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Research Article

ANTI-DIARRHOEAL POTENTIALITY OF FLOWER EXTRACT OF *BUTEA MONOSPERMA*

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ABSTRACT

Butea monosperma belongs to the family Fabaceae, is commonly known as 'Palas'. Earlier folklore claims reveals that the plant is used in diarrhoea and dysentery. The whole plant has been used for antidiarrhoeal activity in Indian traditional medicine. So the flowers of the plant were screened for their antidiarrhoeal activity by castor oil induced model and gastro intestinal motility test model. In the present study, methanol extract of the flower of *Butea monosperma* (MEBM) were used at two dose level (200 mg / kg and 400 mg / kg p.o) against several experimental models of diarrhoea in rats. MEBM treated animals showed significant inhibitory effect against castor oil induced diarrhoea and gastrointestinal motility test in rat tissue and chicken ileum. Hence the present study supports the traditional claim of *Butea monosperma* as an antidiarrhoeal drug in the Indian System of Medicine.

Keywords: *Butea monosperma*, Palas, Antidiarrhoeal, MEBM- Methanolic Extract of *Butea monosperma*

INTRODUCTION

Butea monosperma (Palas) is medium- sized deciduous tree belongs to family Leguminaceae-Papilioneae/family-Fabaceae[1] is a native to tropical South Asia, especially from the regions of Pakistan, India, Bangladesh, Nepal, Sri Lanka, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, and western Indonesia. The tree grows a height of 50 ft with stunning flower clusters. The foliage occurs at the onset of flowers which develops during January-March. The *Butea monosperma's* flowers, bark and gum from the stem have been widely used in traditional system of medicine, and out these flowers have been studied extensively both, chemically and pharmacologically. Traditionally, flowers have been used as astringent, aphrodisiac, diuretic, anthelmintic, in diarrhea, gynecological and various CNS disorders[2]. The trunk becomes twisted and gnarled making to a conversation piece by the wind directions. The bark posses' ash color upon maturation The leaves are three folliate, large and stipulate, flowers are rigid racemes of 15cm long, densely brown velvety on bare branches, calyx is dark to olive green to brown in color and densely velvety outside, corolla is long with silky silver hairs protruding with outside bright orange red, Stamens are diadelphes, ovary are of two ovule, style filiform,curved and stigma capitates. The flower tends to be darkish grey with like supporting branch itself. The upper parts of flowers are brick red[3].

The flowers of ***Butea monosperma*** are good source of flavonoids. The contents of flowers are butein, butrin, isobutrin, plastron, coreipsin and isocoreipsin[4]. Diarrhoea has long been recognized as one of the most important health problems in the developing countries. It is most dangerous symptom of gastrointestinal problems and is associated with excessive defecation and stool outputs. The WHO has constituted a Diarrhoeal Disease Control Program (CDD), which includes studies of traditional medicinal practices, together with the evaluation of health educational and prevention approaches[5].

MATERIALS AND METHODS

Plant material

The flowers of ***Butea monosperma*** (palas) were collected in the month of November, 2011 from the local market of Ghaziabad, India. The flower were authenticated by the National Bureau of Plant Genetic Resources, (Indian Council of Agricultural Research), Pusa campus, New Delhi-110 012 and the voucher specimen NHCP/NBPGR2012-04 is preserved in the pharmacognosy department of our institute for further reference. The flowers were dried under shade with occasional shifting and then powered with mechanical grinder and stored in an airtight container for further extraction purpose.

Preparation of extract

The powder material (flower, 100gm) was subjected to hot continuous soxhlet extraction with methanol (35°C-45°C) for 36 hours. The filtrate was collected and the mass were again subjected to extraction process for 24 hours. The filtrates were collected and were concentrated over water bath maintaining a temperature of 40°C. The concentrated mass was cooled and finally it was placed in the desiccators and was used for further studies. The percentage yield of the extract was calculated as 12.6%w/w. The preliminary phytochemical screening were carried out and it was found that the following constituents like tannins, flavanoids, alkaloids, sterols and terpenes were present.

