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ANTIPYRETIC AND ANTIDIARRHEAL ACTIVITY OF *Geranium ocellatum* LEAVES EXTRACT

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Abstract- *Geranium ocellatum* commonly known as black eyed Geranium. Analgesic activity of *Geranium ocellatum* leaves extract have been screened in mice by acetic acid induced writhing method. Forced swim test have been performed to test the antidepressant activity of *Geranium ocellatum* leaves extract. In both experiments the extract shown significant effect compared to standard drugs.

Keywords- *Geranium ocellatum*, Antipyretic activity, Anti-diarrheal activity, Castor oil.

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Introduction

Geranium ocellatum commonly known as black eyed geranium, belong to the family geraniaceae. Synonyms are Geranium bicolor, Geranium choorense. Black Eyed Geranium is a diffuse slender annual herb, which is velvety or hairy-glandular. It mainly found in the temperate and sub-tropical zones of the Himalayas at an elevation of 300-1,800 metres. Moist shady places at elevations of 900-2400 metres in Nepal. It grows at lower altitudes in the Himalayas. Leaves are nearly circular or kidney-shaped in outline, 0.8-5 cm broad, divided into up to 7 lobes. *Geranium ocellatum* have pink cup-shaped flowers, 1.2-1.5 cm broad, have a purplish black eye in the center. The species name *ocellatum* means, like a small eye. Sepals are glandular-hairy. Petals are inverted-egg shaped, twice as long as the sepals, pink with a dark base. Flowering usually during March-April. The plant is astringent and diuretic. The juice of the plant is used to treat amoebic dysentery. It mainly contain tannins.

Pyrexia or fever is caused as a secondary impact of infection, malignancy or other diseased states [1]. It is the body's natural function to create an environment where infectious agents or damaged tissues cannot survive. Normally, the infected or damaged tissue initiates the enhanced formation of proinflammatory mediators (cytokines, such as interleukin 1β, α, β and TNF-α), which increase the synthesis of prostaglandin E2 (PgE2) near hypothalamic area and thereby trigger the hypothalamus to elevate the body temperature [2]. When body temperature becomes high, the temperature regulatory system, which is governed by a nervous feedback mechanism, dilates the blood vessels and increases sweating to reduce the temperature. When the body temperature becomes low, hypothalamus protects the internal temperature by vasoconstriction. High fever often increases faster disease progression by increasing tissue catabolism, dehydration and existing complaints, as found in HIV [3]. Most of the antipyretic drugs inhibit COX-2 expression to reduce the elevated body temperature by inhibiting PGE2 biosynthesis [4]. These synthetic agents irreversibly inhibit COX-2 with a high selectivity and are toxic to the hepatic cells, glomeruli, cortex of brain and heart muscles. In majority of cases fever is associated with diarrhea

In developing countries, a majority of people living in rural areas almost exclusively use traditional medicine in treating all sorts of diseases including diarrhoea. Diarrhea is a major health problem especially for children under the age of 5 and up to 17% of children admitted in the pediatrics ward die of diarrhea. Worldwide distribution of diarrhea accounts for more than 5-8 million deaths each year in infants and children below 5 years old especially in developing countries [5]. According to WHO estimates for 1998, about 7.1 million deaths were caused by diarrhea [6]. The incidence of diarrheal diseases still remains high despite the efforts of many governments and international organizations to curb it. It is therefore important to identify and evaluate available natural drugs as alternatives to currently used anti-diarrheal drugs, which are not always free from adverse effects [7]. A range of medicinal plants with anti-diarrheal properties is widely used by traditional healers. However, the effectiveness of many of these anti-diarrheal traditional medicines has not been scientifically evaluated.

Materials and Methods

Dried leaves pulverized and macerated with water. The aqueous extract have been used for experimentation.

Toxicity Studies

The acute toxicity study was done as per the OECD guidelines (407). The compounds were administered orally in different doses, where 24 hrs. toxicity was recorded to identify the toxic does. The dose of the test compounds was then fixed on the basis of their acute toxicity as 200 mg/kg for evaluation.

Antipyretic Activity

Antipyretic activity was carried out according to the previously reported methods [8]. Briefly, pyrexia was induced in rats by injecting 20% (w/v) aqueous suspension of Brewer's yeast intramuscularly. After 18 h, the animals developed 0.5˚C or more rise in the rectal temperature (about 60% of the total number of animals injected). They were distributed into different groups of 5 each and to the test group extract was administered orally at a dose of 200 mg/kg. One group was administered with ASA (100 mg/kg) orally [9]. Control group was given 0.5 ml normal saline. At different time intervals, rectal temperature was noted. Percentage reduction in rectal temperature was calculated by considering the total fall in temperature to normal level as 100%.

