

EVALUATION OF ANTI DIARRHEAL ACTIVITY OF STEM BARK OF *OROXYLUM INDICUM* ON EXPERIMENTAL ANIMALS

Anjali Garg\*, Vipin Kumar Gupta and Avnesh singh

Department of Pharmacy, Meerut Institute of Engineering and Technology, Meerut, Uttar Pradesh, India.



\*Corresponding Author: Anjali Garg

Department of Pharmacy, Meerut Institute of Engineering and Technology, Meerut, Uttar Pradesh, India.

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## ABSTRACT

**Aim:** The objective of this study was to assess the Anti-Diarrheal Activity of the stem bark of the *Oroxylum Indicum* plant in Wistar albino rats. **Method:** The animals for the test were starved for 24 hours before experiments but were allowed free access to water. The animals for the experiment were divided into a normal control group, standard control group, stembark extract control-1group, and stembark control-2group, containing five rats in every group.

The animals were treated as follows:

Group-I: Control (normal saline solution, orally).

Group II: Castor oil-induced diarrhoeal group(Castor-oil, orally)

Group-III: Standard treated(Loperamide 3mg/ kg, orally).

Group-IV: Diarrhea+Ethanolic extract of *Oroxylum Indicum* stem bark 250mg/kg, orally.

Group-V: Diarrhea+Ethanolic extract of *Oroxylum Indicum* stem bark 500mg/kg, orally.

Later 30minutes after the given above cure the diarrhea is produced through using oral administration of 0.2ml of castor oil to each rat.

Every rat is kept in the house in a separate cage, the floor of the cage is lined with blotting paper. Every hour changed the lining of the floor.

Observed continues for four hrs, at the time of observations time the no. of total fecal yield and the statistics of diarrhea feces are noted of the rats. **Results:** The administration of the 250 mg/kg dosage of stem bark of the *Oroxylum Indicum* plant significantly exhibits Anti-Diarrheal effects, when compared to the ethanol group.

**Conclusion:** The *Oroxylum Indicum* stem bark ethanolic extract showed anti-diarrhoeal action in the different models of diarrhoeal provisional rats. The *Oroxylum Indicum* stem bark ethanolic extracts suggestive reduction of the momentum of charcoal-meal by the abdominal and tool lower the occurrence of evacuation and feces stools. Likely the stem bark ethanolic extracts of *Oroxylum Indicum* prevent significantly PGE2-induced enter polling. Both stem bark ethanolic extracts of *Oroxylum Indicum* at the different dosages of 250mg/kg and 500mg/kg display unique pharmacological results besides diarrhea. Soon behalf of these observations and evaluations we can say that *Oroxylum Indicum* stem bark has anti-diarrhoeal action. It can be assumed that *Oroxylum Indicum* stem bark extract might be a possible spring for the new chief detection of the development of anti-diarrhoeal medicine.

**KEYWORDS:** Castor Oil, Enterpooling, And Gastrointestinal.

## 1. INTRODUCTION

Diarrhea is a common condition that is frequently seen in clinical practice. The strict definition of diarrhea is difficult due to individual differences in habits, but it is usually defined as frequent defecation more than 3 times a day, loose and unsanitary stools, or an abnormal increase in the total amount and water content of stool.<sup>[1]</sup>

Diarrhea can include gastrointestinal problems such as fever, abdominal pain, or vomiting. It is related to imbalances in controlling absorption and diarrhea associated with hypermotility leading to excessive loss of

body fluids and electrolytes in the feces and its causes are different. It is a leading cause of malnutrition and death among children in developing countries today.<sup>[2]</sup>

Diarrhea is a disorder of the gastrointestinal system regarded as bloating, frequent, high levels of fecal fluid matter, that is known as watery stools. The main reason for diarrhea is greater bowel movements, short absorption time, and a large volume of fluid in the delivery of the large intestine as well as full dimensions to absorb salts, electrolytes, and water. It can be

produced by any type of allergy, toxic substances, unhealthy foods, or poor hygiene.<sup>[3]</sup>

