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Antipyretic Activity of the Root Extracts of *Xylocarpus*

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ABSTRACT

Various types of conditions exist in the body that causes fever and pain. Drugs that are used to treat fever are called antipyretics, and those are usually prescribed to treat elevated body temperature. But those drugs result in many other side effects like ulcers, perforations, bleedings and obstructions, which make their use questionable and limiting. Medicinal plants are used in the treatment of diseases from the starting of the human race and the process; they had been subjected to rigorous investigations and tests to establish a scientific proof and validation of the various pharmacological activities and their respective mechanisms of action in treating the herbs. Considering the anti-inflammatory properties of the plant, *Xylocarpus mekongesis* was investigated for its antipyretic activity in yeast method and 3doses out of which 00mg/kg body weight showed a better activity compared to the standard drug and other extracts too. The mechanism of action was similar to the paracetamol action that is inhibition of prostaglandin synthesis.

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INTRODUCTION

Medicinal plants are used in the treatment of diseases from the starting of the human race and the process; they had been subjected to rigorous investigations and tests to establish a scientific proof and validation of the various pharmacological activities and their respective mechanisms of action in treating the herbs [1].

They have been giving the chemical lead molecules that are effective against many dangerous diseases. In most of the diseases like congestive heart failure, cancer etc. are still relied on the medicinal plants only for the treatment [2].

Various types of conditions exist in the body that causes fever and pain. Drugs that are used to treat fever are called antipyretics, and those are usually prescribed to treat elevated body temperature. But those drugs result in many other side effects like ulcers, perforations, bleedings and obstructions, which make their use questionable and limiting [3, 4].

There are selective drugs that are used to treat various kinds of fevers, and most important of them are COX inhibitors which also wok effectively on other inflammatory responses like pain and stress management.

These are reported to cause systemic side effects like cardiovascular problems and heart-related issues [5, 6]. There are also some psychological issues related to these drugs; they are tolerance, dependence and in some cases, addiction too. They show a negative impact on the body than the uses of those synthetic drugs [7, 8].

Xylocarpus mekongesis which is commonly called a possur plant. It is commonly grown in the areas of West Bengal and Bangladesh and the Andaman islands.

This plant is a mangrove forest dweller and traditionally used for its astringent properties and dysentery as a febrifuge. Its bark has antimalarial, antidiarrhoeal and anticancer properties [9].

EXPERIMENTAL SECTION

Collection and extraction

Fresh plants were collected from the mangrove region near the borders of Bengal and Orissa. They were appropriately authetified by a botanist, and a herbarium specimen was prepared and submitted in the college laboratory and library. The roots of the plant are adequately dried under shade for few days until they are dried.

After they are dried, they are collected and ground in a blender, and the powder was sieved and used for further procedures.

This powder was extracted for chemical constituents using methanol as a solvent and using the percolation process. The drug is packed in a pouch and placed in a percolator.

The solvent was passed through the percolator for 24 hrs at the rate of 10ml per minute until the solvent ran colourless. This was then filtered, and the filtrate was collected and evaporated and used for the further experiments in different doses like 200,400 and 600mg/kg weight of the rats.

Antipyretic Activity

Animal protocol

Animals used in this investigation are albino rats which weighed 145-165gm on average. They are kept in propylene cages for the acclimatization to the lab environment in 12 hrs day and night cycles which were maintained in the laboratory.

They are allowed to have free access tot eh standard pellet feed and wat too. They were maintained under air conditioning and normal humidity comfortable for the rats.

Brewer's yeast induced pyrexia method.

All the animals were noted to the rectal temperature via the rectal route, and the recordings were made correctly. Then brewers yeast was mixed with methyl cellulose solution at 15% concentration was injected in the subcutaneous route to all the rats.

Then the rats were allowed to rest for 24hrs and rats that showed any change in the temperature were only selected for the study, and the rest of the rats were discarded from the experiment [10].

The rats were divided into 5groups with 6rats in each group, and the rectal temperature at 1 hour was recorded and noted. Group1 was administered with tween 80 solution which acted as a control group which were induced with pyrexia and not given any drug. Group 2-4 were given three doses of the extract at a dose of 200mg/kg, 400mg/kg and 600mg/kg of the body weight. Table 1

Then the rats were allowed to rest, and the body temperatures were recorded for every 1, 2, 3 and 4hrs of the administration of the drug [11]. The standard drug used int eh group 7 was paracetamol at a dose of 100mg/kg [12–14].

RESULTS

The methanol fraction of the plant roots exhibited a significant action in lowering the rectal temperature in the rats from the starting hour of the experiment.

This was not comparably similar to the pattern of the lowering of the temperature on an hourly basis compared to the paracetamol, which lowered the temperature instantly in the first hour itself. Contrarily the extracts kept on lowering the body temperature during the prolonged hours of the experiment to 4hrs.

There were different doses of extracts that were studied for the activity they are 200,400 and 600mg. Out of which, 600mg/kg showed a better activity compared to 400 compared to 200, and the least activity was shown by 200 mg which denotes that there is a dose-dependent lowering of the pyrexia that is induced by the yeast.

Yeast induced pyrexia is an example of pathogen or infection-based fever that is common and economical induction of pyrexia in the lab.

The activity was similar to the paracetamol inhibition of the fever, which we can conclude that the similar mechanism of action of the extracts was exhibited as that of the paracetamol.

The prostaglandins elevation might have taken place with the induction of yeast, and the extracts inhibited their synthesis and cytokinin release too. Also, they inhibit the cox enzymes, which are the inflammatory mediators at any injury site [13].

Having considered the similar mechanism of the paracetamol and the extracts it can be supported by the anti-inflammatory activity of the plant roots. But the delay in action can be explained by the fact that paracetamol disintegrated easily in the gastric juice and showed its activity instantly. The extract took it time to get digested with the juice and then show its action.

Table 1: Antipyretic property of the plant in yeast method

Group	Rectal temperature ^{0}C	Temperature after drug administration ^{0}c			
		1hr	2hr	3hr	4hr
Saline 1.5ml	38.65±0.47	43.42±0.62	41.39±1.03	42.74±0.54	42.86±0.75
Extract at 200mg/kg	38.72±0.83	41.81±0.51	42.46±0.95	40.33±0.12	39.57±0.64
Extract at400mg/kg	39.21±0.94	41.35±0.74	42.14±0.38	39.42±0.65	38.02±0.83*
Extract at 600mg/kg	38.46±1.02	41.60±0.93	40.09±0.67	39.57±0.76	38.23±0.55*
standard 100mg/kg	40.59±0.68	42.21±0.46	39.52±0.81	39.65±0.98	38.09±0.27*

CONCLUSION

Considering the anti-inflammatory properties of the plant, *Xylocarpus mekongesis* was investigated for its antipyretic activity in yeast method and 3doses out of which 00mg/kg body weight showed a better activity compared to the standard drug and other extracts too. The mechanism of action was similar to the paracetamol action that is inhibition of prostaglandin synthesis.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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