

TO EVALUATE THE ANTIPYRETIC ACTIVITY OF *Prosopis juliflora* ETHANOLIC EXTRACT IN BREWER'S YEAST INDUCED HYPERTHERMIA IN RATS

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ABSTRACT

The ethanolic extract of *Prosopis juliflora* has been explored as potential, effective and safer anti-pyretic activity. A plant which is rich in Alkaloids, Flavonoids, Tannins, Anthraquinones and Quinones and are responsible for inhibition of H⁺, K⁺ ATPase and inhibition of *Helicobacter pylori* growth. Twenty four male rats were randomly allotted to four groups (6 animals per group) and food was deprived off for 48 hours water provided but before 24 hours of experiment, water also withheld. Group 1 was treated with water for injection (100ml/kg). Group 2 treated with Paracetamol (150 mg/kg p.o dissolved in water for injection). Group 3 and 4 were treated with ethanol extract of *Prosopis juliflora* (250 and 300 mg/kg p.o respectively). Temperature maintained at $\pm 3^{\circ}\text{C}$, for 0 to 4 hours of interval at the dose of 250mg/kg. Significantly reduced the rectal temperature at 3 hours and at dose 500 mg/kg. Significantly reduced the rectal temperature at 2, 3 and 4 hours in comparison with vehicle control.

Key words: Antipyretic, *Prosopis juliflora*, Ethanol extract, Paracetamol, Dose dependent

INTRODUCTION

Traditional use of higher plants with antipyretic properties is a common worldwide feature of many ethno botanical cultural systems. In ethno botany, plants with naturally occurring antipyretic properties are commonly referred to as febrifuges. Antipyretics cause the hypothalamus to override an interleukin-induced increase in temperature. The body then works to lower the temperature, resulting in a reduction in fever. *Prosopis* is a genus of trees and shrubs in the legume family. The products obtained from *Prosopis juliflora* have been used for human consumption in bread, biscuits, sweets, syrup and liquors (Ahmad A et al, 1986).

Extracts of *Prosopis juliflora* seeds and leaves have several in vitro pharmacological effects such as antibacterial, antifungal and anti-inflammatory properties. These properties have been attributed to piperidine alkaloids. A number of compounds have also been reported from this plant, the most common of these being steroids, tannins, leucoanthocyanidin and ellagic acid glycosides. A new monocyclic diketone, prosopidione, and two alkaloids, namely, juliprosinene and juliflorinine, have been isolated from the leaves (Ahmad A et al., 1989).

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MATERIALS & METHODS

1. Twenty four male rats were randomly allotted to four groups (6 animals per group). After measuring the rectal temperature of all the rats, hyperthermia was induced by subcutaneous injection of 20% (w/v) aqueous suspension of brewer's yeast. After 18 hours of yeast induction rectal temperatures were measured and only rats those show an increase in temperature by 0.7°C and more from baseline was used for the study.
2. Groups I were assigned as vehicle control and administered with Water for Injection (10 ml/kg). Group II were administered with paracetamol (150 mg/kg) and served as Positive control. Groups III and IV were administered with ethanol extract of *Prosopis juliflora* at the dose of 250 and 500 mg/kg respectively.
3. The temperature was measured at 0 (18 hr after yeast injection), 1, 2, 3 and 4 hrs after administration of doses.
4. Data were analyzed using one way ANOVA followed by Dunnett T method as post-hoc test. All values were reported as mean ± SEM. Statistical significance was set at $p \leq 0.001$.

Husbandry Conditions are as follows

Temperature: 20±3°C

Humidity: 30-70%

Light: 12 hours light and 12 hours dark cycle.

Air changes: 12-15 changes per hour

RESULTS AND DISCUSSION

Twenty four male rats were randomly allotted to four groups (6 animals per group). After measuring the rectal temperature of all the rats, hyperthermia was induced by subcutaneous injection of 20% (w/v) aqueous suspension of brewer's yeast. After 18 hours of yeast induction rectal temperatures were measured and only rats those show an increase in temperature by 0.7°C and more from baseline was used for the study. The anti-pyretic activity of *Prosopis juliflora* ethanol extract in brewer's yeast induced hyperthermia in Rats shown in Table 1 and Formulation Details shown in Table 2. Groups I were assigned as vehicle control and administered with Water for injection (10

ml/kg). Group 2 were administered with paracetamol (150 mg/kg) and served as Positive control. Groups 3 and 4 were administered with ethanol extract of *Prosopis juliflora* at the dose of 250 and 500 mg/kg respectively.

