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### ANTI-DIARRHOEAL ACTIVITY OF ETHANOLIC LEAF EXTRACT OF *KEDROSTIS FOETIDISSIMA* IN MICE

Anjana Yogesh<sup>1</sup>, Latha M<sup>2</sup>, SaravanaBalaji MD<sup>3</sup>, Premlal KR<sup>4</sup>, Vinod Mony<sup>5</sup> and  
Sivaprakash V<sup>6\*</sup>

<sup>1</sup>Department of Periodontics, <sup>2</sup>Department of Oral Pathology, KGF College of Dental Sciences & Hospitals, BEML Nagar, Kolar Gold Fields, Kolar, Karnataka, India.

<sup>3</sup>Department of Periodontics, RVS Dental College & Hospital, Coimbatore, Tamilnadu, India.

<sup>4</sup>Division of Oral Pathology & Microbiology, Indira Gandhi Institute of Dental Science, Sri Balaji Vidyapeeth University, Puducherry, India.

<sup>5</sup>Division of Oral Pathology, PMS College of Dental Science & Research, Trivandrum, Kerala, India.

<sup>6</sup>Department of Pharmacology, Nandha College of Pharmacy, Erode, Tamilnadu, India.

#### ABSTRACT

Diarrhoea is a condition of having three or more loose or liquid stools per day. It is a common cause of death in Third World Countries and the second most known cause of children deaths worldwide. In many developing countries, a large proportion of the population relies on traditional practitioners and their armamentarium of medicinal plants in order to meet health care needs. The aim of the study is to evaluate the anti-diarrhoeal activity of ethanolic leaf extract of *Kedrostis foetidissima* against experimentally induced diarrhoea in laboratory animals. Swiss albino mice were used in faecal put model and castor oil induced diarrhoea models. For above two models, the animals were divided into 4 groups of six animals each. Group I served as control received CMC solution, Group II and III were administered with 200 and 400 mg/kg of ethanolic leaf extract of *Kedrostis foetidissima* respectively. Group IV served as reference control, received 5mg/kg of Loperamide. The result showed that, in measurement of faecal output there was significant decrease in faecal out was observed with *Kedrostis foetidissima* and in castor oil induced diarrhoea test, both the doses of *Kedrostis foetidissima* reduced the number of diarrhoealFrom the above it was concluded that, ethanolic leaf extract of *Kedrostis foetidissima* exhibited antidiarrhoeal activity in animal models.

**Keywords:** *Kedrostis foetidissima*, Anti-diarrhoea, Castor Oil and Appakovai.

#### INTRODUCTION

Diarrhoea accounts for more than 5-8 million deaths worldwide each year in age less than 5 years especially in developing countries. To combat this problem the world health organization has initiated a diarrhoea disease control program to study traditional medicine practices and other related aspects together with the evaluation of health education and prevention approaches. Plants have been a valuable source of natural product for maintaining human health for many years.

About 80% of individuals from developed countries receive traditional medicines including compounds derived from medicinal plants. Such medicinal plants can be exploited since it has been shown that they are important sources of new chemical substances with potential therapeutic effects [1]. *Kedrostis foetidissima* belongs to Cucurbitaceae which is worldwide distributed. In India the *Kedrostis foetidissima* is abundantly present in the warm and dry areas of Gujarat, Punjab, Uttarpradesh,

Maharashtra & Andhra Pradesh and it is also found in the Malabar, Deccan and Carnatic regions of India. Traditionally the leaf juice of *Kedrostis foetidissima*, locally named as *Appakovai*, applied externally on joints cures relieves pain in babies. It was also used in the treatment of diarrhoea and measles. Leaf infusion was taken in treating diarrhoea and leaf decoction was taken orally in the treatment of measles [2,3]. Kamatenesi (2011) suggested the roots of *Kedrostis foetidissima* (jacq.) cogn. crushed, mixed in cold water is taken once a day for the treatment of Measles [4]. The antibacterial activity of chloroform extract of leaf and stem of *Kedrostis foetidissima* against bacteria like *Streptococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Serratia marcescens* [5]. The Anti-proliferative effects of the methanolic extract of *kedrostis foetidissima* in breast cancer cell lines were documented [6]. Leaf and Stem Extract of *Kedrostis foetidissima* exhibited wound healing activity [7]. So far no scientific evidence available for its antidiarrhoeal potential, so effort has been taken to prove its traditional claim by screening the antidiarrhoeal activity of ethanolic leaf extract of *Kedrostis foetidissima* in mice.

