



Review on Anti-Diarrhoeals

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Abstract

This review provides a practical, simple, and logical approach to the diagnosis and management of patients with acute infectious diarrhea, one of the most common diagnoses in clinical practice. Diarrhea in the immunocompromised host, traveler's diarrhea, most patients do not require specific therapy. Therapy should mainly be directed at preventing dehydration. Various home remedies frequently suffice in mild, self-limited diarrhea. However, in large-volume, dehydrating diarrhea, oral rehydration solutions should be used, as they are formulated to stimulate sodium and water absorption. Antidiarrheal agents can be useful in reducing the number of bowel movements and diminishing the magnitude of fluid loss. The most useful agents are opiate derivatives and bismuth subsalicylate. Antibiotic therapy is not required in most patients with acute diarrheal disorders.

Keywords

Antidiarrhoeals, Herbal medicine, Diarrhoea

INTRODUCTION:

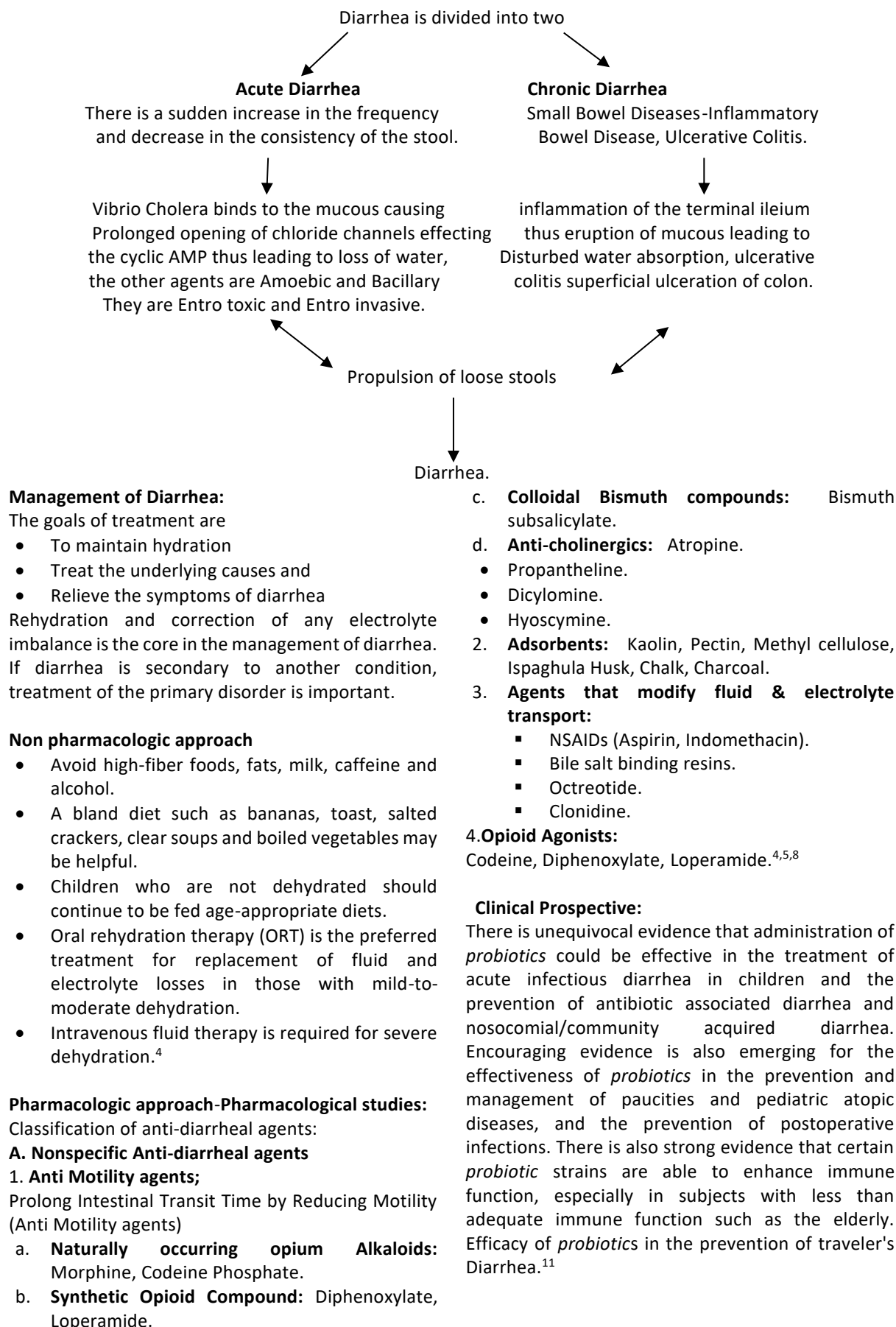
Diarrhea affects most individuals at some time during their lives. The occasional loose or watery stool is so common that few individuals seek medical advice, unless the diarrhea is persistent. Diarrhea is an increase in the volume of stool or frequency of defecation or frequent passage of abnormal watery stools. Diarrhoea is defined by the World Health Organization "As having 3 or more loose or liquid stools per day, or as having more stools than is normal for that person". It is one of the most common clinical signs of gastrointestinal disease, but also can reflect primary disorders outside of the digestive system. Certainly, disorders affecting either the small or large bowel can lead to diarrhea.^{1,2}

