



ANTIPYRETIC ACTIVITY OF METHANOL EXTRACT OF *ACACIA LEUCOPHLOEA ROXB* BARK

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ABSTRACT: The plant *Acacia leucophloea Roxb* is reported to have great medicinal value in Indian medicine. The present study deals with the preliminary phytochemical screening of *Acacia leucophloea Roxb*, in vivo evaluation of antipyretic activity of methanol extract by using yeast-induced pyrexia method. The effect of methanol extract of Bark shows that different dose caused lowering of the body temperature up to 2 h following its administration. The effect of methanol extract on yeast-induced pyrexia shows that the rectal temperature was markedly elevated to 38.24°C, 24h after the subcutaneous injection of yeast suspension, decreased to 37.97°C within 30 minutes of Bark extract (100mg/kg) treatment respectively. Bark extract are producing significant antipyretic activity against the yeast-induced pyrexia model, hence the extract favours antipyretic activity.

Key Words- *Acacia leucophloea*, Methanol extract, antipyretic activity.

INTRODUCTION

Acacia leucophloea Roxb also called *reonja*, is a moderate sized tree and it attains a height of about 20 to 30 ft and a girth of 2 to 3 ft ⁽¹⁾, belongs to the family *Fabaceae* under the subfamily *Mimosoideae*. *Acacia leucophloea*'s native range through South and Southeast Asia is non-contiguous ⁽²⁾. Its largest continuous distribution is arid India through Sri Lanka, Bangladesh, Burma and much of Thailand ⁽³⁾. The chemical constituents found are n-Hexacosanol, beta- Amyrin, beta-Sitosterol and Tannin ⁽⁴⁾. Traditionally the bark is used as astringent, bitter, thermogenic, styptic, alexeteric, antihelmintic, vulnerary, demulcent, constipating, expectorant and antipyretic, vulnerary, demulcent, constipating, bronchitis, cough, vomiting, wounds, ulcers, diarrhoea, dysentery, internal and external haemorrhages, dental caries, oral ulcers, proctoptosis, stomatitis and intermittent fevers ⁽⁵⁾.

An antipyretic is a type of medication that will prevent or reduce fever by lowering body temperature from a raised state. They will not affect normal body temperature if the patient does not have a fever. Generally, most non-steroidal anti-inflammatory drugs (NSAIDs) work by inhibiting prostaglandin synthetase within the hypothalamus.

Fever, or pyrexia, occurs when the body reaches a temperature above what is considered "average". Bear in mind, however, that this "average" temperature can vary from person to person within certain parameters. It is generally accepted fever exists at a temperature above 37 degrees Celsius when the thermometer is placed under the armpit, or over 37.5 degrees Celsius when measured orally or rectally.

Fever usually results from microbes such as bacteria or viruses triggering the body's defence mechanisms. Antipyretics (literally "against the fire") are drugs that reduce fever⁽⁶⁾. The literature survey also revealed that there are no reports on correlation between chemical constituents and their pharmacological properties. The present study is therefore undertaken, to study the antipyretics activity of the *Acacia leucophloea* bark.

MATERIAL AND METHOD

Collection of Plant Materials

Dried bark of *Acacia leucophloea* were collected and authenticated by Dr. S.N. Sharma, Technical Officer, Department of plant Sciences, Indian Institute of Integrative medicine, Jammu. A voucher specimen (specimen No. 21852) was deposited in the herbarium of Indian Institute of Integrative medicine, Jammu. All the animal experiments were conducted by the approval of Institutional Animal Ethics Committee (reg. no- 1349/AC/10/CPCSEA). During the study period, guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Institutional Animal Ethics Committee (IAEC) were followed for the maintenance of animals.

Methods

Method of preparation of methanol extract

The extraction was done by using hot continuous method using Soxhlet apparatus. The successive extraction was performed by using the solvents n-hexane and methanol. The methanol extract of *acacia leucophloea* bark was used for this study.

