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A Review on Phytochemistry and Pharmacology of Medicinal Plant Having Antidiarrheal Activity



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ABSTRACT

Diarrhea is the one of the most important health problem, leading cause of mortality and morbidity in the developing countries, affecting mostly the children and infants. In marketed medicines are available to treat diarrhea like loperamide, bismuth but various side effect attributed to these synthetic drugs have stimulated a rapid and continuous growth of interest towards the use of herbal medicine for the treatment of diarrhea. The aim of this review is to delineate various plant used for treatment of diarrhea with their phytochemical properties and efficacy of these plant.



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INTRODUCTION

Diarrhea is the frequent and profuse discharge of intestinal content in loose and fluid form. It may be acute or chronic. In diarrhea, the fluid is not absorbed sufficiently, resulting in watery bowel discharge. The cause of acute diarrhea may be temporary problem like infection and the chronic diarrhea may be due to disorders of intestinal mucosa.^[1]

Diarrhea is a very common problem in childhood. Usually, it's mild and brief. It can be occurred especially in infants. Diarrhea is release of three or more loose stools. It is characterized by increased gastrointestinal motility and secretion and a decrease in the absorption of fluid and electrolytes. Based on the duration, diarrhea is classified into 3 types: Acute diarrhea (duration < 2 weeks), Persistent diarrhea (duration from 2 to 4 weeks), and Chronic diarrhea (duration of more than 4 weeks). Acute diarrhea is mainly caused by enteric pathogens including viruses, bacteria, and parasites whereas most cases of chronic diarrhea result from functional or inflammatory bowel disorders, malabsorption syndromes, and drugs. Pathogenic agents, such as Cryptosporidium, Giardia lamblia, and enteropathogenic bacteria, are thought to be the cause of persistent diarrhea.

Signs of Diarrhea

Diarrhea refers to watery stools, but it may be accompanied by other symptoms. These include:

- Stomach pain
- Abdominal cramps
- Bloating
- Weight loss
- Fever
- Body aches
- Chills

Diarrhea is also a symptom of other conditions, some of which can be serious. Other possible symptoms are:

- Blood or pus in the stool
- Persistent vomiting
- Dehydration

If any of these accompany diarrhea, or if the diarrhea is chronic, it may indicate a more serious illness.

Dehydration: Dehydration is a loss of body fluids, which are made up of water and salts. When sick children vomit or have diarrhea, they can lose large amounts of salts and water from their bodies, and can become dehydrated very quickly. Dehydration can be very dangerous, especially for babies and toddlers. Children can even die if they are not treated.

Dehydration is not always related to an underlying condition; it may be caused by:

- Vomiting & diarrhea
- Drug that increases urine excretion (diuretics)
- Excessive sweating particularly with prolonged exertion
- Decreased water intake
- Burns
- Heat

Signs of Dehydration:

- Decreased urination (less than four wet diapers in 24 h)
- No tears
- Dry skin, mouth and tongue
- Sunken eyes
- Grayish skin
- Sunken soft spot (fontanel) on infant's head

Healthy children can spit up, vomit or have a loose stool once in a while without being in danger of dehydrating.

The use of herbal drug in the treatment of diarrhea is a common practice in many countries. These plants, which abound in the environment. In view of this, there is a need to search for plant with antidiarrheal properties and adequately document them, some plants are introduced below in this review having antibacterial properties.

Table No.1: Some plants having antibacterial, anti-diarrheal activity.

Sr. No.	Name	Scientific Name	Family
1.	Sweet yellow bells	<i>Hermannia inacana cav.</i>	Sterculiaceae
2.	Tejpatta	<i>Cinnamomum tamata</i>	Lauraceae
3.	Banhinia acuminata	<i>Banhinia acuminata</i>	Fabaceae
4.	Bael	<i>Aegle marmelos</i>	Rutaceae
5.	Guava	<i>Psidium guajava L.</i>	Myrtaceae
6.	Astragalus	<i>Astragalus membranaceae</i>	Fabaceae
7.	Piper mint	<i>Mentha piperita</i>	Lamiaceae
8.	Moringa	<i>Moringa oleifera</i>	Moringaceae
9.	Pongamia pinnata	<i>Millettia pinnata</i>	Fabaceae
10.	Bahera	<i>Terminallia ballirica</i>	Combretaceae

1. *Hermannia incana* cav.(sterculiaceae)-



Hermannia incana

Hermannia incana cav. swterculiaceae is known as mavulakuvaliwe and sweet yellow bells. It is a sparsely hairy prostrate herb with yellow flowers. It is found in grassland and marshes of the Eastern Cape province of south Africa.