There are numerous causes of diarrhea, but in almost all cases, this disorder is a manifestation of one of the four basic mechanisms described below they are:¹

1. Osmotic Diarrhea.
2. Secretary Diarrhea.
3. Inflammatory and Infectious Diarrhea.
4. Diarrhea Associated with Deranged Motility.
5. Drug induced Diarrhea.
6. Bile salt diarrhea.¹⁻³

Pathophysiology:

Diarrhea mainly caused due to Bacterial, Viral, Amoebic attack mechanism given below:



Crofelemer Is Approved for Noninfectious Diarrhea in HIV-Infected Patients (Fulyzaq):

On December 31, 2012, the FDA announced the approval of crofelemer (Fulyzaq) to relieve symptoms of noninfectious diarrhea in HIV-infected patients taking antiretroviral therapy (ART). The recommended dose is one 125-mg delayed-release tablet taken orally twice daily. HIV enteropathy — damage the virus has done to the gastrointestinal tract, which can reverse very slowly or not at all. For such The FDA has approved crofelemer to relieve diarrhea in patients with HIV/AIDS who are undergoing antiretroviral therapy. Crofelemer is indicated to manage watery diarrhea caused by secretion of water and electrolytes in the gastrointestinal tract, provided the diarrhea is not caused by viral, bacterial, or parasitic infection. Dosage is twice daily.^{10,11,12}

The frequency of antibiotic-associated diarrhoea (AAD) and *Clostridium difficile*-associated diarrhoea (CdAD) was prospectively determined in a population of 2462 patients recruited. AAD developed in 4.9% of the treated patients. Faecal samples were obtained

from 69% of patients with AAD and 55.4% were positive for *C. difficile* cytotoxin B. The frequency of AAD varied from 1.8 to 6.9% at the participating centres ($P < 0.001$). Medical interventions (laxative treatment, endoscopy and abdominal surgery) or presence of one concomitant disease (diabetes, malignancy, chronic renal disease and inflammatory bowel disease) did not significantly affect the frequency of AAD, whereas patients suffering from two or more of these illnesses had significantly ($P = 0.001$) higher frequencies of AAD. Patients treated with antibiotics for 3 days had a significantly ($P = 0.009$) lower frequency of AAD than those treated for longer periods. Treatment with cephalosporins, clindamycin or broad-spectrum penicillins was associated with an increased risk of AAD. With specimens from one centre, 62.5% of tested patients with AAD and 33.8% of asymptomatic patients were positive for cytotoxin B. Although *C. difficile* cytotoxin B in stool samples was significantly associated with AAD ($P = 0.003$), the causal relationship with diarrhoea is not always evident.¹²

