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Scientific Research

Laxative Effect of *Eugenia jambolana* Crude Leaf Bud Extract

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ABSTRACT

The therapeutic value of Eugenia jambolana Lam. commonly known as 'Jamun' has been recognized in different system of traditional medication for the treatment of different diseases and ailments. It contains several phytoconstituents belonging to category of alkaloids, glucosides, flavonoides and volatile oils. It has been reported as digestive, astringent to the bowels, anthelmintic, sore throat, bronchitis, asthma, thirst, biliousness, dysentery, blood purifier, ulcers and diabetes. There are few reports available on clinical uses of Eugenia jambolana in diabetes that have shown promising results. In south India ayurvedic practitioners were using the leaf buds of Eugenia jambolana to induce laxative effect and to clean up the intestinal contents before starting any medication. The result showed that of E. jambolana stimulates the contractile action of frog and mice through an acetylcholine-like mechanism and effectively stimulates gastrointestinal motility in mice and frogs. In this paper we have discussed the laxative effect of Eugenia jambolana leaf bud extract which was never reported scientifically.

***Keywords*:** *Eugenia jambolana*, *Traditional Medicine*, *Laxative*

1. Introduction

Traditional or indigenous drugs used by different ethnic groups of the world for the treatment of diseases have special significance of having been tested on long time scale. They are relatively safe, easily available and affordable to masses. *Eugenia jambolana* Lam belonging to the family Myrtaceae is a large evergreen tree up to 30 m high. It is widely distributed through out India, and known as Jamun. It has been valued in Ayurveda and Unani system of medication for possessing variety of therapeutic properties. Most of the plant parts of *E. jambolana* are used in traditional system of medicine in India. According to Ayurveda, its bark is acrid, sweet, digestive, and astringent to the bowels, anthelmintic and in good for sore throat, bronchitis, asthma, thirst, biliousness, dysentery, blood impurities and to cure ulcers [1-8]. The fruits are acrid and sweet, cooling, dry and astringent to bowels. The seeds are sweet, astringent to bowels and good for diabetes. The sprouts are refrigerant, carminatives & astringent to bowels. Its bark, with or without the addition of other astringents like cardamom and cinnamon, is used as decoction in case of chronic diarrhoea and dysentery. Juice of the tender leaves of *E. jambolana* together with mango leaves and myrobalan is administered along with goat's milk and honey to cure dysentery with bloody discharge (Chakardata) where as juice of tender leaves alone or in combination with carminatives is given along with goat's milk to cure diarrhoea in children. Timbola *et al.*, isolated quercetin (0.0085%), myricetin (0.023%), myricitrin (0.009%), and a flavonol glycosides myricetin 3-O-(4"-acetyl)-α-L-rhamnopyranosides (0.059%) from its leaves. Traditional Ayurvedic practioners in tamil nadu used the *E. jambolana* leaf bud as purgative/laxative to clean up gastro intestinal tract before starting any other medication or treatment. Literature survey revealed that the plant extract has yet not been screened for its traditional laxative and purgative effects in experimental animals. Therefore the present study was carried out to provide pharmacological evidence for the folkore medicinal consideration of leaf bud crude extract as laxative.

2. Results

2.1. Effect of *E. jambolana* on Gastrointestinal Motility and Laxative Effect

The effect of *E. jambolana* on the gastrointestinal motil-

Table.1 Effect of E. jambolana on gastrointestinal motility and laxative effect in frogs.

S. No	Drug	Oral dose	Charcoal dose	% Length of charcoal moved
1.	Saline	1 mL	1 ml	15
2.	Dulcolax	1 mL	1 ml	83
3.	*E. jambolana* crude leaf bud extract	1 mg/mL	1 ml	78
4.	*E. jambolana* crude leaf bud extract	2 mg/mL	1 ml	82
5.	*E. jambolana* crude leaf bud extract	3 mg/mL	1 ml	89

Figure 1. Distance traveled by the charcoal in frog's gut.

ity tested on frogs as per the protocol motioned in materials and methods. The distance traveled by the charcoal plug from the pylorus to the caecum was measured, and expressed as the percent of the total length of the distance (**Figure 1**). The motility and laxative effect value presented in **Table 1**.

2.2. Laxative Activity of *E. jambolana* in Albino Mice

In albino mice the appearance of pasty stools was noted in the *E. jambolana* crude leaf bud extract treated and control mice. The statistical significance of the difference between the data of two groups was calculated and values are presented in **Table 2**.

2.3. Spasmogenic Effect in Isolated Frog Ileum

We performed a pharmacological evaluation of a herbal laxative of *E. jambolana*, which induced a large spas-

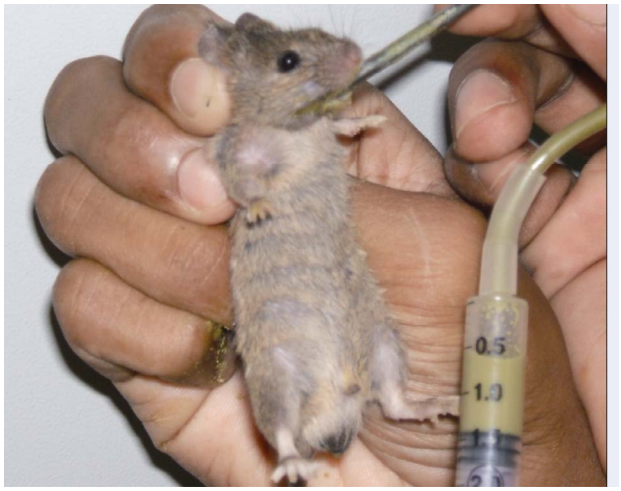

Table 2. Purgative activity of *E. jambolana* crude leaf bud extract in albino mice.