## MATERIALS & METHODS

### Plant Material

#### Collection and Authentication

The leaves of *Kedrostis foetidissima* was collected from Kolli hills. It was identified and authenticated as *Kedrostis foetidissima* by Scientist 'F' Botanical survey of India, Southern Regional Centre, Tamilnadu Agriculture University, Coimbatore. The voucher specimen (BSI/SRC/5/23/2015/Tech/12439) has been deposited in department for further references.

#### Preparation of Extract

The collected leaves were, shade dried and then ground into coarse powder. The powder was then subjected to exhaustive extraction by a maceration process using 90% ethanol as a solvent at room temperature for 7 days. The ethanolic extract was concentrated by vacuum distillation to dry. The collected extract was stored in desiccators and used for further pharmacological study.

#### Animals

Male Swiss albino mice (20 – 25 gm) were used in the study. The animals were obtained from animal house, Nandha College of Pharmacy, Erode. The animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of  $24 \pm 2^\circ\text{C}$  and relative humidity of 30 – 70 %. A 12:12 light:day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed and approved by the Institutional Animal

Ethics Committee of Nandha College of Pharmacy (Reg No: 688 / PO/Re/S/02 / CPCSEA) and were in accordance with the guidelines of the CPCSEA.

### Anti-diarrheal Activity

#### Measurement of faecal output

Four groups of mice ( $n = 6$ ) were housed singly in separate cages. Group I served as the control and received 0.1% CMC (Carboxy Methyl Cellulose solution). Groups II & III mice were treated respectively with 200 & 400 mg/kg of extract, while group IV mice received Loperamide at 5 mg/kg, p.o., the standard anti-diarrhoeal drug. Following treatment, the faecal materials were collected for 8 h post treatment, were dried in an incubator and their weights measured. The percentage faecal output (%FOP) was calculated [8].

#### Castor oil model [9]

Overnight-fasted mice were randomly divided into four groups ( $n = 6$ ). Group I served as the control and received 0.1% CMC (Carboxy Methyl Cellulose solution; Groups II & III mice were treated respectively with 200 & 400 mg/kg of *Kedrostis foetidissima* extract, while group IV mice received Loperamide at 5 mg/kg, p.o., the standard anti-diarrhoeal drug. 1 h later, diarrhoea was induced in all groups by inoculating castor oil (0.5 ml/mouse, p.o.). The numbers of diarrhoeal episodes were recorded for each time and cumulative values were calculated for 4 h post induction of diarrhoea, and the numbers of animals devoid of diarrhoeal droppings at 4 h were considered as a percentage protection from diarrhoea.

### Statistical Analysis

Results were expressed as mean  $\pm$  SEM. The data were analyzed by using one way analysis of variance (ANOVA) followed by Dunnett's 't' test using GraphPad version 3. P values  $< 0.05$  were considered as significant.

## RESULTS

### Anti-diarrheal Activity

#### Measurement of faecal output

The anti-diarrhoeal activity of ethanolic leaf extract of *Kedrostis foetidissima* was studied using mice by faecal output method and the result was shown on table 1. Treatments of *Kedrostis foetidissima* leaf extract at 200 & 400 mg/kg, p.o. doses could reduce faecal production of the treated mice significantly in a dose-dependant manner. The faecal weight of control group was  $0.47 \pm 0.02$  g/100gm animal. The faecal weight of *Kedrostis foetidissima* leaf extract 200 and 400 mg/kg was  $0.29 \pm 0.01$  and  $0.39 \pm 0.02$  g/100gm animal respectively. The faecal output of the reference control loperamide was  $0.23 \pm 0.01$  g/100gm animal. The % reduction in faecal output was recorded to be 51.06 and 38.29 for the extract (200 & 400 mg/kg, respectively) and Loperamide it was 17.01 %.