Diarrheal disease is the most important cause of illness and mortality disease throughout worldwide. Poor hygiene, mess, and bed food are the cause of approximately 88% of diarrheal-related deaths. Diarrhea is a serious global health problem which responsible for more than 5 to 8 million deaths in children under the age of 5 every year, especially in developing countries.<sup>[4]</sup>

Diarrhea is a continuous pass of loose, aqueous, and discolored feces. Water loss through diarrhea may lead to dehydration and imbalance of electrolytes and maybe die in the last.<sup>[5]</sup>

## 2. MATERIAL AND METHODS

### 2.1 MATERIAL

The plant *Oroxylum Indicum* is very common; this is found in almost every house of every village and also in cities but cities have less chances of finding the *Oroxylum Indicum* plant. *Oroxylum Indicum* plant is known and identified by every individual like from children to old age persons.

The *Oroxylum Indicum* stem bark was collected from a botanical garden in Meerut Uttar Pradesh (India).

### 2.2. EXPERIMENTAL ANIMALS

This experiment is done for the investigation and determination of the effect of ethanolic leaf extract on *Oroxylum Indicum* castor oil-induced diarrhea. The investigational procedures are permitted through the International Animal Ethical committee by reference no. of procedure IAEC/PH-/...../Dt. Wistar rats weighing 200g-250g of either sex are carefully chosen. Rats were starved for 24 hours before the experiment but allowed free access to water and were housed in polypropylene containers below ordinary circumstances of the life cycle of 12 hrs light/dark cycles and temp of 20°C ± 20°C, with seven days before the experimentations. Rats are

adjusted to research laboratory circumstances before experimentation examinations. Animals were randomly divided into five groups, each group consisting of 6 animals: (Group-1) Control (normal saline solution, orally), (Group-2) Castor oil induced diarrhoeal group, (Group-3) Diarrhoeal group treated with standard drug (Loperamide, 3 mg/kg, orally), (Group-4) Diarrhoeal group treated with *Oroxylum Indicum* stem bark extract (250mg/kg, orally) and (Group-5) Diarrhoeal group treated with *Oroxylum Indicum* stem bark extract (500mg/kg, orally).

### 2.3. Statistical Analysis

Statistics standards are expressed as MEAN ± SD. Arithmetical examination statistics is completed through ANOVA through subsequent Tuckey's test. p < 0.05 was measured as substantial.

## 3. RESULTS

### 3.1 PERCENTAGE YIELD OF ETHANOL EXTRACT OF STEM BARK

The stem bark of *Oroxylum Indicum* was collected and dried in shades, and then dried bark was powdered mechanically by grinder and mixture and passed through a sieve (sieve no. 40). After this about 300gm of bark, the powder was packed in Soxhlet apparatus and extracted with pure distilled water. Evaporate till the solvent come to a brownish-black color and collected in a disc. The calculated percentage yield of *Oroxylum Indicum* ethanolic extract was found 21.51%.

### 3.2 PHYTOCHEMICAL SCREENING OF ETHANOLIC EXTRACT OF STEM BARK

The crude sample of the plant was passed through preliminary phytochemical examination for the analysis and identification of various phytoconstituents. A study of preliminary phytochemical evaluation of *Oroxylum Indicum* stem bark ethanolic extract was performed as per various procedures and the following results were obtained.

S.No.	Phytochemical Constituents	Name Of Tests	Results
1.	Alkaloids	Mayer's test	Present
		Hager's test	Present
		Dragendorff's test	Present
2.	Carbohydrate and reducing sugar	Molisch's test	Present
		Benedict's test	Present
3.	Tannins	Ferric chloride test	Present
4.	Saponins	Froth test	Absent
5.	Glycosides	Modified Borntrager's Test	Present
		Legal test	Present
6.	Flavonoids	Alkaline reagent test	Present
7.	Protein and amino acid	Ninhydrin test	Present
8.	Terpenoids and steroids	Salkowski's test	Present

Phytochemical analysis of the ethanolic extract of *Oroxylum Indicum* showed the occurrence of various phytochemical elements like Alkaloids, Flavonoids, Carbohydrates and reducing Sugar, Glycosides, tannins,

Proteins, amino acids, and terpenoids Steroids were developed. In *Oroxylum Indicum* ethanolic extract phytochemical constituent Saponins were absent, and Saponins were not formed / present in ethanolic extracts.

