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Evaluation of antipyretic, antinocieptive and sedative effects of *Tribulus terrestris*, *Mimosa pigra* and *Alkanna tinctoria* methanolic extracts

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ABSTRACT

This study is aimed to evaluate the of antipyretic, antinocieptive and sedative effects of *Tribulus terrestris*, *Mimosa pigra* and *Alkanna tinctoria* methanolic extracts. The methanolic extracts of *Mimosa pigra* and *Alkanna tinctoria* showed significant antipyretic and sedative effects. None of the extracts showed any antinociceptive effects. The maximum fall in body temperature was 3.9 - 4.3 ℃ and occurred 45 minutes after injection of the extracts.

Keywords: Antipyretic, Sedative, *Tribulus terrestris*, *Mimosa pigra*, *Alkanna tinctoria*.

INTRODUCTION

Plants are potent biochemical sources. Chemical compounds can be obtained from different parts of the plant like flowers, seeds, roots, fruits, bark, leaves, etc. According to the part of the plant the concentration may vary, many herbal medicines derived from plant extracts are being used in the treatment of many diseases, On the other side, not all the mechanisms of action of how they work are known. Various herbal preparations are being used broadly for inflammatory conditions treatment [1].

Tribulus terrestris (Goat head, Yellow Vine, Caltrop and Puncture Vine) is a flowering plant of the Zygophyllaceae family, native to warm temperature and tropical regions of southern Europe, southern Asia, Northern Australia and Africa [2]. Studies showed that *Alkanna tinctoria*, Family (Boraginaceae) has many activity as antioxidant, antimicrobial and wound healing properties [3]. *Mimosa pigra* family (Fabaceae) is a woody invasive shrub that originates from tropical America and has now become widespread throughout the tropics including Sudan and it has many medicinal uses [4], a number of Fabaceae family plants have been reported in the scientific literature for their antihyperglycemic, antinocieptive, antipyretic and sedative effects activities [5].

On the other hand, plant-derived compounds or plant extracts are possible to provide a great source of new medicinal agents [6] [7]. This study reports on the antipyretic, antinocieptive and sedative effects of *Tribulus terrestris*, *Mimosa pigra* and *Alkanna tinctoria* methanolic extracts.

MATERIALS AND METHODS

Plant material

T. terrestris and *Mimosa pigrawas* collected from Kord Nuba Mountain (Western Sudan). *Alkanna Tinctoria* was collected from India.

All the plants were authenticated at the College of Pharmacy, King Saud University, Riyadh and voucher specimens were placed in the King Saud University Herbarium.

Preparation of extract

The Tribulus terrestris, *Mimosa pigra* and *Alkanna tinctoria* plant material in a powder form (350 g) was extracted by cold maceration method with sufficient quantity of methanol at room temperature for 48 hr. the process was repeated for two times to ensure a complete extraction process. The extracts were then filtered and concentrated using a reduced pressure [5].

Animal

Male albino white rats (1500 g body weight) were used in this study. The rats were obtained from the animals were obtained from the Experimental Animal Care Centre, College of Pharmacy, King Saud University, Riyadh. The animals were housed under constant temperature (22 ± 2ºC) and light/dark cycle (12/12 h).

Drug administration

All the extracts were suspended in 0.9% Normal saline followed by homogenization. The suspended agent alone served as control [8].

Experimental work

The method used in this study to record the body temperature is the rectal probe thermometry [9]. Male albino white mice (25g body weight) were divided into 6 groups (N = 6 animals / group). Initial basal body temperature was measured using a rectal probe and a digital thermometer. The probe was inserted to a depth of 2.5 cm into the rectum. The 2.5 cm mark on the probe cord was marked using a permanent black ink. Then each of the extracts was injected into two different groups of mice using doses of 0.5 and 1g/kg intraperitoneally. Then the temperature was measured at 15, 30,45,60,90 and 120 minutes following administration of the extract. The decreases in the rectal temperature were reported as mean± SEM. Differences between basal temperature and that induced by the different doses of the extract were calculated using ANOVA. Only results with $P \leq 0.05$ were regarded as significant.

RESULTS AND DISCUSSION

In this study methanolic extracts of the plants *Alkanna tinctoria* and *Mimosa pigra* showed mild sedative effects and good antipyretic effects, the antipyretic effects followed a dose dependent manner and a time dependent manner up to 45 minutes following administration of the extracts, the rectal temperature started to rise towards the basal level 2 hours after administration of the extracts and the reduction in the temperature was more significant as the dose is increases from .5 to 1gm, the maximum fall in body temperature was 3.9 -4.3 °c and occurred 45min after administration of the extracts (see Table 1), indicating their good ability to combat with the antipyretic mediators While methanolic extract of *Tribulus terrestris* showed week antipyretic activity and mild sedative effects. The study also showed that the extracts have no any antinocieptive activities using hotplate method.

The present outcomes gives a wide range of potency of the extracts showing antipyretic effects mentioned in table 1 and sedative effects, these results match with the findings of other scientists, e.g. *Mimosa pigra* has been used to treat fever in Indonesia and Thailand [10][11], *Alkanna tinctoriahas* anti-inflammatory properties [12], both methanolic and chloroform extract of *Tribulus terrestris* have revealed anti-inflammatory activity. Thus it is speculated that the induced hypothermia may be due to the anti-inflammatory properties.

Table 1: Effects of *Tribulus terrestris*, *Mimosa pigra* and *Alkanna tinctoria* extracts on mice

		Decrease in Temperature (℃) x min After (i. p) Administration					
Mean control Rectal Temperature (°C)before Treatment	Extract and dose (g/kg i.p)	15	30	45	60	90	120
	ATB						
37.1 ± 0.1	0.5	2 ± 0.3	2.2 ± 0.1	2.2 ± 0.3	1.3±0.05	0.5±0.1	0.1±0.2
37.2 ± 0.3	1	3.5 ±0.2	4 ± 0.3	4.3±0.1	3.8±0.3	3.5±0.1	2.3±0.3
	M						
37.4 ± 0.2	0.5	1.4 ± 0.2	1.7 ± 0.3	1.5 ±0.1	1.3 ±0.2	1.1 ± 0.3	0.8 ± 0.2
37.1 ±0.1	1	3.7 ± 0.1	3.9 ±0.2	3.9±0.1	3.6 ±0.3	3.5 ± 0.2	3.3 ±0.1
	T						
36.9 ± 0.3	0.5	0.5 ± 0.1	0.6 ± 0.5	0.45 ±0.3	0.4 ±0.3	0.2 ±0.3	Zero
37 ± 0.2	1	1.6 ±0.3	1.4 ± 0.9	1.2±0.7	1 ± 0.8	0.5 ± 0.3	Zero

Values represent the mean± SEM, $P<0.05$
- ATB: *Alkanna Tinctoria*
-T: *Tribulus terrestris*
-M: *Mimosa pigra*

CONCLUSION

Both *Alkanna tinctoria* and *Mimosa pigra* extracts showed potential antipyretic effects, the three extracts showed mild sedation and none of them showed any antinocieptive effects. Those plants may provide a new lead pharmacophore for more potent antipyretic analogues.

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