**Table 1. The table shows the anti-diarrhoeal effect of ethanolic leaf extract of *Kedrostis foetidissima* on the measurement of faecal output in mice**

S.No	Drug Treatment	Faecal Weight (g)/100 gm Mouse	% Reduction
1	Control(0.1% CMC)	0.47 ± 0.02	-
2	<i>Kedrostis foetidissima</i> (200mg/kg)	0.29±0.01***	51.06
3	<i>Kedrostis foetidissima</i> (400mg/kg)	0.39±0.02*	38.29
4	Reference Control Loperamide (5mg/kg)	0.23 ±0.01**	17.01

Values are in mean ± SEM (n=6),

\*P<0.05 , \*\*P<0.01, \*\*\*P<0.001 Vs Control

#### Castor Oil Induced Diarrhoea Mice

The anti-diarrhoeal activity of ethanolic leaf extract of *Kedrostis foetidissima* was studied using mice by castor oil induced diarrhoea and the result was shown on table 2. Treatments of *Kedrostis foetidissima* leaf extract at 200 & 400 mg/kg, p.o. doses could reduce number of diarrhoeal episodes of the treated mice significantly in a dose-dependent manner. The number of

diarrhoeal episode of control group was 8.32± 0.03. The number of diarrhoeal episode of *Kedrostis foetidissima* leaf extract 200 and 400 mg/kg was 4.73± 0.02 and 3.56 ± 0.01 respectively. The number of diarrhoeal episode of the reference control loperamide was 1.95± 0.01. The % reduction in faecal output was recorded to be 43.15 % and 57.21 % for the extract (200 & 400 mg/kg, respectively) and Loperamide it was 76.56 %.

**Table 2. The table shows the anti-diarrhoeal effect of ethanolic leaf extract of *Kedrostis foetidissima* on castor oil induced diarrhoea mice.**

S.No	Drug Treatment	No of Diarrhoeal Episodes at 4 hrs	% Reduction
1	Control(0.1% CMC)	8.32±0.03	-
2	<i>Kedrostis foetidissima</i> (200mg/kg)	4.73±0.02**	43.15
3	<i>Kedrostis foetidissima</i> (400mg/kg)	3.56±0.01**	57.21
4	Reference Control Loperamide (5mg/kg)	1.95±0.01***	76.56

Values are in mean ± SEM (n=6),

\*P<0.05 , \*\*P<0.01, \*\*\*P<0.001 Vs Control

#### CONCLUSION

From the present research work, it is concluded that the ethanolic leaf extract of *Kedrositis foetidissima* selected for pharmacological screening with a special reference to anti-diarrhoeal activity. Traditionally the leaves of *Kedrositis foetidissima* was used to control diarrhoea. Literature review on *Kedrositis foetidissima*

reveals the plant possess antimicrobial, antitumor and wound healing activity. *Kedrositis foetidissima* leaf extract exhibited anti-diarrhoeal property in dose dependent manner in three different models. Further study has to be conducted by isolating the active principal responsible for anti-diarrhoeal property which may add a new herb anti-diarrhoeal agent.

#### REFERENCES

1. Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL, Jameson JL. Harrison's Principles of Internal Medicine. McGraw-Hill, New York, 2005, 189-197.
2. Ragupathy S. Malasars medicinal utility of the flora in the Velliangiri hills. *J Ethnobiol Ethnomed*, 2008.
3. Tabuti JRS, Lye KA, Dhillon SS. Traditional herbal drugs of Bulamogi, Uganda: plants, use and administration. *J Ethnopharmacol*, 88, 2003, 19-44.
4. Kamatenesi. Medicinal plants of Otwal and Ngai Sub Countries in Oyam District, Northern Uganda. *J Ethnobiol Ethnomed*, 7, 2011, 7-11.
5. Priyavardhini S, Shyamala Gowri S, Vasanth K, Umadevi M. Antibacterial activity of Stem and Leaf extracts of *Kedrostis foetidissima* (jacq.) cogn. *AnciSci Life*, 28(2), 2008, 10-11.
6. Choene M, Motadi LR. Anti-proliferative effects of the methanolic extract of *kedrostis foetidissima* in breast cancer cell lines. *Mol Biol*, 107, 2012, 1-5.
7. Amutha M, Lalitha P. Evaluation of Wound Healing Activity of Leaf and Stem Extract of *Kedrostis foetidissima* (Jacq.) Cogn. *Res J Pharm Biol Chem Sci*, 4(2), 2013, 445 – 449.
8. Akah PA. Purgative potentials of *Euphorbia heterophylla*. *Fitoterap*, 60, 1989, 45 – 48.
9. Longanga Otshudi A, Vercruyse A, Foriers A. (2000). Contribution to the ethnobotanical, phytochemical and pharmacological studies of traditionally used medicinal plant in the treatment of dysentery and diarrhea in Lomela area, Democratic Republic of Congo (DRC). *J Ethnopharmacol*, 71(3), 2000, 411-423.