Medicinal plants with Antidiarrheal property:

Sno	Name	Family	Part	Model used	Animal Species	Dose	Route	Reference year	'P' Value	Reference year
1.	<i>Acorus Calamus</i>	Acoraceae	Whole plant	C.O.I.D	Mice	3mg, 7.5mg, 15 mg/kg		Shoba F et al. ¹³ (2001).	<0.001	Shoba F et al. ¹³ (2001).
2.	<i>Ludwigia hyssopifolia</i>	Onagraceae	Whole Plant	C.O.I.D, Serotonin I.D	Mice	1ml/kg 10-400mg /k	P.O	Shaphiullah M et al. ¹⁴ (2003).	<0.001	Shaphiullah M et al. ¹⁴ (2003).
3.	<i>Mangifera indica</i>	Anacardiaceae	Seeds	C.O.I.D, MgSO ₄ I.D	Mice	250mg /kg	P.O	Sairam K et al. ¹⁵ (2003).	<0.05	Sairam K et al. ¹⁵ (2003).
4.	<i>Rhus Javanica</i>	Meliaceae	Fruit	C.O.I.D, C.O.I.E.P,	Mice	100, 200, 400mg/kg	P.O	Arun K .Yadav et al. ¹⁶ (2004).	<0.05	Arun K .Yadav et al. ¹⁶ (2004).
5.	<i>Galla Chinensis</i>	Chinensis	Whole plant	Anti L.T	Mouse	4.7-1.3ml/kg	P.O	Jaw-Chyun Chen et al. ¹⁷ (2005).	<0.05 <0.01	Jaw-Chyun Chen et al. ¹⁷ (2005).
6.	<i>Xylocarpus moluccensis</i>	Combeteraceae	Fruit Pulp	C.O.I.D	Mice	200mg /kg	P.O	Uddin SJ et al. ¹⁸ (2005).	<0.01	Uddin SJ et al. ¹⁸ (2005).
7.	<i>Asparagus</i>	Liliaceae	Root	C.O.I.D, Charcoal meal	Mice	150, 200, 250mg/kg	P.O	Venkatesan N et al. ¹⁹ (2005).	<0.001	Venkatesan N et al. ¹⁹ (2005).