H. incana is used to treat stomach – ache and diarrhea. Atropine sulphate produces anticholinergic effect evaluation of intestinal transit time (Juliane *et al.*, 2014) while the activated charcoal is help to inhibit the absorption of drugs and other chemicals into the body.

The antidiarrheal activity of *H. incana* leaves are effective against diarrhea because presence of this phytoconstituent tannins, flavonoids, alkaloids and saponins in the aqueous extract.

2. *Cinnamomum tamala* -



***Cinnamomum tamala* Leaves**

Cinnamomum tamala (Buch-Ham.) is a large evergreen tree mostly used for spice and commonly used medicinal plant for treating diarrhea. It is also called Indian bay leaf. It

belongs to the family is *Lauraceae* and other synonyms of the plant is Talisha, Pat-taakulu by Telugu, Talisapatri, tejpatta by Bengali and Hindi, Tamalapatram by Malayalam, Tezpat by Urdu, Tejpat by Manipuri people and Patraka by Kannada. The leaves of *Cinnamomum tamala* are distinguished by their flavorful hot and pungent taste and also having clove-like taste. The leaves are highly medicinal and are used for treating various disorders.

(Hossain et al.,2012) It can be evaluated the crude ethanolic extract of the leaves of *Cinnamomum tamala* for phytochemical and pharmacological properties such as antidiarrheal, antimicrobial and cytotoxic effects. Their findings declare that *Cinnamomum tamala* is antidiarrheal, antimicrobial and cytotoxic in nature. This review help to suggests why the leaves are popularly used in folk medicines for preparing herbal medicines for treating diarrhoea. *Cinnamomum tamala* leaves can be irregular and decocted for stopping diarrhea.

3. *Bauhinia acuminata* -



Bauhinia acuminata

Bauhinia acuminata is an evergreen large shrub (family of Fabaceae). This shrub mainly cultivated in the Southeast Asia region such as, Indonesia, Malaysia, Bangladesh, and Philippines. The morphology of the plant is observed and the height of this shrub is approximately 2 to 3 meters tall and leaves of 1.5 to 4 cm long petioles. The shape of blades are broadly ovate and divided about 1/3 of their length.

Bauhinia acuminata having fragrant flowers that measure between 8 to 12 centimeters in diameter. *Bauhinia acuminata* leaves contain many essential phytoconstituents such as ursolic acid, phthalic acid, phthalic acid esters, gallic acid and palmitic acid. The research from Islam *et al.*, (2014) is help to evaluated the antidiarrheal and the antimicrobial properties

of the *Bauhinia acuminata* plant. The result shows that *B. acuminata* leaves extract are most effective for treating diarrhea.

4. *Aegle Marmelos* -



Aegle marmelos

Aegle marmelos is commonly found in all over India, Bangladesh, Sri-lanka and Nepal. This is a medium sized and slow-growing tree the height of this tree between 25 to 30 feet tall (family of Rutaceae). It is popularly known as wood apple and other synonyms of this plant are Bael, Golden apple, Japanese bitter orange and Stone apple. It contains many essential active chemical constituent that is mostly used for medicinal purposes. Almost all over the parts of this plant such as the fruits, leaves, seeds, stems, roots and barks can be used as medicines for treating many disorders. It is an most important medicinal plant for treating diarrhea and dysentery this plant generally used in Ayurveda's. Antidiarrheal properties of this plant have been confirmed by several researchers (Joshi *et al.*,2009). This research help for investigating *in vitro* antidiarrheal activity of dried fruit pulps of *A. marmelos*. MIC (Minimum Inhibitory Concentrations) method are used for detecting the antidiarrheal against the causative organisms of diarrhea. The ethanolic extracts of *A. marmelos* show effective against, *S. sonnei*, moderate against *S. and dysenteriae*, *S. flexneri*.