Animals

Albino rats (Wistar) weighing 150-200g of either sex were used for the study. They were procured from the animal house of NIET, Greater Noida. The animals were acclimatized for one week under laboratory conditions. They were housed in polypropylene cages and maintained at 27 C±2°C less than 12 hrs dark/light cycles. They were fed with standard rat feed and water *ad libitum* was provided. The litter in the cages was renewed thrice a week to ensure hygenicity and maximum comfort for animals. Ethical clearance for handling the animals was obtained from the Institutional Animals Ethical Committee prior to the beginning of the project work bearing the protocol number NIET\IAEC\2011\39.

Method

Castor oil induced diarrhoea

The rats were fasted for 18hrs. The *wistar albino* rats of either sex were divided into four groups of six each and were treated as per the following regimen.

Group I: 2%v/v saline (p.o.)

Group II: Test drug (MEBM, 200 mg/kg, p.o)

Group III: Test drug (MEBM, 400 mg/kg, p.o)

Group IV: Loperamide (2 mg/kg, p.o.)

Animals in each group received castor oil at dose level of 2ml/kg body weight by oral route after 30 min of drug administration. The animals were placed separately in cages with filter paper, which was changed every hour. All the animals were observed for defecation up to 4 hours. Characteristic diarrhoeal droppings were noted in the transparent plastic dishes placed beneath the individual perforated rat cages. The mean numbers of wet feces were calculated from the diarrhoeal droppings in the transparent dishes.

Gastrointestinal motility test

Rats were sacrificed following by euthanasia technique and the tissues were isolated and arranged in student's organ bath in tyrode solution at suitable environment. It was treated with standard drug acetylcholine and then treated with test drug (MEBM) and they were observed for specific responses.

RESULTS

Inhibition of castor oil induced diarrhea

In the present investigation, antidiarrhoeal activity was evaluated by castor oil induced diarrhoeal model and gastro intestinal motility test. It was observed that the extract MEBM at both dose levels significantly reduced number of defecation and wet faecal matter in comparison to control. The extract (MEBM) reduced the frequency of defecation as well as wetness of faecal matter significantly in castor oil induced diarrhea, like standard drug (loperamide). The results were tabulated in table-1.

Effect on gastrointestinal motility

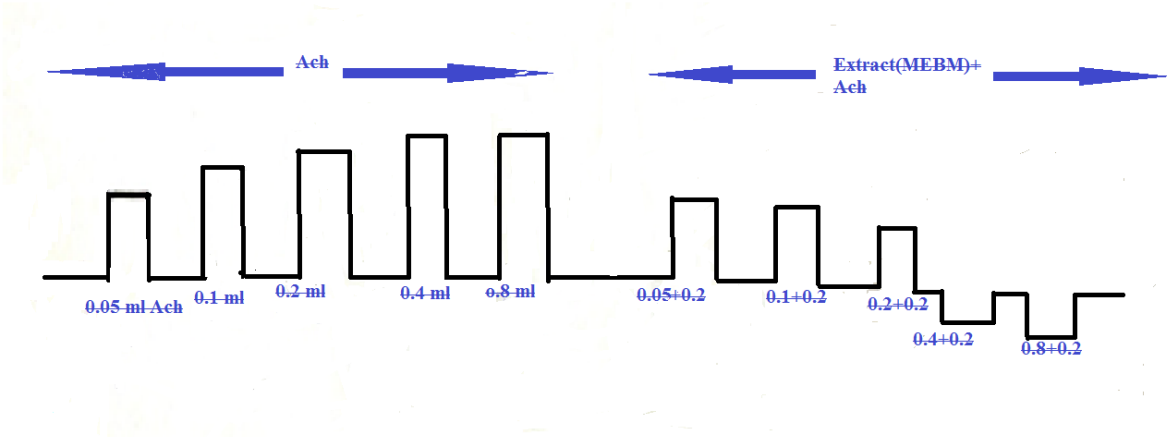
The extract (MEBM) decreased the motility in gastrointestinal test significantly in both tissue of rat and chicken ileum when as compared to acetylcholine. The concentration response curve of both rat tissue and chicken ileum are shown in figure 1:

Table 1: The effect of Methanolic extract of *Butea monosperma* on castor oil induced diarrhoea models in rats.

