

## ***Pharmacological Action of Purgative (Laxatives) –An Overview***

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### **ABSTRACT**

*The definition of purgative is the agents which promotes defecation. There are several plant source like senna, from the pharmacognosy perspective which is helpful in releasing the stool. There are several categories based on the time taken by which the stool is released, it is categorized as laxative, purgative, stimulant etc. Fibre rich food and exercise can help the human intestine to boost the defecation process.*

***KEYWORDS:*** *laxative, purgative, stimulant, senna, pharmacognosy*

## **INTRODUCTION**

### **Purgatives**

They are pharmacological substance surrounding the entire subject of purgation is far from clear; though what there is about the purgative drugs to stimulate interest in their terminology rather than their effect is equally obscure. Some main authorities refer to them as purgatives; others as the laxatives, aperients, or cathartics. Others confuse the issue still further by labelling all such drugs as the cathartics, and then grading these "cathartic" drugs as laxatives, purgatives, or the drastics according to the intensity of their effect. Perhaps the most sensible approach is simply to apply the term purgative to any drug taken by the mouth with the aim of mainly promoting defaecation, and in this way avoid confusion engendered by the use of synonyms (Spring, 1998).

Laxatives are medicines that treat the constipation, either by softening the stools or by stimulating the intestines to push out the stool/have a bowel movement. While they can be

safely used temporarily, they can do more harm than good if availed improperly or chronically without medical guidance (Koyama et al.,1999). Types of the laxatives Stimulant laxatives such as bisacodyl (Dulcolax), castor oil, and the senna (Senokot), are non-prescription "over-the-counter" (OTC) medications. They simulate the nerves in the walls of the large intestines and cause intestinal contractions as well as fluid and the electrolyte changes. While easily accessible, they can be dangerous if availed improperly, and are the most commonly abused laxatives (Halm et al.,2000). These laxatives can be habit forming, meaning that aggrandizingly higher doses are needed to obtain the same effects. "Natural" stimulant laxatives usually contain senna (Dawson,1994). These are stimulant laxatives (see above) that happen to come from plant sources (Fig-1). The advancements in the field of pharmacology helped to shape the health of human beings (Dr. S. Sreeremya,2024).



***Figure 1: Their dangers are the same as those of the synthetic stimulant laxatives.***

Non-stimulant laxatives are safer if used correctly and in appropriate doses. They encompass the following:

- Osmotic laxatives such as Miralax and Milk of Magnesia work by drawing the fluid into the intestines. These are less habit-forming; however, they can still cause fluid and the electrolyte imbalances when used incorrectly. Some require a prescription.
- Lubricant and the emollient laxatives, such as mineral oil or docusate (Colace), work by mainly softening the stool. These are generally safe to use for a limited time.
- The Bulk-forming laxatives, such as psyllium (Metamucil), Citracel, and FiberCon, are generally safe and also are a biosource of dietary fiber. When used in higher-than-recommended doses, the bulk-forming laxatives can cause intestinal problems and block absorption of other nutrients (Luciano et al.,1984).



*Figure: 2*

Laxatives are a category of the medications frequently used to address constipation and various other gastrointestinal medical conditions (Dorge et al.,1998). Their prime mechanism involves enhancing digestion and promoting bowel movements, thereby mainly facilitating the process of bodily excretion. Osmotic or stimulant laxatives are typically availed as the first treatment option for constipation. If they do not effectively manage constipation, the prokinetics or secretagogues may be used as the next steps(Fig-2).

Laxatives can garner relief for patients with irritable bowel syndrome (IBS) with constipation, the chronic idiopathic constipation (CIC), and opioid induced constipation. Researchers have described the prophylactic use of laxatives in intensive care unit (ICU) patients to prevent constipation. Also, other researchers have suggested laxatives during opioid administration in patients with the sickle cell disease, particularly in post-surgical patients and younger children (Chang et al., 1971).

Constipation is a common diagnosis that requires the proper evaluation and appropriate treatment. Notably, the laxative therapy is not the sole treatment for constipation. Initial management should involve lifestyle changes, encompassing consuming increased fluids and fiber-rich foods, such as asparagus, broccoli, Brussels sprouts, the cabbage, and spinach, into their diet. If constipation persists despite the lifestyle modifications, the use of laxatives becomes a viable consideration. The comprehensive approach to treating the chronic constipation encompasses patient education, the behavior modification, dietary adjustments,

and, if necessary, the inclusion of laxative therapy.

In addition to alleviating constipation, laxatives are occasionally availed to empty the bowels before procedures such as the colonoscopies. According to the American Gastroenterological Association's 2023 guidelines, CIC is a common bioclinical condition affecting approximately 8% to 12% of the US population. Regarding the pharmacological interventions, treatment options encompass a range of over-the-counter and prescription medications, such as polyethylene glycol (PEG), magnesium oxide, the lactulose, and bisacodyl. Unresponsive CIC may require treatment with the lubiprostone, linaclotide, plecanatide, or prokinetic agent (Kockerling et al.,1993).

### THE MECHANISM OF ACTION

Laxatives are categorized based on the mechanism of action they exert, as mentioned below.