5. Guava (*Psidium guajava* L)



Guava

Guava (*Psidium guajava* L) is an evergreen fruit-bearing tree (family- Myrtaceae). *P. guajava*, the common guava is lemon guava, apple guava, yellow guava, it is a small tree in the myrtle family. They are widely cultivated in many tropical and subtropical regions and it is a common tropical fruit. Guava is origin of Central America, Caribbean and South America before spreading to other parts of the world.

Several varieties of guava are found such as Allahabadi Surkha, Harijha, Fruits of sebha, Apple guava, Chittidar, Lucknow 49, Allahabad Safeda Seedless, Hafshi, and Arka Mridula. Guava contains some active phytoconstituents such as essential oils, dietary fiber, flavonoids, vitamin C, saponins, phenols, fatty acids, pectin, carotenoids, tannins, triterpenes, lectins and vitamin A. Various clinical studies have revealed the traditional use of guava for treating gastroenteritis, diarrhea and other digestive problems has been proven in various clinical studies. The every part of the tree like leaves, bark and fruit are used for medicinal purpose.

The lectin chemicals present in guava are effective for binding *E. coli* thus help to inhibiting its attachment to the intestinal wall (Rodriguez *et al.*, 2001). This thus helps to prevent infection and diarrhea caused by the diarrhea-causing organism *E.coli*.

The extract of guava leaves is providing soothing nature and it help to the easy re-absorption of water in the intestines. The antibacterial properties help to cure and treat diarrhea, gastroenteritis and dysentery. The bark and leaves of the plant is used to treat diarrhea.

6. *Astragalus (membranaceus)*



Astragalus (Astragalus membranaceus)

Astragalus membranaceus is a flowering plant in the family Fabaceae. It is commonly used for traditional treatment. Balachandar *et al.*, (2012) investigated if *A. membranaceus* can inhibit the *in vitro* growth of bacterial. The methanolic and ethanolic extracts of *A. membranaceus* were prepared using dried roots. The extracts are used for phytoscreening for determine their phytochemical constituents.

A. Membranaceus contain some active phytochemicals such as cardiac glycosides, alkaloids, terpenoids, flavonoids, and saponins. The ethanolic extracts showed maximum effective than methanolic extracts. Their findings show that the roots of *A. membranaceus* are effective against diarrheal micro organism. Moreover due to the antiviral and antibacterial properties of this herb, this herb is considered more effective for treating diarrhea.

7. *Menthe piperita (peppermint)*



Peppermint

Peppermint or *M. balsamea Willd* or *Mentha piperita* is hybrid herbaceous plant. It is a hybrid species of mint, a cross between watermint and spearmint. this plant is origin of

Europe and the middle East. Now a day this plant is widely spread and propagated in many region of the world. Peppermint grows well in a shaded place, moist, and fast spreads over the ground. Originally, peppermint is mostly used for flavoring and spicing foods. It is also used for preparation of toothpaste, mouthwashes, cosmetics, soaps and several other products.

Peppermint is having rich constituent of 1,8-cineol, menthone, carboxyl esters, volatile oil, menthyl acetate, menthol and menthofuran. Peppermint oil also contains traces of limonene, caryophyllene, pinene and pulegone. Most importantly, peppermint is widely used for its high medicinal properties this plant is generally used for preparation of some traditional medicine and this is also used for flavoring agent in many medicine formulations. Due to its soothing effects, peppermint is normally used in folk medicine for aches, flatulence, nausea, relieving pains, indigestion, and irritable bowel syndrome, diarrhea. Peppermint plant is highly recommended for treating diarrhea (Abaas *et al.*, 2015). It contains some volatile oil and this volatile oil given many beneficial effects.

8. *Moringa oleifera Lam.*



Moringa oleifera Lam

Moringa oleifera Lam. is the one of the most important plant widely cultivated in India. It is flowering plant belonging to family Moringaceae. It is found in small to medium in size, that consist of thirteen species from tropical and subtropical climates. It is originally from Africa and Asia and the name is derived from the term murungai or muringa.