The temperature was measured at 0 (18 hour after yeast injection), 1, 2, 3 and 4 hours after administration of doses. The ethanolic extract of *Prosopis juliflora* was tested for antipyretic activity in brewer's yeast induced Hyperthermia in rats presented in table 1 with different formulations as water for injection, paracetamol and ethanol extract of *Prosopis juliflora* in different concentration and weight of the test was 300 mg, 500 mg and 1000mg along with 20mL volume of vehicle concentration presented in table 2. The subcutaneous injection of brewer's 20% yeast suspension % raised the rectal temperature of the rats 18 h after administration (37.33 ± 0.08 °C v/s 39.03 ± 0.12 °C, $p < 0.001$). As data presented in Table 3 and Graph 1 the positive drug paracetamol (150 mg/kg) significantly reduced the rectal temperature at 2, 3 and 4 hours. The ethanol extract of *Prosopis juliflora* exhibited dose dependent antipyretic activity at 2, 3 and 4 hours and at dose 250 mg/kg significantly reduced the rectal temperature at 3 hour and at dose 500 mg/kg significantly reduced rectal temperature at 2, 3 and 4 hours in comparison with vehicle control.

Data was analysed using one way ANOVA followed by Dunnett T method as post-hoc test. All values were reported as mean ± SEM. Statistical significance was set at $p \leq 0.001$.

Table 1: Study design of the anti-pyretic activity of *Prosopis juliflora* ethanol extract in brewer’s yeast induced hyperthermia in Rats.

Groups	Treatments	Dose (mg/kg)	No: of Animals	Animal No.
G1	Water for Injection (WFI)	0(10 ml/kg)	6	1-6
G2	Paracetamol	150	6	7-12
G3	Ethanol extract of <i>Prosopis juliflora</i>	250	6	13-18
G4	Ethanol extract of <i>Prosopis juliflora</i>	500	6	19-24

Table 2: Formulation details the anti-pyretic activity of *Prosopis juliflora* ethanol extract in brewer’s yeast induced hyperthermia in Rats.

Groups	Treatment	Dose Concentration	Final Volume	
			Weight of test/reference item (mg)	Volume of vehicle (mL)
G1	Water for Injection (WFI)	0	0	20
G2	Paracetamol	15	300	20
G3	Ethanol extract of <i>Prosopis juliflora</i>	25	500	20
G4	Ethanol extract of <i>Prosopis juliflora</i>	50	1000	20

Table 3: Effect of *Prosopis juliflora* on rectal temperature in brewer’s yeast induced hyperthermia in albino Wistar Rats

Treatment Groups	Dose (mg/kg rat b.wt.)	Body weight (g)	Initial Rectal Temperature in °C before yeast injection	Rectal Temperature in °C. 18 hrs after Yeast Injection (0 hours)	Rectal Temperature in °C after treatment			
					1 hour	2 hour	3 hour	4 hour
G1 Water injection(10ml/kg)	0	194.3 ±2.90	37.52 ±0.13	39.2 ±0.29	39.15±0.16	39.20±0.12	38.97±0.10	38.78±0.19
G2 Paracetamol	150	191.3 ±3.90	37.23 ±0.18	38.93 ±0.20	38.45±0.18	38.08±0.20**	37.87±0.15***	37.63±0.11***
G3 Ethanol extract of <i>Prosopis juliflora</i>	250	186.3 ±3.09	37.22 ±0.13	38.87 ±0.26	38.93±0.24	38.50±0.26	38.30±0.24*	38.20±0.24
G4 Ethanol extract of <i>Prosopis juliflora</i>	500	189.5 ±3.91	37.37 ±0.19	39.12 ±0.24	38.72±0.23	38.40±0.19*	38.15±0.18*	37.83±0.19**