- **Bulk-forming laxatives:** These agents retain fluid in the stool, elevating stool weight and consistency. Psyllium, dietary fiber, and the methylcellulose are common examples. It is important to take ample water for the bulk-forming agents to work. Lack of water, in turn, can lead to bloating and cause bowel obstruction (Kunzelmann ,2002).
- **Osmotic agents:** This class of the medicines is poorly absorbable and draws water into the lumen of the bowel. Milk of magnesia, the lactulose, sorbitol, and PEG are common examples.
- **Prokinetic agents:** Cisapride and tegaserod work as agonists of the 5-hydroxytryptamine receptors. They work on the intrinsic neurons, releasing acetylcholine and inducing mucosal secretion. However, cisapride has been withdrawn from the market due to some concerns about severe cardiovascular adverse effects.The Tegaserod is available under new investigational drug processes.The Prucalopride is a selective, high-affinity 5-HT<sub>4</sub> agonist. ATI-7505 and velusetrag are specific agents under investigation as well.
- **Lubricants:** The Mineral oil aids the passage of stools by its lubricating action throughout the intestines (Binder,1977).
- **Stimulants:** Simulate the myenteric plexus and the Auerbach plexus, increasing intestinal secretions and motility. They also majorly decrease the absorption of water from the lumen of the bowel. Examples encompass Bisacodyl, senna, cascara, and sodium picosulfate (SPS). Senna and cascara are present in the herbal teas or remedies.

- **Surface active agents:** Docusate lowers the surface tension, which paves to water and fats penetrating the stool (Harewood et al.,2003).
- **Guanylate cyclase agonist:** Linaclotide induces cGMP, paving to cystic fibrosis transmembrane conductance regulator (CFTR), which, in turn, the causes water and electrolyte secretion into the lumen. The compound Plecanatide is also an intestinal secretagogue acting through a similar mechanism.
- **Chloride channel activator:** Lubiprostone, a chloride channel activator, paves to water and chloride secretion into the stool and softer stool consistency.
- Examples of the natural laxatives: For some people, foods can act as natural laxatives.

**These include:**

Avocados, the Almonds, Aloe Vera, Apple Juice, Apricots (dried), Artificial Sweeteners, Basil, Beets, The Bananas, Carob, Capsicum, Cabbage, Caffeine, Chicken Broth (canned), Heated, The Chicory, Chocolate, Coconut, Dates, Endive, Fenugreek, Figs, Flaxseed, The Grapes, Guava with Seeds (Froehlich et al.,2005).

**CONCLUSION**

Several categories of faecal releasers are discussed like the Osmotic laxatives such as Miralax and Milk of Magnesia etc, the stimulants like senna, emollients, high fibre food products like banana, alovera, basil also help in this process.

**REFERNCES**

1. Froehlich F, Wietlisbach V, Gonvers JJ, et al. Impact of colonic cleansing on quality and diagnostic yield of colonoscopy: the European Panel of Appropriateness of Gastrointestinal Endoscopy European multi-center study. *Gastrointest Endosc* 2005;61(3):378–84.
2. Harewood GC, Sharma VK, de Garmo P. Impact of colonoscopy preparation quality on detection of suspected colonic neoplasia. *Gastrointest Endosc* 2003;58(1):76–9.
3. Binder HJ. Mechanisms underlying the absorption of water and ions. *Int Rev Physiol* 1977;12:285–304.
4. Kunzelmann K, Mall M. Electrolyte transport in the mammalian colon: mechanisms and implications for disease. *Physiol Rev* 2002;82(1):245–89.
5. Kockerling A, Fromm M. Origin of cAMP-dependent Cl<sup>-</sup> secretion from both crypts

- and surface epithelia of rat intestine. *Am J Physiol* 1993;264(5 Pt 1):C1294–301.
6. Chang WW, Leblond CP. Renewal of the epithelium in the descending colon of the mouse. I. Presence of three cell populations: vacuolated-columnar, mucous and argentaffin. *Am J Anat* 1971;131(1):73–99.
  7. Dr. S. Sreeremya, *Journal of Pharmacology, Toxicology and Therapeutics*, History dcxvgb
  8. Dorge A, Beck FX, Rechkemmer G. Cellular site of active K absorption in the guinea-pig distalcolonic epithelium. *Pflugers Arch* 1998;436(2):280–8.
  9. Luciano L, Reale E, Rechkemmer G, et al. Structure of zonulae occludentes and the permeability of the epithelium to short-chain fatty acids in the proximal and the distal colon of guinea pig. *JMembr Biol* 1984;82(2):145–56.
  10. Dawson DC. Ion channels and colonic salt transport. *Annu Rev Physiol* 1991;53:321–39.
  11. Feldman GM. HCO<sub>3</sub><sup>-</sup> secretion by rat distal colon: effects of inhibitors and extracellular Na<sup>+</sup>. *Gastroenterology* 1994;107(2):329–38.
  12. Halm DR, Halm ST. Secretagogue response of goblet cells and columnar cells in human colonic crypts. *Am J Physiol Cell Physiol* 2000;278(1):C212–33.
  13. Spring KR. Routes and mechanism of fluid transport by epithelia. *Annu Rev Physiol* 1998;60:105–19.
  14. Koyama Y, Yamamoto T, Tani T, et al. Expression and localization of aquaporins in rat gastrointestinal tract. *Am J Physiol* 1999;276(3 Pt 1):C621–7.