### 3.3 PHARMACOLOGICAL INVESTIGATION OF ETHANOLIC EXTRACT OF *OROXYLUM INDICUM* STEM BARK

#### 3.3.1 Effect of *Oroxylum-Indicum* stem bark ethanolic extract on charcoal meal produces hyperperistalsis

Castor oil-induced diarrheal group shows a negligible increase in the mean extent of small-intestine by 0.83% as compared to the control group while treatment with 250 mg/kg and 500 mg/kg of ethanolic extract of *Oroxylum Indicum* significantly decrease the extent of small-intestine by 3.27% and 1.31% as compared to a diarrheal group. Further, the mean expanse moved with charcoal meal markedly elevated in the diarrheal group by 52.78% as compared to the control group which on

treatment with 250 mg/kg and 500 mg/kg of ethanolic extract of *Oroxylum Indicum* significantly decrease by 37.33% and 39.41% as compared to the diarrheal group.

Moreover, peristalsis index (%) also markedly elevated in the diarrheal group by 24.62% as compared to the control group which on treatment with 250 mg/kg and 500 mg/kg of ethanolic extract of *Oroxylum Indicum* significantly decrease by 29.54% and 33.70% as compared to the diarrheal group. On comparing both 250 mg/kg and 500mg/kg dosage treatment groups, a less significant extent of small-intestine, movement of charcoal meal and peristalsis index (%) was observed.

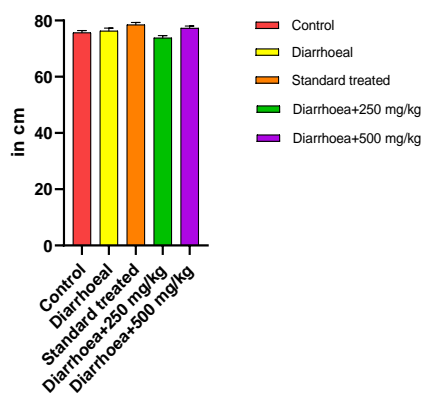
Groups	Mean extent of small-intestine(c.m.)	Mean expanse moved with charcoal(c.m.)	Peristalsis index (%)
Control group	75.67±0.76	53.3±0.84	65.07±0.83
Castor oil induced diarrhoeal group	76.3±0.99	81.7±0.76	86.33±0.45 <sup>a</sup>
Std. treated	78.5±0.77	42.8±0.68	48.89±0.73 <sup>b</sup>
Diarrhea+250mg/kg	73.8±0.81	51.2±0.94	60.82±0.77 <sup>b</sup>
Diarrhea +500mg/kg	77.3±0.73	49.5±0.72	57.23±0.84 <sup>b</sup>

Standards are represented as MEAN±SD, of n=6 per group. Where \*p<0.01 when associated to castor oil cured group.

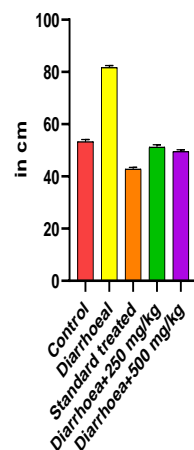
This revealed that stem bark ethanolic extract at a dosage of 250mg /kg slowed the flow of charcoal feed in rats associated with the control group. But the amount of 500 mg/kg of extracts from the bark of the stem does not express any substantial effect, it shows a delay in the flow of charcoal powder in animal experiments.

Based on the above observations, we can conclude that treatment with a low dose did not show a substantial effect but at a high dose showed their effect close to the normal effect and the results were statistically significant.

