 1). Probably, these oral doses (400mg/Kg and 800mg/Kg) were not enough to affect the general motor activity <sup>[14]</sup>.

Some scientific workers have already reported that low dose of DZP (1.0 mg/Kg) did not cause significant effect on spontaneous locomotor activity. However, doses higher than 1.0 mg/Kg decreased this parameter <sup>[15, 16]</sup> as observed during present study that DZP at the dose of 1.3mg/Kg decrease this parameter significantly. However intraperitoneal administration of Acacia at 800mg/Kg also significantly decreases the motor activity in open field test and this effect if comparable with positive control DZP. Authors <sup>[17]</sup> investigated the spontaneous locomotor activity in an open-field test also suggest that some drugs in low doses were ineffective. The results are in agreement of other studies <sup>[18]</sup>, that only high doses can decrease the locomotor activities significantly. In future, further studies are required to observe the effect of *Acacia Tortilis* in different species.

#### 4. CONCLUSION

In conclusion, the present study has demonstrated that the high doses of extract of *Acacia Tortilis* can lower the locomotor activity if administered intraperitoneally (i.p.).

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#### Ethical Approval

Authors hereby declared that The experimental protocol were followed according to Guidelines for Care and Use of Laboratory Animals in Biomedical Research (2010) all rule were followed, as well as specific national laws where applicable. All experiments have been examined and approved by the departmental ethics committee”.

#### Competing Interests

The authors have no conflict of interest to report.

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