	<i>Recemosus</i>			test PGE2 E.P C.O.I.D, PGE2 induced EP.						
8.	<i>Butea Monosperma</i>	Fabeaceae	Stem bark		Rat WA	200,400mg/kg	P.O	Gunakkunru A. et al. ²⁰ (2005).	<0.05	Gunakkunru A. et al. ²⁰ (2005).
9.	<i>Guiera Senagelensis</i>	Combeteraceae	Roots	C.O.I.E.P	Rats, Mice	100,200mg/kg	P.O	Aniagu S.O et al. ²¹ (2005).	<0.05	Aniagu S.O et al. ²¹ (2005).
10	<i>Acacia Ctacheu</i>	Fabeaceae	Whole plant	C.O.I.D	Mice	250mg/kg	P.O	Ray .D et al. ²² (2006)	<0.001	Ray .D et al. ²² (2006)
11.	<i>St.Jhons Wort</i>	Hypericum Perforatum	Whole plant	Irinotican(CPT-II) Induced D	Rats	400mg/kg	P.O	Huze Peng et al. (2006). ²³	Modify the pro inflammatory cytokine	Huze Peng et al. (2006). ²³
12.	<i>Azardira cta Indica Swienten</i>	Meliaceae	Leaf	C.O.I.D	Mice	100.200,300mg/kg	P.O	Thakurta P et al. ²⁴ (2007).	<0.001	Thakurta P et al. ²⁴ (2007).
13.	<i>Macrophylla King</i>	Meliaceae	Seed	C.O.I.D, C.O.I.E.P,	W.A Rats	25,50,100mg/kg	P.O	Anup Maiti et al. ²⁵ (2007).	<0.01 <0.05	Anup Maiti et al. ²⁵ (2007).
14.	<i>Uthocarpus Delbata</i>	Fagaceae	Leaf	C.O.I.D, PGE2.I.E.P	W.A Mice	800mg/kg	P.O	Arun K .Yadav et al. ²⁶ (2007).	<0.001	Arun K .Yadav et al. ²⁶ (2007).
15.	<i>Punica Grantum</i>	Puniaceae	Peels	C.O.I.D,	A.Rats	100,200.300,400 mg/kg	P.O	E.Y.Qnais et al. ²⁷ (2007).	<0.05	E.Y.Qnais et al. ²⁷ (2007).
16.	<i>Lystea Polyantha</i>	Lauraceae	Dried Bark, Aerial parts	C.O.I.D, Charcoal meal test	Rats	50,75,100mg/kg	P.O	Poonia B.S et al. ²⁸ (2007).	<0.01 <0.001	Poonia B.S et al. ²⁸ (2007).
17.	<i>Combete rum Sericium Momoridica</i>	Seraceae	Roots	C.O.I.D, G.I.M.T	Rats	250,500mg/kg	P.O	Sini,JM et al. ²⁹ (2008)	<0.05	Sini,JM et al. ²⁹ (2008)
18.	<i>Balsamia & Stachytrapheta Indica. Morinda</i>	Rubiaceae	Leaves	C.O.I.D Jejenum	W.A Rats, Rabbits	0.1,0.25 gm/kg 0.4,0.8, 1.6 mg/ml.	I.P	Otimenyin O.Sunday et al. ³⁰ (2008).	<0.05	Otimenyin O.Sunday et al. ³⁰ (2008).
19.	<i>Morindoides</i>	Rubiaceae	Leaves	C.O.I.D	W.A Rats	500-100 mg/kg	P.O	S Meite et al. ³¹ (2009)	<0.01	S Meite et al. ³¹ (2009)
20.	<i>Blighia Sapdia</i>	Sapinadaceae	Stem Bark	C.O.I.D,	Rats, Mice	265,350mg/kg	P.O	S.Antwi et al. ³²	<0.05	S.Antwi et al. ³² (2009).

				C.O.I.E. P, G.I.M.T				(2009).		
21.	<i>Mitragyna Diversifolia</i>	Rubiaceae	Plant	C.O.I.D, G.I.M.T	Rats	250mg /kg	P.O	Jebunnissa et al. ³³ (2009).	<0.00 1	Jebunnissa et al. ³³ (2009).
22.	<i>Amaranthus Spinosa</i>	Amaranthaceae	Whole plant	C.O.I.D, C.O.I.E. P, G.I.pro pulsion model	mice	100,20 0,400mg g/kg	P.O	Hussain.Z et al. ³⁴ (2009).	<0.00 1	Hussain.Z et al. ³⁴ (2009).
23.	<i>Haloptelea Integrifolia</i>	Utricaceae	Leaves	C.O.I.D, MgSo4 I.D	Mice	200,25 0mg/kg	P.O	Shirinivas S et al. ³⁵ (2009).	<0.05	Shirinivas S et al. ³⁵ (2009).
24.	<i>Cynodon Dactylon</i>	Poaceae	Whole Plant	C.O.I.D, C.O.I.E. P, Charco al MT	WA Rats	200,30 0mg/kg	P.O	Babu Ravinder et al. ³⁶ (2009).	<0.00 1	Babu Ravinder et al. ³⁶ (2009).
25.	<i>Sphaeranthus Amaranthoides</i>		Pant	C.O.I.D	Rats	200,40 0mg/kg	P.O	Lata L.S et al. ³⁷ (2009)	<0.01	Lata L.S et al. ³⁷ (2009)
26.	<i>Terminalia Belericia</i>	Combeteraceae	Fruit Pulp	C.O.I.D	Rats	200mg /kg	P.O	Bimlesh K et al. ³⁸ (2010).	<0.01	Bimlesh K et al. ³⁸ (2010).
27.	<i>Erythrina Senegalensis</i>	Fabeaceae	Bark	C.O.I.D in jejunu m	Rats, Rabbi ts	250mg /kg 1000m g/kg	I.P	Otimenyin S.O et al. ³⁹ (2010).	<0.05	Otimenyin S.O et al. ³⁹ (2010).
28.	<i>Chochlosperum Planchonii</i>	Bixaceae	Whole Plant	C.O.I.E. P Charco al Plug Transit time	Rats WA	2500.5 00mg/ kg	P.O	Ezeja M.I et al. ⁴⁰ (2010)	<0.05	Ezeja M.I et al. ⁴⁰ (2010)
29.	<i>Dodonaea Viscosa</i>	Spadiaceae	Roots	C.O.I.D		100,20 0,400 mg/kg	P.O	Rajamanickam V et al. ⁴⁴ (2010).	<0.00 1	Rajamanickam V et al. ⁴⁴ (2010).
30.	<i>Monodora tenuifolia</i>	Annonaceae	Seeds	C.O.I.D, Charco al meal test	Rat Mice	100,20 0,400mg g/kg	I.P	Ezenwali M.O.et al. ⁴¹ (2010)	<0.05	Ezenwali M.O.et al. ⁴¹ (2010)
31.	<i>Loxara Coccinea Linn</i>	Rubeaceae	Flowers	C.O.I.D	W.A Rats	100,20 0,400mg g/kg	I.P	Yasmeen Maniyar et al. ⁴³ (2010)	<0.01 <0.00 1	Yasmeen Maniyar et al. ⁴³ (2010)
32.	<i>Dalbergia Sissoo</i>		Bark	C.O.I.D C.O.I.I. T	Albin o Swiss Rats	200- 400mg /kg	Oral	Kalaskar et al. ⁴⁴ (2010)	<0.01 <0.05	Kalaskar et al. ⁴⁴ (2010)