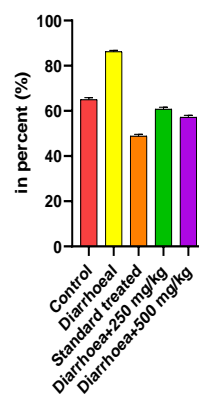
(a) Mean extent of small intestine



(b) Mean expanse moved with charcoal meal



(c) Peristaltic index



### 3.3.2 Effect of *Oroxylum Indicum* stem bark ethanolic extract on castor oil produce diarrhea

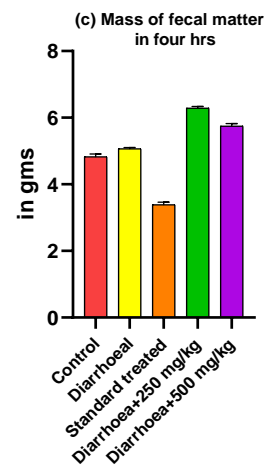
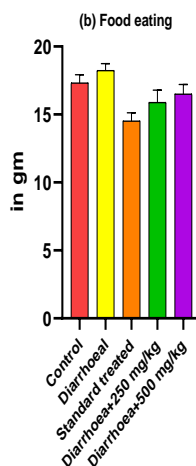
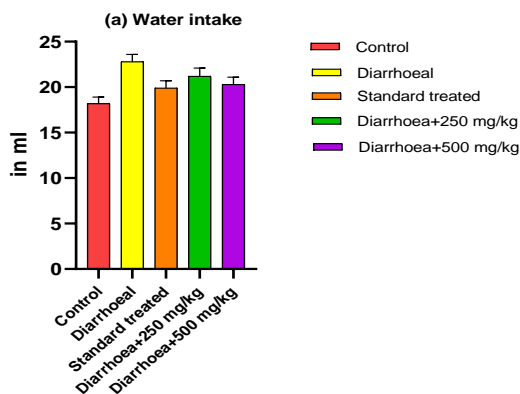
Castor oil-induced diarrheal group showed a substantial increase in aquatic intake, dietary intake, and mass of a fecal substance by 25.27%, 5.3%, and 4.97% compared to the control group while on treatment with 250 mg/kg and 500 mg/kg of ethanolic extract of *Oroxylum Indicum* significant decrease by 7% and 10.96% in

aquatic intake and 8.32% and 4.67% dietary intake was observed as compared to the diarrheal group. Furthermore, the main anti-diarrhoeal effect of *Oroxylum Indicum* extract on fecal matter discharge was found at a dose of 500 mg/kg was 24% more and at a dose of 250 mg/kg discharge 13.41% more than the diarrheal group and its lesser than in Loperamide cured rat.

Groups	Water-intake in ml	Food eating in gm	Mass of fecal matter discharge in four hrs in gm
Control group	18.2±0.7	17.32±0.6	4.83±0.08
Castor oil	22.8±0.8 <sup>a</sup>	18.238±0.5 <sup>a</sup>	5.07±0.03 <sup>a</sup>
Castor oil + Loperamide	19.9±0.8 <sup>c</sup>	14.53±0.6 <sup>c</sup>	3.39±0.07 <sup>c</sup>
Castor oil + 250 mg/kg	21.2±0.9 <sup>c</sup>	15.89±0.9 <sup>b</sup>	6.29±0.05 <sup>b</sup>
Castor oil + 500 mg/kg	20.3±0.8 <sup>c</sup>	16.51±0.7 <sup>c</sup>	5.75±0.07 <sup>c</sup>

Standards are represented as MEAN±SD, of n=6 per group, <sup>a</sup>p< 0.01vs control, <sup>b</sup>p< 0.05, <sup>c</sup>p< 0.01 while associated to castor-oil cured groups.

The *Oroxylum Indicum* stem bark ethanolic extract on the dosages of 250 mg/kg & 500 mg/kg, decrease the occurrence of excretion and to the whole mass of feces meaningfully.