Antidiarrheal Activity

Castor Oil Induced Diarrhea in Rats

Female Wistar rats weighing 210-230 g are used after overnight food deprivation. For the experiment, the rats are housed in individual cages with no access to drinking water. Animals are divided into different groups. The potential antidiarrheal extract administered orally by gavage at a dose of 200 mg/kg. Controls receive the solvent only. Each dose is given to 5 animals. One hour after dosage, 1 ml of castor oil is administered orally. Stools are collected on non-wetting paper sheets of uniform weight up to 24 hrs. after administration of the castor oil. Every 15 min during the first 8 h, urine is drained off by gravity and the net stool weight, termed early diarrheal excretion, is recorded.

The diarrhea-free period is defined as the time in minutes between castor oil administration and the occurrence of the first diarrheal output. The acute diarrheal phase is the time between the first and the last diarrheal output of the 8 hrs. observation period. Stools occurring between 8 and 24 hrs. after castor oil administration are called late diarrheal excretion [10,11].

Result and Discussion

Table 1- Effect of Geranium extract on Yeast induced pyrexia in rats

Groups	Rectal temperature		Time after administration		
	Initial	18 hr. after yeast injection	30 min.	60 min.	120 min.
Control	36.7± 0.036	37.9±0.022	37.8±0.010	38.15±0.17	39.45±0.03
Extract	37.6± 0.10	38.4±0.65	37.1±0.15*	36.78±0.52*	36.7±0.054*
Aspirin	37.5±0.18	38.19±0.04	36.8±0.028	36.8±0.042	36.26±0.062

Values expressed in Mean± SEM (n=5).
**p<0.05; when compared with control group*

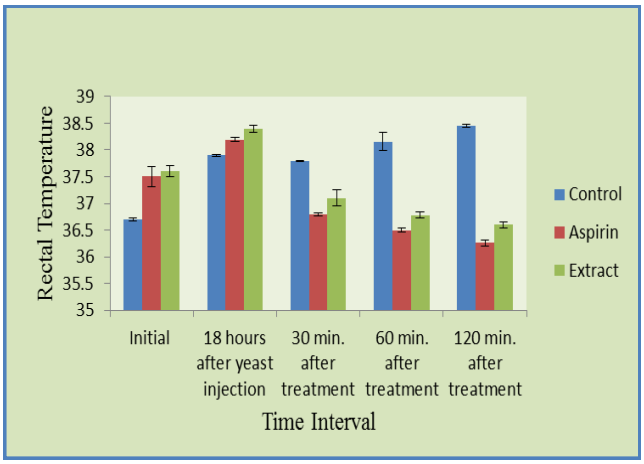

Fig. 1- Effect of *Geranium extract* on Yeast induced pyrexia in rats

The effect of extract on yeast induced pyrexia has been shown in [Table-1], [Fig-1]. *Geranium extract* at dose 200 mg/kg b.w produced a significant (P<0.05) decrease in yeast induced pyrexia as compared to the control group. Aspirin (100 mg/kg b.w.) also showed significant (P<0.001) decrease in the temperature.

Castor Oil Induced Diarrhea in Rats

In the castor oil-induced diarrhea experiment, the rats that did not receive the plant extract, showed typical diarrhea signs such as watery and frequent defecation. Whereas the extract treated group shows a marked anti-diarrheal effect in the rats. The dose of extract significantly decreased (p<0.05) the total number of wet faeces produced by administration of castor oil (5.24± 2.65 at the dose of 200 mg/kg) as compared to the castor oil-treated control group (24.80± 3.21). The percentage of inhibition of castor oil induced diarrhea in extract treated rats was 78.87 % at 200 mg/kg dose. The effect of Geranium extract was similar to that of the standard drug, loperamide (3 mg/kg) which produced an inhibition of 79.51% [Table-2]. The average weight of faeces in the control group was 7.58 g. Treatment with extract significantly reduced (p<0.05) the weight of faeces to 4.64 g [Table-2].

Table 2- Effect of Geranium extract on Castor oil induced diarrhea

Groups	Total no. of feaces	Number of diarrheal feaces	% inhibition	Total weight of feaces (in gm.)	% inhibition
Control	26. 32± 4.73	24.80± 3.21	0%	7. 58± 1.31	0%
Extract	16.23± 0.97	5.24± 2.65	78.87%	4.64 ± 1.42	38.78%
Loperamide	10.83 ± 0.92	5.07 ± 1.60	79.51%	1.73 ± 0.83	75.72%

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