33.	<i>Crateva Nurvala</i>	Capparidaceae	Root Bark	C.O.I.E.P	W.A. Rats	500mg/kg	I.P	Otimenyin et al. ³⁹ (2010)	<0.001	Otimenyin et al. ³⁹ (2010)
34.	<i>Kegelia Africana</i>	Lam	Plant	C.O.I.D in jejunum	Rats, Rabbits	250mg/kg 1000mg/kg	I.P	Otimenyin et al. ³⁹ (2010)	<0.05	Otimenyin et al. ³⁹ (2010)
35.	<i>Clitoria Ternate</i>	Fabeaceae	Root	C.O.I.D, EP	Rat	100,20 0,400mg/kg		Upwar N et al. ⁴⁵ (2010).	<0.05	Upwar N et al. ⁴⁵ (2010).
36.	<i>Calitropis Gigantea</i>	Asclepiadaceae	Aerial Parts	C.O.I.D, C.O.I.E.P	Mice	100,20 0,400mg/kg	I.P	Chitme H.R et al. ⁴⁶ (2010).	<0.001	Chitme H.R et al. ⁴⁶ (2010).
37.	<i>Crateva Nurvala</i>	Capparidaceae	Stem Bark	C.O.I.D, C.O.I.E.P	Mice	500mg/kg	I.P	Inayatullah et al. ⁴⁷ (2010)	<0.001	Inayatullah et al. ⁴⁷ (2010)
38.	<i>Moringa Oleifera</i>	Moringaceae	Root	C.O.I.D, C.O.I.E.P	Rats	100.20 0,400mg/kg	I.P	Sarlaya M.G et al. ⁴⁸ (2010).	<0.01 <0.001	Sarlaya M.G et al. ⁴⁸ (2010).
39.	<i>Rubia Tinctorum</i>	Rubiaceae	Roots	C.O.I.D	Mice	200mg/kg	P.O	Sarlaya A et al. ⁴⁸ (2010).	<0.01	Sarlaya A et al. ⁴⁸ (2010).
40.	<i>Dichrostema Chyscinerea</i>	Mimosaceae	Bark & Root	C.O.I.D, Small intestinal T.T	Rats WA	200,400mg/kg	P.O	Jayakumari S et al. ⁵⁶ (2011)	<0.05	Jayakumari S et al. ⁵⁶ (2011)
41.	<i>Delonix Regia</i>	Fabeaceae	Flowers	C.O.I.D, PGE2 Induced E.P	Rats WA	100,25 0,500mg/kg	P.O	Shiramane R.S et al. ⁵⁷ (2011)	<0.05	Shiramane R.S et al. ⁵⁷ (2011)
42.	<i>Vincetoxicum Stocksi</i>	Asclepiadaceae	Plant	C.O.I.D	W.A Rats	300mg/kg, 1000mg/kg	Oral	Jebunnessa et al. ³³ (2011)	<0.05	Jebunnessa et al. ³³ (2011)
43.	<i>Cicer Arietum</i>	Leguminales	Root	C.O.I.D,	Mice	200,400mg/kg	P.O	Dalal K et al. ⁵⁰ (2011).	<0.05	Dalal K et al. ⁵⁰ (2011).
44.	<i>Musa Sapientum</i>	Musaceae	Fruit	C.O.I.D, MgSO4 .I.D, G.I.M.T	Mice	100,200mg/kg	P.O	Hossain M.S et al. ⁵¹ (2011).	<0.001	Hossain M.S et al. ⁵¹ (2011).
45.	<i>Eugenia Jambolana</i>	Myrtaceae	Bark	C.O.I.D, PGE2 Induced E.P	Rats WA	400mg/kg	P.O	Mukherjee P et al. ⁵² (2011).	<0.05	Mukherjee P et al. ⁵² (2011).
46.	<i>Ficus Bengalensis</i>	Moraceae	Roots	C.O.I.D, PGE2 Induced E.P	Rats WA	400mg/kg	P.O	Mukherjee P et al. ⁵² (2011).	<0.05	Mukherjee P et al. ⁵² (2011).
47.	<i>Ficus Recemosa</i>	Moraceae	Bark	C.O.I.D, PGE2 Induced E.P	Rats WA	400mg/kg	P.O	Mukherjee P et al. ⁵² (2011).	<0.05	Mukherjee P et al. ⁵² (2011).