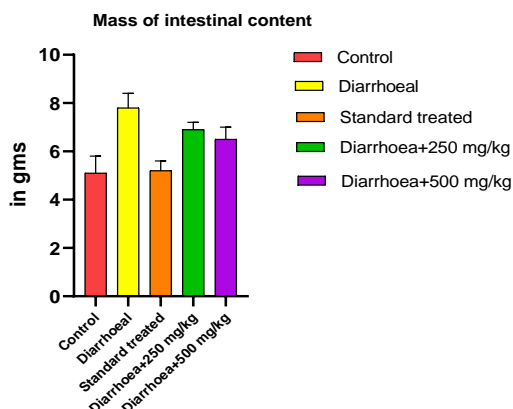
### 3.3.3 Effect of *Oroxylum indicum* stem bark ethanolic extract on castor oil enteropooling in rat.

Groups	Mass of intestinal content (g.m.)
Control group	5.1±0.7
Castoroil	7.8±0.6 <sup>a</sup>
Castor oil + Loperamide	5.2±0.4 <sup>c</sup>
Castor oil + 250mg/kg	6.9±0.3 <sup>c</sup>
Castoroil + 500mg/kg	6.5±0.5 <sup>c</sup>

Standards are represented as MEAN±SD, of n=6 per group, ap< 0.01 vs control, cp<0.01 when associated with castor-oil cured group.

*Oroxylum Indicum* ethanolic stem bark extract anti-diarrhea activity tested in castor oil enter pooling. Castor oil-treated rats showed a significant increase in intestinal content by 52.94% compared with a normal rat. *Oroxylum Indicum* at a dosage of 250mg/kg and 500mg/kg cured rats displayed a substantial decrease by 11.53% and 16.66% in intestinal content weight compared with rats treated with castor oil. The release of *Oroxylum Indicum* showed a dose-dependent anti-

diarrhea effect, 500 mg/kg presented a greater reply and was lesser than loperamide cured rat.



#### 4. DISCUSSION

Diarrhea has long been considered one of the most common well-being issues in growing nations. *Oroxylum Indicum* is an olden shrub by a great therapeutic assessment. The drug is effective in hepatotoxicity, hyperglycemia, and infectious diseases. It has also been shown to be very effective in wound curing due to the antioxidant countryside of its phytoconstituents.

The outcomes of the studies displayed that *Oroxylum Indicum* stem bark contains Alkaloids, Flavonoids, Saponins, Steroids, terpenoids, and additional nutrients. These phytoconstituents might counteract the old-style use of the stem bark of that plant to control the quantity of microbial and fungous poisons. tannins which are the main antibodies in diarrhea alter the proteins that make up the tannates that decrease the invasion of the abdominal mucosa which makes the gastrointestinal tract less sensitive and reduces irritation.

The study included an Ethanolic stem bark Extract Ercolid Disease Activity Test for *Oroxylum indicium* of the first castor oil that causes diarrhea in rats with loperamide as good control. The use of the diarrhea model caused by castor oil is due to the autocoids and prostaglandins elaborate as they contribute to the cause of diarrhea. Ricinoleic acid from castor-oil causes irascibility and swelling of the duodenal mucosa primary to the release of prostaglandin that stimulates motility and excretion. Rats treated with castor oil presented a substantial growth in aquatic, mass, and fecal substance intake associated with a usual rat. The ethanol stem bark extract of *Oroxylum Indicum* has shown a significant drop in water, and dietary fecal matter compared to rats treated with castor oil. This indicates that the extracted plant has an anti-diarrhoeal effect.

Significant prevention of the entry of castor oil into rats indicates that *Oroxylum Indicum* stem bark extract produces diarrhea with spasmolytic activity, a general mechanism to prevent the release of autocoid and prostaglandins this prevents the release of castor oil. The

limits detected in that model are the mass of the duodenal contents and the ratio of stomach content restriction. Rat cured with castor oil showed substantial growth in the content of colonic content associated with a normal rat. *Oroxylum Indicum* at a dosage of 250mg/kg and 500mg/kg cured rat displayed substantial reduction and mass of colonic content.