S. No	Drug	Oral dose	Appearance of pasty stool
1.	Saline	5 mL	112 min ± 6 min
2.	Caster oil	2 mL	37 ± 10 min
3.	*E. jambolana* crude leaf bud extract	1 gm/mL	60 ± 7 min
4.	*E. jambolana* crude leaf bud extract	2 gm/mL	59 ± 7min
5.	*E. jambolana* crude leaf bud extract	3 gm/mL	55 ± 8min

(n = 6 in each group).

mogenic effect that was more or less equal to acetylcholine in isolated frog ileum. Atropine inhibited the spasmogenic effect of of *E. jambolana* and Ach, suggesting that *E. jambolana* acts via a cholinergic mechanism

3. Discussion

The result shows that the distance travelled by the charcoal in *E. jambolana* treated frog's gut is dose dependent. Dulcolax and *E. jambolana* were having more or less equal laxative effect among the frog groups. In case of the albino mice the castor oil was very effective with respect to time taken to exert laxative effect. *E. jambolana* took only half of the time when compared with normal saline for the Appearance of pasty stool. This shows that *E. jambolana* was excerting very good laxative effect in albino mice. The contractile effect of of *E. jambolana* appears to be mediated through an acetylcholine-like mechanism. A neurotransmitter released by the parasympathetic nervous system, acetylcholine acts in the gut by stimulating M3 muscarinic receptor subtypes; atropine blocks all muscarinic receptor sites. Through this mechanism, acetylcholine plays an important physiological role in regulating the peristaltic movements of the gut. We observed that of *E. jambolana* exerted an effect similar to that of acetylcholine. In conclusion, our

data show that of *E. jambolana* stimulates the contractile action of frog and mice through an acetylcholine-like mechanism. We showed that of *E. jambolana* effectively stimulates gastrointestinal motility in mice and frogs. These data suggest that of *E. jambolana* is a valid, safe folk laxative.

4. Experimental

4.1. Materials and methods

E. jambolana leaf buds were collected from the local farms of vellore districts tamil nadu in the month of November-December-2009. The fresh leaf buds were weighed and ground using mortal and pistol, the crude extract adjusted to the final concentration of 100 mg/mL using sterial distilled water. This crude extract was used to test laxative effect in frogs, rats, as animal models. Acetylcholine per chlorate, atropine sulfate and gum tragacanth were purchased from Sigma Chemicals. Castor oil was purchased from local market. Commercially available dulcolax (bisacodyl) tablets used as standard drug for laxative effect.

4.2. Identify the Headings

We selected laxatives commonly used in India to compare with *E. jambolana*. The laxative Dulcolax was obtained from pharmaceutical shops. Dulcolax tablets were dissolved in sterial distilled water.

Frogs (150 g - 200 g) were purchased from local supplier. Mice were obtained from the Animal Breeding Laboratory. All animals were housed at the Animal biotechnology Laboratory of the University, and kept at 23˚C - 25˚C. Animals had free access to water and food. Frogs were sacrificed by standard methods. All the efforts were made to minimize animal suffering by guidelines of ani- mal laboratory of the University

4.3. Effect of *E. jambolana* on Gastrointestinal Motility and Laxative Effect

The effect of *E. jambolana* on the gastrointestinal motility was tested on frogs (four frogs per group). The animals were starved for 24 h prior to the experiment. The frogs were given orally with the *E. jambolana*, or dulcolax, or distilled water. The Laxative activities of *E. jambolana* were conducted on frogs by giving 1 mg/ml, 2 mg/ml, 3 mg/ml of *E. jambolana* leaf bud crude extracts through oral route. The standard or control groups were given with 1 mL of sterile distilled water. Positive control or dulcolax group were given with 10 mg/kg of body weight. At 5 min after drug administration, 1 mL of a 5% charcoal suspension in 10% aqueous solution of tragacanth powder was administered orally to each animal. The animals were killed 15 min later when the charcoal reached to 50% of distance from the pylorus to the caecum in control, to open the abdomens. The distance traveled by the charcoal plug from the pylorus to the caecum was measured, and expressed as the percent of the total length of the distance. The motility and laxative effect value presented in **Table 1**.

4.4. Laxative Activity of *E. jambolana* in Albino Mice

Albino mice fasted for 24 h were divided in groups of six animals each and were fed with different doses of the *E. jambolana* crude leaf bud extract or castor oil 0.2 mL/20g in the form of emulsion. They were then fed corn meal diet and time for the appearance of pasty stools was noted in the treated and control mice. The statistical significance of the difference between the data of two groups was calculated and values are presented in **Table 2**.

4.5. Spasmogenic Activity of *E. jambolana* in Isolated Tissue Preparations

The spasmogenic activities of *E. jambolana* were conducted using isolated frog ileum preparations. Segments of ileum 2 cm long were suspended in a 100 ml tissue bath containing Tyrode's solution, bubbled with a mixture of 95% O_2 and 5% CO_2, and maintained at 37˚C. Intestinal responses were recorded isotonically using Bio-Science transducers and an oscillograph. Each tissue was allowed to equilibrate for at least 10 min before the addition of *E. jambolana* (1 g/ml) or any drugs. The contractile effect of the test materials was assessed as a percentage of the maximum effects that were induced by acetylcholine (0.2 M, 0.06 g/ml). To see whether the contractile effect of *E. jambolana*

was mediated through acetylcholine-like mechanism, the tissue was pre-treated with atropine (0.1 M) and allowed to equilibrate for 15 min before the re-determination of the effect of *E. jambolana* or acetylcholine.

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