Antipyretic activity⁽⁷⁾

The body temperature of each albino Wistar mice was recorded by measuring rectal temperature at predetermined intervals. Albino wistar mice were fasted overnight with water *ad libitum* before the experiments. Pyrexia was induced by subcutaneously injecting 20% (W/V) brewer's yeast suspension (10 ml/kg) into the animal's dorsum region. The rectal temperature of each mice was again recorded after 24 h of yeast administration. Mice that did not show a minimum increase of 0.5 °C in temperature 24 h after yeast injection was discarded. Forty eight selected mice were grouped into eight and immediately treated as follows: group I received normal saline, group II received 10 mg/kg paracetamol, while groups III, IV and V received methanol Bark extracts 25, 50 and 100 mg/kg respectively i.p, and groups VI, VII and VIII received methanol bark extracts 25, 50 and 100 mg/kg respectively i.p. Rectal temperature of all the mice was then recorded by inserting digital thermometer into the rectum of each mice at thirty minutes.

RESULTS

Antipyretic potential of Bark extract was evaluated by determining its effect on yeast-induced pyrexia in rats. The methanol extract of Bark provide moderate to marked anti-pyretic activities, which was also dose-dependent. The result showed methanol extract of different doses caused lowering of the body temperature up to 2 h following its administration. The effect of methanol extract on yeast-induced pyrexia shows that the rectal temperature was markedly elevated to 38.24°C, 24h after the subcutaneous injection of yeast suspension, decreased to 37.97°C within 30 minutes of Bark extract (100mg/kg) treatment respectively, and reduced till 2 hours showing a sizeable decrease and was comparable to paracetamol. At 50 and 100mg/kg marked anti-pyretic activity detected which were significantly different than the controls (p<0.05). Generally, for all concentration of methanol extract of Bark showed marked anti-pyretic activities. This result reveals that methanol extract of *acacia leucophloea* bark have marked antipyretic activity as compare with standard paracetamol.

Table No.1: Antipyretic effect of methanol extract of *Acacia leucophloea* Bark

Treatment	Dose	Rectal Temperature (°C)				
		0.0h	0.5h	1.0h	1.5h	2.0h
Control	-	38.24±0.19	38.27±0.21	38.21±0.31	38.56±0.09	38.03±0.13
Paracetamol	10mg/kg	38.49±0.22	37.08±0.12*	36.53±0.24*	35.72±0.19*	35.02±0.17*
Bark	25mg/kg	38.46±0.25	38.18±0.21	38.01±0.31	37.84±0.46	37.25±0.13*
	50mg/kg	38.23±0.34	38.06±0.11	37.65±0.22	37.42±0.16*	37.10±0.06*
	100mg/kg	38.37±0.09	37.97±0.13	37.38±0.42*	36.89±0.35*	36.11±0.17*

Significantly different from the control at P<0.05, Standard drug – Paracetamol

DISCUSSION

Fever may be a result of infection or one of the sequelae of tissue damage, inflammation, graft rejection, or other disease states. Antipyretics work by getting the "thermostat" in the hypothalamus to override the interleukin-induced increase in temperature. The body will then work to lower the temperature to the new, lower temperature and the result is a reduction in the fever. Antipyretics will also reduce prostaglandin synthesis in the hypothalamus by inhibiting the effect of endogenous or microbial pyrogens on the heat regulating sensors of the hypothalamus. By blocking prostaglandin synthetase, antipyretics prevent a rise in prostaglandin levels in the brain. Antipyretic are drugs, which reduce the elevated body temperature. Regulation of body temperature requires a delicate balance between production and loss of heat, and the hypothalamus regulates the set point at which body temperature is maintained. In fever this set point elevates and a drug like paracetamol does not influence body temperature when it is elevated by the factors such as exercise or increase in ambient temperature⁽⁸⁾. The effect of methanol extract of Bark shows that different dose caused lowering of the body temperature up to 2 h following its administration. The effect of methanol extract on yeast-induced pyrexia shows that the rectal temperature was markedly elevated to 38.24°C, 24h after the subcutaneous injection of yeast suspension, decreased to 37.97°C within 30 minutes of Bark extract (100mg/kg) treatment respectively. The extract produced a significant reduction in yeast induced pyrexia in rats dose-dependently and its effect is comparable to that of the standard anti-pyretic drug used in this study. Most of the available synthetic antipyretic, such as paracetamol, aspirin, nimusulide etc. have toxic effect to the various organs of the body. Search for safe herbal remedies with potent antipyretic activity, this plant can reduce the use of synthetic antipyretic drug.

CONCLUSION

The present study suggest that the plant *Acacia leucophloea* Roxb could be a potential source as natural antipyretic activity that could have great importance to reduce the fever.

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