The Charcoal meal hyper peristasis model is used to examine *Oroxylum Indicum* anti-diarrhoeal action using the length of the small intestine, and the distance traveled through charcoal diet limits to calculate the peristalsis. Reducing bowel movements is one of the ways anti-diarrhoeal agents can do this. It was noted that *Oroxylum Indicum* severely restricted the processing of coal meal at all tested levels. These findings suggest that these extracts have the potential to influence peristaltic bowel movements thus representing the occurrence of anti-motility action.

Magnesium sulfate is an osmotic laxative. It causes diarrhea by endorsing the discharge of cholecystokinin from the intestinal mucosa which prevents the re-absorption of sodium chloride and aquatic into the lumen. Loperamide has anti-diarrhoeal action for both castor oil and magnesium-induced diarrhea. Limitations are aquatic and food eating and mass of fecal substance within four hrs. The outcomes displayed elevated aquatic drinking, diet, and mass of fecal material associated with a normal rat. *Oroxylum Indicum* at treatments of 250mg/kg and 500mg/kg presented a substantial reduction in aquatic, feed eating, and fecal matter mass compared with rat treated with magnesium sulfate. Fecal material weight in four hrs pointedly reduced to 500mg/kg associated with *Oroxylum Indicum* cure. Exit presented substantial anti-diarrhoeal action but is lower than ordinary loperamide cured rat. This indicates that *Oroxylum Indicum* is in effect in the cure and control of diarrhea.

The common medicine loperamide is one of the greatest effects and broadly used drugs. Loperamide was a mu opiate receptor-agonist that enhances local and colonic movement.

Time by increasing intestinal function, differentiating electrical action into the intestine, and slowing the passage of liquid through the ileum. The anti-diarrhoeal action of the shrub is associated with which conventional medicine. Loperamide decreases diarrhea caused by castor-oil, and prostaglandin efficiently. It too decelerates duodenal movement, colon flow rate, and colon motility. Decreased bowel movement is associated with impaired calcium ion penetration by digested calcium channels.

Loperamide is an artificial medication that is broadly used in the cure and control of diarrhea, and though comparatively safe in terms of dosage, life-threatening loperamide can cause a novel clinical trial of loperamide

poisoning. Other symptoms might be faintness, abdominal ache, uneasiness or swelling, nausea, dry mouth, and faintness. The shrub extracts of *Oroxylum Indicum* are similarly used in the cure of diarrhea as they may have fewer side effects than loperamide.

The present research work is hypothesized based on a literature survey. Other parts such as leaves and roots of *Oroxylum Indicum* show anti-diarrhoeal effects due to the presence of chemical constituents tannins, alkaloids, and other chemical constituents which are responsible for the anti-diarrhoeal activity. The study is conducted based on the chemical constituent 'Tannins' which are responsible for the anti-diarrhoeal activity. The phytochemical study of the *Oroxylum Indicum* bark finds evidence for the presence of chemical constituents like tannins, alkaloids, and other chemical constituents which are responsible for the anti-diarrhoeal activity. So we can say *Oroxylum Indicum* bark has anti-diarrhoeal properties. The stem bark of *Oroxylum Indicum* has bulkiness properties that are also responsible of anti-diarrhoeal potential.

## 5. CONCLUSION

The *Oroxylum Indicum* stem bark ethanolic extract showed anti-diarrhoeal action in the different models of diarrhoeal provisional rats. The *Oroxylum Indicum* stem bark ethanolic extracts suggestive reduction of the momentum of charcoal-meal by the abdominal and tool lower the occurrence of evacuation and feces stools.

Likely the stem bark ethanolic extracts of *Oroxylum Indicum* prevent significantly PGE2-induced enter polling. Both stem bark ethanolic extracts of *Oroxylum Indicum* at the different dosages of 250mg/kg and 500mg/kg display unique pharmacological results besides diarrhea.

Soon behalf of these observations and evaluations we can say that *Oroxylum Indicum* stem bark has anti-diarrhoeal action. It can be assumed that *Oroxylum Indicum* stem bark extract might be a possible spring for the new chief detection of the development of anti-diarrhoeal medicine.

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