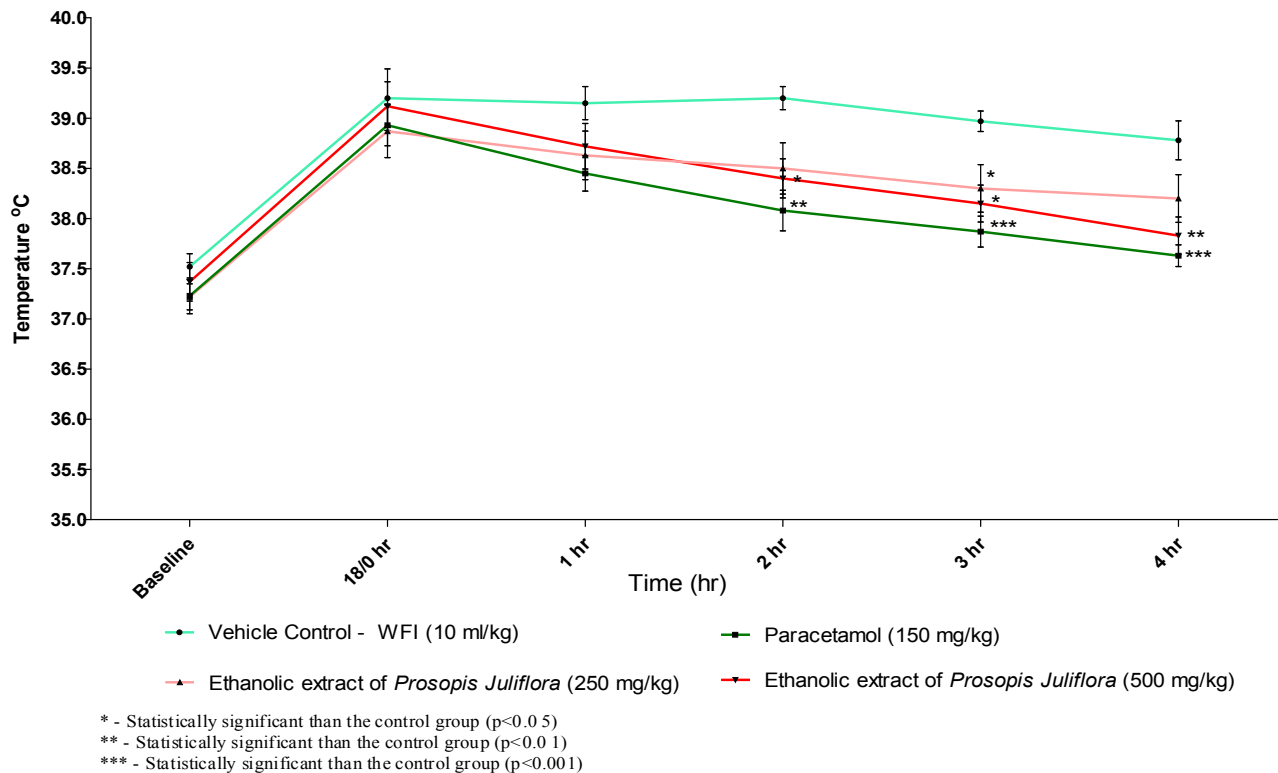
Values are expressed as mean ± SEM; n= 6

* - Statistically significant than the control group (p<0.05)

** - Statistically significant than the control group (p<0.01)

*** - Statistically significant than the control group (p<0.001)

Graph.: 1 Effect of *Prosopis juliflora* ethanolic extract on rectal temperature in Brewer's yeast-induced hyperthermia in rats



CONCLUSION

The ethanolic extract of *Prosopis juliflora* reveals the presence of major bio-active compounds like alkaloids, Steroids, Tannins, Leucoanthocyanidin, and Ellagic acid glycosides, were tested in brewer's yeast induced hyperthermia in rats' exhibits anti-pyretic activity at different tested dose levels. The study reveals the potential bio-active compounds in *Prosopis juliflora* may be used as potential drugs against anti-pyretic activity.

REFERENCES

1. Ahmad A, Ali Khan K, and Ahmad VU, Qazi S. (1986): *Antibacterial activity of juliflorine isolated from Prosopis juliflora*. *Planta Med*, 1:285-8.
2. Ahmad, A., Khursheed, A.K., Sabiha, Q. and Viqaruddin, A. (1989a): *Antifungal activity of some hydrosoluble Prosopis juliflora alkaloids*. *Fitoterapia*, 60: 86-89.
3. Al ShakhHamed, W. M. A.; Al Jammas, M. A. (1999): *The antimicrobial activity of alkaloidal fraction of Prosopis juliflora*. *Iraqi Journal of Veterinary Sciences*, 12(2): 281-287
4. Goel U, Saxena DB, Kumar B. (1989) *Comparative study of allelopathy as exhibited by Prosopis juliflora Swartz and Prosopis cineraria (L) Druce*. *J Chem Ecology*, 15:591-4.
5. Kanthasamy, A., Subramanian, S. and Govindasamy, S. (1989a): *Bactericidal and fungicidal effects of Prosopis juliflora alkaloidal fraction*. *Indian Drugs*, 26: 390-394.
6. Nwafor PA., Jacks TW., Ekanem AU. (2007): *Analgesic and Anti-inflammatory Effects of methanolic extract of Pausinystaliamacroceras stem bark in rodents*. *Int. J. Pharm* 3, 86-90.

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