48.	<i>Lucas lavendulae Folia</i>	Labiatae	Aerial Parts	C.O.I.D, G.I.M .T, PGE2 I.D	Rats	400mg /kg	P.O	Mukherjee P et al. ⁵² (2011).	<0.001	Mukherjee P et al. ⁵² (2011).
49.	<i>Erythrina Indica</i>	Fabeaceae	Leave	C.O.I.D, PGE2 Induced E.P	Rats WA	500mg /kg	P.O	Kamalraj R et al. ⁵³ (2011).	<0.01 =5mg /kg	Kamalraj R et al. ⁵³ (2011).
50.	<i>Phyllanthus Embellica</i>	Euphorbeaceae	Crude extract	C.O.I.D, C.O.I.E.P, Isolated jejenum	Rat, Rabbit, Pig	100mg /kg, 250-500mg /kg, 500-700mg /kg	I.P	Mehmood M.H et al. ⁵⁴ (2011)	<0.01 <0.001 <0.05	Mehmood M.H et al. ⁵⁴ (2011)
51.	<i>Psidium Guvava</i>	Psidaceae	Leaves	C.O.I.D, C.O.I.E.P	Rats Mice	50,100. 200400 mg/kg	P.O	Ojewole et.al Jan 2011	<0.05	Ojewole et.al Jan 2011
52.	<i>Xylocarpus Grantum Koenig Cayratia Pedata Lam</i>	Meliaceae	Fruit	C.O.I.D	W.A Rats	200,250,500 mg/kg	P.O	Khadem Ali et al. ⁶⁵ (2011).	<0.001	Khadem Ali et al. ⁶⁵ (2011).
53.			Plant	C.O.I.D MgSO4 I.D	W.A Rats	200 mg/kg	P.O	Kartik et.al 69-75 2011.	<0.05	Kartik et.al 69-75 2011.
54.	<i>Rumex Vesicarius</i>	Linn	Seeds	C.O.I.D	A.W Rats	3mg/kg, 200-400mg /kg	I.P P.O	A.Zecariah et al. ⁵⁵ (2011).	<0.001	A.Zecariah et al. ⁵⁵ (2011).
55.	<i>Ficus Glomerata</i>	Liliaceae	Leavea	C.O.I.D	A.W Rats	3mg/kg	I.P	Pampatiwar et al. ⁵⁹ (2011)	<0.001	Pampatiwar et al. ⁵⁹ (2011)
56.	<i>Bombax Bunopozense</i>	Bombaceae	Leave	C.O.I.D, EP	Rat	100,200,400mg /kg	P.O	G.C Akudor et al. ⁶⁰ (2011).	<0.05	G.C Akudor et al. ⁶⁰ (2011).
57.	<i>Fenugreek</i>	Rubeaceae	Seed	C.O.I.D, PGE2 I.E.P	W.A Rats	100,200,400mg /kg	I.P	MS.Shree Devi et al. ⁵⁸ (2012).	<0.01 <0.001	MS.Shree Devi et al. ⁵⁸ (2012).
58.	<i>PedaliuM Murex</i>	Liliaceae	leave	C.O.I.D	W.A Rats	250,500 mg/kg	P.O	R.Ravikumar et al. ⁶² (2012)	<0.01	R.Ravikumar et al. ⁶² (2012)
24.	<i>Solanum Pubesens Wild & GymnosporiaE Piper Guinea Schum& Thom</i>	Solanaceae Celasteraceae.	Leaves	C.O.I.D	W.A Rats	300 mg/kg	I.P	Anurag Bhargav et al. ⁶³ (2012).	<0.001	Anurag Bhargav et al. ⁶³ (2012).
25.		Piperaceae	Leaf	C.O.I.D, G.I.T.C.M.T	W.A Rats	250,500mg/kg	P.O	Ogu GI et al. ⁶⁴ (2012)	<0.05	Ogu GI et al. ⁶⁴ (2012)