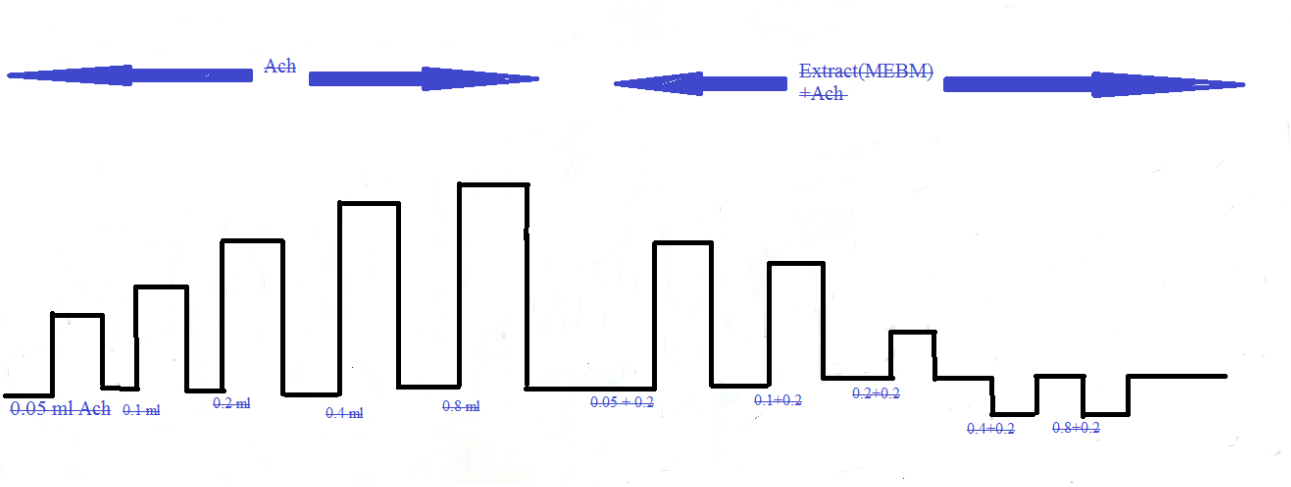
Treatment Groups	Dose(mg/kg)	Frequency of defecation (Mean±SEM)	Total weight of wet stools (Mean±SEM)
Control	___	7.835± 1.02	4.505± 0.52
MEBM	200	3.36 ±0.43*	2.465± 0.261*
MEBM	400	3.212± 0.39**	2.202± 0.182**
Standard(Loperamide)	2	2.36± 0.35**	1.741± 0.089**

No. of animals N=6, P<0.05*, P<0.01**, when compared with control group. One way Anova

MEBM: Methanolic Extract of *Butea monosperma*



(a) Concentration Response Curve of rat tissue



(b) Concentration Response Curve of chicken ileum

Fig. 1: The effect of Methanolic extract of Butea monosperma on gastrointestinal motility test

DISCUSSION

The people in developing countries are very prone to suffer from diarrhoea, especially children, which eventually lead to malnutrition. The World Health Organization launched a diarrhoeal disease control program in order to eradicate this problem. Herbal remedies are preferred for a number of ailments in recent years. Organizations like World Health Organization (WHO) and United Nations Children's Fund (UNICEF) are very much interested in herbs to be used for the treatment of childhood diarrhoea[6]. Diarrhoea has long been recognized as one of the most important health problem in the developing countries[7]. Worldwide distribution accounts for more than 5-8millon deaths each year in infants and small children's less than 5 years. According to WHO estimation for the year 1998, there were about 7.1 million deaths due to Diarrhoea[8]. Many plants conveniently available in India are used in traditional folklore medicine for the treatment of diarrhoea used includes *Andrographis peniculata, Asparagus racemosus, and Cassia auriculata* etc[9]

It is widely known that castor oil or its active component ricinoleic acid induces permeability changes in mucosal fluid and alters the electrolyte transport which results in hyper secretary response of diarrhoea[10, 11]. The extract (MEBM) inhibited the frequency of defecation significantly in castor oil induced diarrhoea, when it was compared with the standard drug (loperamide). The wetness of fecal material was also reduced, by both the standard and extract (MEBM). The extract (MEBM) decreased motility in gastrointestinal test significantly in both tissue of rat and chicken ileum.

The active constituents like tannins [12], flavanoids [13], alkaloids [14], sterols and terpenes [15] were found to be responsible for antidiarrhoeal activity which was confirmed from our findings and phytochemical screening which showed the presence of these constituents, thereby responsible for the activity.

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