Moringa oleifera is most popular species found, which is mostly found from the foothills of the Himalayas in India before spreading to other parts of African countries.

All over part of the plant having an active chemical constituent which are used in tradition medicine and this plant are used in Ayurveda's for preventing and treating various diseases. It contains various phytoconstituents and it having an efficacy against many diseases. The main phytoconstituent is **saponins, alkaloids, steroids, tannins, flavonoids, phenolic acids, glucosinolates and terpenes**. The diversity of these phytochemicals is contributes to its numerous pharmacological activities. In Its healing properties are attributed to its constituents of phytochemicals such as glycoside compounds (glucosinolates and isothiocyanates). The research of Saralaya *et al.*, (2010), reveal Moringa oleifera Lam root extracts can be used for treating diarrhea.

9. *Pongamia Pinnata* (Linn.)



Pongamia pinnata (Linn.)

Pongamia pinnata (Linn.) Pierre, the synonyms of this plant is Pongam oil tree, Karach, Indian beech, Naktamāla, Pungai, Millettia Pinnata or Honge tree, is a medium-sized evergreen glabrous tree with a short bole and a spreading crown. The morphology of tree is 15 to 25 meters in height. Pongamia is cultivated in most soil types such as clayed, sandy or stony ones but they highly grow on wet soil. Although the oil and residue content of the plant are very harmful and can also cause nausea and vomiting if consumed by humans or animals. For preparation of herbal remedies the fruits, sprout and seed are used. Kumar *et al.*, (2015) revel from their research that the plant leaves extract is effective for treating diarrhoea and abdominal enlargement. The leaves of *Pongamia pinnata* (L.) Pierre can be used for preparing herbal medicines for treating diarrhea. Pongamia pinnata is often used in folk medicines and Ayurveda preventing and treating several diseases such as diarrhea and dysentery.

10. *Terminalia belerica*



Terminalia belerica (Bahera)

Terminalia bellirica, is most important tree in ayurveda's. This are easy to found. Synonym of *T. Bellirica* is bahera, baheda, bastard myrobalan or beleric. It is a large deciduous tree belonging to the Combretaceae family. It is commonly found on the plains and lower hills in South and Southeast Asia, this is avenue tree. In traditional Indian Ayurvedic medicine, the Indian popular rasayana medicine "TRIFALA" fruit of this plant is used. Fruits are widely collected in the wild in the Malwa region of Madhya Pradesh.

The extracts of *T. balerica* many active phytoconstituent are present like tannins, ethyl gallate, glucoside, resin, gallic acid, etc. The extract of fruit pulp of *T. belerica* at the doses of 334mg/kg, 200 mg/kg, 143mg/kg have more prominent antisecretory effect than reduction in gastrointestinal motility (kumar *et al* .,2010).

REFERENCES

- 1) Abaas, I. S., Murtadha, R. M. and Majeed, A. H. (2015), The phytochemical and clinical evaluation of peppermint oil (*Mentha piperita* L.) with olive oil (*Olea Europaea* L.) in the treatment of Irritable bowel syndrome (IBS), *World journal of pharmacy and pharmaceutical sciences*,4(9),pp.1401-1405.
- 2) Balachandar, S., Jagadeeswari M., Dhanabalan R. and Meenachi M. (2012), Antimicrobial activity of astragalus membranaceus against diarrheal bacterial pathogens, *International Journal of Pharmacy*, 2(2), pp.416-418.
- 3) Bliss D. Z., Jung H. J., Savik K., Lowry A., LeMoine M., Jensen L., Werner C. and Schaffer K. (2001) Supplementation with dietary fiber improves fecal incontinence. *Nursing research* 50, pp. 203-212.
- 4) Haggerty P. A., Muladi K, Kirkwood B. R., Ashworth A. and Manunebo M. (1994), Community-based hygiene education to reduce diarrhoeal disease in rural Zaire: impact of the intervention on diarrhoeal morbidity. *International Journal of Epidemiology*, 23: pp.1050-1056.
- 5) Hossain, M. H., Howlader, M. S. I., Dey, S. K., Hira, A., Ahmed, A., Jahan, F. and Sarkar, R. P. (2012), Evaluation of antidiarrhoeal, antimicrobial and cytotoxic activities of *Cinnamomum tamala* leaves from Bangladesh, *International Journal of Pharmacy*, 2(4), pp. 731-734.

