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Colon Targeted Drug Delivery Systems of Phyllanthus Amarus Schum & Thonn & Glycyrrhiza Glabra for Ulcerative Colitis

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ABSTRACT

For more than 3000 years, Phyllanthus amarus Schum and Thonn herbs have been used in traditional medicine. It belongs to the Euphorbiaceous family and has several names, including ‘‘bring me the seed", "stonebreaker", and "wind gala". The term "colon drug delivery system" describes the deliberate administration of medications to the large intestine and other lower digestive tract organs. For the localized treatment of a number of colonic conditions, including colon cancer, IBD, inflammatory bowel disease (such as ulcerative colitis and Crohn's disease), drug administration tailored too peculiar regions of the GIT are advantageous. This plant has been used historically as a stomachic, gastro-protective, and appetizer for eons. The plant has been used traditionally for years as a stomachic, gastro-protective, and appetizer. It is commonly recognized that the medication has a gastro-protective effect. The process may involve a reduction in stomach ulcers, suppression of edema, evacuation of leukocytes from submucosal layers, and enhancement of appetite through increased contraction of the gastric mucosa and inhibition of inflammatory cells. It is prepared by tablet formulation by using following ingredients, p. amarus, glycyrrhiza glabra, Microcrystalline cellulose, cross providon, Talc, Magnesium stearate, Starch paste and evaluating by this test, Tablet hardness, Friability test, Dissolution test, disintegration time test. Xanthum gum is used as a polymer. The formulation showed good efficiency and has passed all evaluation parameters.

Keywords: *Phyllanthus amarus schum and thonn, Glycyrrhiza glabra, limitations, advantages.*

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INTRODUCTION

One of important plant genera is Phyllanthus [1] which is readily accessible as raw herbal remedies in India. About a thousand species of the genus Phyllanthus, which belongs to the family Euphorbiaceae, can be found in the Caribbean and lower Caribbean areas, which includes the United States, Africa, and Asia [2,3]. The flowering plant Amarus[4]. is a prevalent weed in India's agricultural areas as well as waste dumps. The main morphological groupings found in the Amarus [4] flowering plant variety are forests, shrubs, and flowers. Furthermore, Ravikant and his business have discovered that southern India is the genetic hub for Phyllanthus species [5]. For long time, people have used Phyllanthus amarus Schum. and Thonn [6] due of its extensive medical background. This plant, also known as Bhumi amla, was a component [7].

Figure No.1.: Phyllanthus amarus schum and thonn

Liquorice root, or Glycyrrhiza glabra, has been used in traditional Chinese medicine for thousands of years. [8] It is commonly used in clinical settings to treat diseases of the immune, respiratory and digestive systems. Additionally, chemicals extracted from Liquorice have anti- inflammatory, antiviral, antibacterial, anti-allergic and anti-cancer properties. [9] Glycyrrhizic acid, one of the components of well-known antiulcer agents. These pharmacological properties contribute to treatment. [10]

Figure No. 2.: Liquorice (Glycyrrhiza glabra)

Of the several ways of taking medicine, but orally is thought to be more particular for giving patients their medications. Oral administration of conventional formulations typically results in the drug dissolving in gastric juice and being absorbed from various regions of the gastrointestinal system, depending on the physicochemical qualities of the drug. When the medication needs to be administered locally to the colon or shielded from the harsh conditions of upper part of GI, this has serious drawbacks. Poorly water-soluble medications may have trouble dissolving in colon. In certain cases, there may be, necessitating the delivery of the drug in a pre-solubilized form or to the proximal colon. In addition to medication solubility, another aspect that needs consideration is the drug's stability in the colonic environment. The medication may bind to mucus, intestinal fluids, food remnants, or general fecal debris in an unspecific way, lowering the concentration of free medicine. Furthermore, through drug degradation, the local microbiota may also have an impact on colonic function. [11]

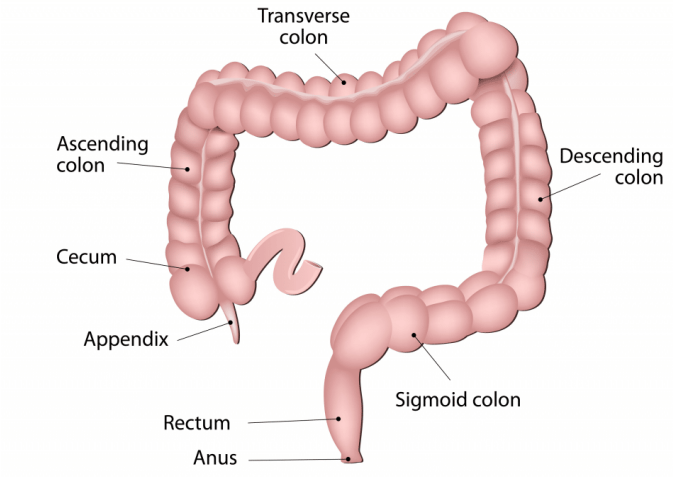

Figure No. 3: Colon

Challenges and limitations

Developing a dissolving testing procedure for testing colon-specific drug delivery system in-vitro can be a difficulty for justification for medicine fairly broad. It is an excellent transportation location for medication because it has pH neutral.

Drug reach to this region extremely difficult. It is especially difficult to access the colon since it is located at the distal end of the alimentary canal.

Drugs delivered through the fluid content which has a much lower fluid content.

Furthermore, drug's stability is a worry that needs to be taken into account when developing the delivery system. The medication may adhere to mucus, feces, digestive secretions, or leftovers from food in an unspecific manner. [12] The bacteria in the colon may alter drug metabolism and performance. [13]

Advantages

Colon-specific medication delivery method provides the following therapeutic benefits.

