

Laxative and anti-purgative bioactive compounds in prevention and treatment of functional gastrointestinal disorders, constipation and diarrhea

Abstract

Phytotherapy is an excellent therapeutic benefit in functional gastrointestinal diseases (FGIDs). In this case, there are several bioactive compounds in nature that have therapeutic activities that allow prevention or treatment of the gastrointestinal disorders such as constipation and diarrhea. Thus, in the current mini-review we will discuss the studies that have been carried out in this context as well as the possible mechanisms of actions.

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Functional gastrointestinal disorders

Normal gastrointestinal functions include transport, digestion, and absorption of nutrients, and removal of waste products. Functional gastrointestinal disorders are characterized by current gastrointestinal disruptions that have opposite pathophysiologic mechanisms such as dysmotility and diarrhea. Patients with FGIDs experience a constellation of symptoms consistent with abnormalities in these gastrointestinal functions.¹

Constipation pathogenesis

Constipation or intestinal dysmotility is an acute or chronic gastrointestinal pathology characterized by infrequent and limited bowel movements, hard and dry stools, inadequate and insufficient bowel evacuation and difficulty in elimination of defecation.²

Pathophysiology of diarrhea

Diarrhea is an increase in the volume of stool or frequency of defecation. The absorption/secretion process of water and electrolytes throughout the gastrointestinal tract is a finely balanced, dynamic process and, imbalance phenomenon caused either by decreased absorption or increased secretion, diarrhoea results.³

Phytotherapy in FGIDs

Phytotherapy, the use of plant-derived medications in the treatment and prevention of disease, is an important therapeutic option in functional gastrointestinal diseases (FGID). Medicinal plants can be classified according to their major constituents and their action. This allows not only their use as single-plant preparations, but also as combinations.⁴

Laxative components

Laxatives contain chemicals that help increase stool motility frequency. For example polysaccharide compounds such as dietary fibers, sucrose, pectin, galactomannan and others have some functional effects on intestinal tract.⁵⁻⁷ Many researchers concluded that the polysaccharide consumption effectively improved bowel

movement, stool output, and polysaccharide may be effective in relieving constipation.⁸ Soluble fiber (pectin, gum and mucilage), after degradation produces a kind of water-absorbing and volume-giving gel, which facilitates the transit in the intestine. In this context, it is established that fiber acts (by a physical action) as a major laxative, which produces the reinforcement and facilitation of the process of GIT in healthy and constipated-rats.^{9,10} The purgative effect could be attributed also to the presence of sucrose which as a major laxative which produces the enhancement of the GIT mechanism in healthy and constipated rats.¹¹ On another hand, the isolated galactomannans have been found to be effective in preventing constipation and in regulating bowel movement in mammals.¹² Mucilage, which is a complex of carbohydrates, is classified as a dietary fiber. Thus, treatment with it improves constipation through changes to the intestinal environment, including the intactness of the intestinal epithelium and therapy of a disturbed mucosal barrier.¹³ It has been reported likewise in many studies the use of isolated-polysaccharides for the prevention or treatment of slow-transit induced by various agents.¹⁴

Compounds with diarrhea-management action

Tannins, a group of major active components of medicinal plant and widely distributed in nature, have a significant antidiarrhoeal activity. Indeed, the presence of tannins, which possess an astringent property, can denature the proteins to form the protein-tannate complexes, which make the intestinal mucosa more resistant and inhibit secretion and therefore the reduction of GIT and diarrhea.¹⁵ The flavonoids have been also ascribed with capacity to reduce the intestinal motility and hydro-electrolytic secretion as well as the ability to inhibit contractions induced by spasmogenics. The aqueous extract of seeds plays a key role in the regulation of intestinal fluid and electrolyte balance.¹⁶ It was reported by various researchers that reducing sugars and saponins can be responsible for antidiarrheal actions. In addition, the inhibition of gut motility can be explained on the basis of presence of alkaloids in the plant, which have been reported to possess anticholinergic property.¹⁷

A recent study showed that sulphated polysaccharide isolated from the Seaweed *Gracilaria caudata* more effectively reduced diarrhoea

than other natural products,¹⁸ such as polyherbal formulations,¹⁹ latex tree derivatives²⁰ and plant extracts.^{21,22}

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Declaration of interest

Only the authors are responsible for the content of this paper.

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