- 6) Islam, M. N., Reyad-ul-Ferdous, M., Fahad, M. A. B., Hossain, M. R. and Mukti, M. (2014), In-vivo Antidiarrheal and In-vitro Antimicrobial Activities of the Leaf Extracts of *Bauhinia acuminata*, American Journal of Research Communication, pp. 158 -166..
- 7) Joshi, P. V., Patil, R. H. and Maheshwari, V. L. (2009), Natural Product Radiance, 8, pp. 498-501. 11]
- Kačániová, M., Petrová, J., Kántor, A., Terentjeva, M. and Kluz, M. (2015), In vitro Antimicrobial Activity of Four Slovak Medicinal Plants against Different Strains of Bacteria, /Scientific Papers: Animal Science and Biotechnologies, 48 (1), pp. 137-138.
- 8) Kamath, J. V., Rahul, N., Kumar, C. K. A. and Lakshmi, S. M. (2014), Psidium guajava L: A review, International Journal of Green Pharmacy, pp. 9-11.
- 9) Kumar, N., Kumar, S., Sharma, K. and Sharma, S. D. (2015), Ethno-Medicinal Uses of Some Plants in Treatment of Constipation, Diarrhea, Dysentery and Other Stomach or Digestive Disorders from District Hamirpur (Himachal Pradesh), India, International Journal of Current Research in Biosciences and Plant Biology, 2(11), pp. 36-39.
- in Azilal Province, Morocco, Journal of Geography and Geology; Vol. 7, No. 4, pp.33-34.
- 10) Lakshmi, T., Geetha, R.V., Roy, A. and Aravind, K. S. (2011), Yarrow (*Achillea Millefolium* Linn.) A herbal medicinal plant with broad therapeutic use - A review, International Journal of Pharmaceutical Sciences Review and Research, vol. 9., issue 2, pp. 136-139
- 11) Laloo, D., & Hemalatha, S. (2011). Ethnomedicinal plants used for diarrhea by tribals of Meghalaya, Northeast India. Pharmacognosy Reviews, 5(10), pp. 147–154. <http://doi.org/10.4103/0973-7847.91108>.
- 12) Maikere-Faniyo R., Van, P. L., Mutwewingabo, A. and Habiyaremye F. X. (1989), Study of Rwandese medicinal plants used in the treatment of diarrhea, Journal of Ethnopharmacol, 26: pp.101–107.130-131. 21]
- Saralaya, M. G., Patel, P., Patel, M., Roy, S. P. and Patel, A. N. (2010), Antidiarrheal Activity of Methanolic Extract of *Moringa oleifera* Lam Roots in Experimental Animal Models, International Journal of Pharmaceutical Research Volume 2, issue 2, pp. 35-38.
- 13) Sekar, D. K., Kumar, G., Karthik, L. and Rao, K. V. B. (2011), A review on pharmacological and phytochemical properties of *Aegle marmelos* (L.) Corr. Serr. (Rutaceae), Asian Journal of Plant Science and Research, 1 (2): pp.8-14.
- 14) Swathi, M., Rajani A., Madhuri M., Sk.Arifa B., Vishnu Vardhan Reddy M. and Hemamalini K. (2014), Anti-diarrhoeal activity of methanolic extract of *Picrorrhiza kurroa royle* ex. Benth, International Journal of Phytopharmacology, 5(1), pp. pp.31-32.
- 15) Abhijit D, Neeta L, Musarrat N, Abhijeet G and Rupa V (2014). Ethnological and ethno-medicinal importance of *Aegle marmelos* (L) corr (Bael) among indigenous people India . American Journal of Ethnomedicine 1;290-312.
- 16) Abhijit D, Neeta L, Musarat N, Abhijeet G and Rupa V (2014). Ethano-medicinal Importance of *Aegle marmelos* Corr among indigenous people India. American Journal of Ethnomedicine I: 290-312.