Reduced side effects when treating colon disorders.

By creating a 'expected' habitat for AA and proteins than the gut.
Essentially reduces metabolism at the first dose of steroids.
Prevention by oral NSAID of IBD.
The colon is not significantly affected by medications that get processed by liver amino acids or stomach acid. [14, 15]

Preparation

Collection: gathered by leaves of Plant Phyllanthus amarus schum and thonn and plant roots of glycyrrhiza glabra fresh from botanical garden of the college. The Department of Botanical Sciences at Sangola Science College in Sangola, Maharashtra, handles the sample's verification.

Sr No.	Ingredients	F1	F2	F3
1	Glycerrhiza glabra	4 w/v	2 w/v	1 w/v
2	amarus.P	4 w/v	3 w/v	2 w/v
3	Cross providon	1.6w/v	1.4w/v	1.2w/v
4	Cellulose that is micro	1.6w/v	1.31w/v	1.21w/v
5	The substance talc	1 w/v	1 w/v	1 w/v
6	The elements of magnesium stearate	1 w/v	1 w/v	1 w/v
7	Paste made with starch	4w/v	3w/v	2w/v
8	Xanthum gum	1.6w/v	1.4w/v	1.3w/v

Table No.1: Ingredients used in colon targeted tablet formulation

Procedure

1.Colon-targeted tablets were created utilizing starch paste as a binder in wet granulation.
2. Microcrystalline cellulose was utilized as a diluent, and talc and magnesium stearate were used as lubricants.
3. First, all of the materials were weighed precisely.
4. The two powders were passed separately through mesh (60), and the xanthan gum and microcrystalline cellulose were sieved through mesh (44) before being combined with the medication.
5. The particles were then mixed and granulated using starch paste.
6. The granules were then passed through mesh (22) and dried at 50°C for 2 hours.
7. The dry granules were lubricated with talc | mg stearate combination after passing through a mesh (22)
8. This were crushed using 10 mm flat plain punches on a compression machine. [16]

Figure No. 4: Tablet Compression machine

Figure No.5: Colon targeted tablet.

The evaluation Testing

Friability testing

The average friability obtained when evaluating the quality of tablets varied from 0.41 to 0.3 This value met the requirements of USP XXVII [22]. Requirements. A weight reduction of up to 0.8% was allowed. A decrease in friability index was observed with increasing concentration of Avicel PH 6.1-7.5, indicating that higher concentrations of Avicel PH 6.1-7.5 produced better quality and less friable tablets. This may be because the properties of Avicel PH 6.1-7.5 make the tablets less brittle and scratch-resistant.

Hardness of tablets

Based on the Monsanto hardness tester results, the average hardness of the tablets ranged from 1.5 to 0.3. In an effort to reduce the impact of violence against time devastation and friability, hardness tablets were made uniformly and with a narrow range. This allowed the friability of one formula compared to another to be viewed as the result of varying filler concentrations.

The breakdown time of tablets

As a result of the disintegration time test on five tablets using. it was found that increasing the concentration of Avicel PH 6.1 to 7.5 in the formulation accelerated the disintegration time of the tablet formulation. This is because the avicel PH 6.6.1-7.5 itself acted as a destroyer or disintegrator. Grind times for these five formulas range from 2 minutes to 7 minutes and 30 seconds. However, this figure complies with the requirement of the Indonesian Pharmacopoeia IV that the disintegration time should not exceed 15 min.

Test for dissolution

Pharmaceutical companies utilize a dissolving test procedure to find out how rapidly a drug material dissolves in a particular solvent or dissolution medium. It's essential for evaluating the efficacy and quality of the medication and guaranteeing consistency between formulations and batches. The process usually entails putting the medication in a controlled setting in a dissolving device, like a paddle or basket, and tracking how much of the medication dissolves over time. [17, 18]

RESULT

Formulation	Friability test	Hardness test	Disintegration time	Dissolution test
F1	0.41 (+ -) 0.3	1.5 (+ -) 0.2	8 hours	90.86 (+ -) 0.003
F2	0.42 (+ -) 0.2	1.8(+ -) 0.2	7 hours	85.56 (+ -) 0.01
F3	0.43 (+ -) 0.04	1.9 (+ -) 0.3	7 hours	80.21 (+ -) 0.02

DISCUSSION

The plant has been used traditionally for years as a stomachic, gastro-protective, and appetizer. It is commonly recognized that the medication has a gastro-protective effect. The process may involve a reduction in stomach ulcers, suppression of edema, evacuation of leukocytes from submucosal layers, and enhancement of appetite through increased contraction of the gastric mucosa and inhibition of inflammatory cells. It is prepared by tablet formulation by using following ingredients, p. amarus, glycyrrhiza glabra, Microcrystalline cellulose, cross providon, Talc, Magnesium stearate, Starch paste and evaluating by this test, Tablet hardness, Friability test, Dissolution test, disintegration time test. Xanthum gum is used as a polymer. The formulation showed good efficiency and has passed all evaluation parameters.

CONCLUSION

Colon targeted tablets for the safe and efficient treatment of colonic illnesses. As a result, different colon-targeted drug delivery methods were created that could release a small amount of the colon-targeted tablet gradually until the formulation was affected by colonic bacteria. The CT1 formulation has a good rate of dissolution, friability, disintegration time, Hardness test Further study is needed for the safety and efficacy using animal models, however the study further can be extended for its stability as per the ICH guidelines.

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