26.	<i>Typhonium trilobatum</i>	Lieaceae	Leaf	C.O.I.D	Mice	250,500mg/kg	I.P	Khadem Ali et al. ⁶⁵ (2012).	<0.05 <0.001	Khadem Ali et al. ⁶⁵ (2012).
27.	<i>Rotula Aquatica</i>	Borogonaceae	Roots	C.O.I.D C.M.T PGE2.I.E.P	A.W Rats	200mg/kg 100mg/kg 100ug/kg	P.O	Sunder Singh et al. ⁶⁶ (2012).	<0.001 <0.001 <0.001	Sunder Singh et al. ⁶⁶ (2012).
28.	<i>Murruya Koenigii</i>		Leaves	C.O.I.D C.M.T PGE2.I.E.P	A.W Rats	200mg/kg 100,200ug/kg	P.O	Praveen Sharma et al. ⁶⁷ (2012).	<0.05	Praveen Sharma et al. ⁶⁷ (2012).
66.	<i>Gymnosporia Amenginata Andrographis Paniculata Nees</i>	Celateraceae	Leaves	C.O.I.D	Male A Rats	300mg/kg	I.P	S.Antwi et al. ³² (2012)	<0.001	S.Antwi et al. ³² (2012)
67.		Antheraceae	Leaves	C.O.I.D, C.O.I.E.P	W.A Rats	100,200,250mg/kg	P.O	Enzawali et al. ⁴¹ (2012).	<0.05	Enzawali et al. ⁴¹ (2012).

W. A= Wistar Albino, C.O.I.D= Castor oil induced Diarrhea, C.O.I.E.P= Castor oil induced Entero pooling, MgSO4.I.D= Magnesium Sulphate induced Diarrhea, G.I.M.T= Gastro intestinal Motility Test, C.M.T= Charcoal Meal Test.

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