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Formulation And Development of Polyherbal Effervescent Granules for The Treatment of Inflammatory Bowel Disease

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Abstract- Inflammatory Bowel Disease (IBD) is a chronic inflammatory disorder affecting the gastrointestinal tract, primarily including Crohn's disease and Ulcerative colitis. The present study aims to formulate and evaluate polyherbal effervescent granules using extracts of Bauhinia variegata and Clitoria ternatea. These plants possess significant anti-inflammatory, antioxidant, and immunomodulatory properties. Effervescent granules were prepared using the wet granulation method and evaluated for physicochemical parameters such as flow properties, effervescence time, pH, and stability. The results indicated that the formulation exhibited good flow properties, rapid effervescence, and acceptable stability. The study concludes that the developed formulation may serve as a promising herbal alternative for managing IBD.

Keywords: Polyherbal Formulation, Effervescent Granules, Kachnar, And Aparajita.

I. INTRODUCTION

HERBAL MEDICINE

Herbal medicine (also called phytotherapy) refers to the use of plants or plant extracts for the prevention and treatment of diseases. It has been practiced for thousands of years in systems like Ayurveda, Traditional Chinese Medicine, and Unani medicine.

- Aloe vera – used for skin healing and digestion
- Turmeric – anti-inflammatory and antioxidant
- Ginger – helps in digestion and nausea
- Tulsi – boosts immunity
- Neem – antibacterial and skin benefits

Herbal medicine in IBD (Inflammatory Bowel Disease)

Some herbs may help reduce inflammation and improve gut health:

- Curcuma longa (curcumin) – anti-inflammatory
- Aloe vera – soothes intestinal lining
- Boswellia serrata – reduces inflammation
- Plantago ovata – improves bowel movement

Advantages of Herbal Medicines

1. Natural Origin
2. Fewer Side Effects
3. Cost-Effectiveness
4. Accessibility and Availability

Disadvantages of Herbal Medicines

1. Lack of Standardization
2. Limited Scientific Evidence
3. Potential Toxicity
4. Chances of Drug-Herb Interactions
5. Contamination and Adulteration
6. Misidentification of Plant Species

INFLAMATORY BOWEL DISEASE

Inflammatory bowel disease (IBD) for is a term chronic (long-term) inflammation of the digestive tract. It mainly includes two conditions:

A. Ulcerative Colitis (UC)

- Inflammation limited to colon and rectum

B. Crohn's Disease (CD)

- Can affect any part of GI tract (mouth to anus)

II. MATERIAL AND METHOD

Materials and Methods

Materials

- Extracts of Bauhinia variegata and Clitoria ternatea

- Citric acid
- Sodium bicarbonate
- Mannitol/Lactose
- PVP (binder)
- Flavoring and sweetening agents

Method of Preparation

Step 1: Extraction

- Plant materials were dried and powdered
- Extracted using hydroalcoholic solvent
- Filtered and concentrated

Step 2: Preparation of Effervescent Mixture

- Citric acid and sodium bicarbonate were dried separately
- Mixed under controlled humidity

Step 3: Granulation

- Extracts and excipients were blended
- Binder solution added
- Passed through sieve to form granules

Step 4: Drying and Packaging

- Granules dried at 40–50°C
- Stored in airtight containers

Table 6.3: Formulation of MDTs.

Ingredients	F1 (g)	F2 (g)	F3 (g)
Kachnar extract	10	12	15
Aparajita extract	10	12	15
Citric Acid	15	14	13
Tartaric Acid	15	14	13
Sodium Bicarbonate	20	20	20
Sucrose	20	18	16
Maize Starch	5	5	4
Microcrystalline Cellulose	5	5	4
Total	100 g	100 g	100 g

Total Weight per Tablet = 349 mg (approx.)

Evaluation of Effervescent granules

1. Effervescence Time

A fixed quantity of granules from each batch was added to a specified volume of water at room temperature. The time required for complete effervescence (cessation of bubbling) was recorded using a stopwatch. Faster effervescence indicates better performance and patient acceptability.

2. pH Determination

The pH of the solution obtained after dissolving the granules in water was measured using a calibrated digtal pH meter.

3. Moisture Content (Loss on Drying)

The moisture content was determined by drying a known weight of granules in a hot air oven at controlled temperature until a constant weight was obtained.

4. Particle Size Analysis

Granules were subjected to sieve analysis using a set of standard sieves. The distribution of particle size was recorded to ensure uniformity, which directly influences flow properties and dissolution behavior.

5. Drug Content Estimation

The amount of active constituents present in each batch was estimated by dissolving a known quantity of granules in a suitable solvent and analyzing it using standard analytical methods.

III. RESULTS AND DISCUSSIONS

1. Effervescence Time

All batches showed proper effervescence when added to water. F1 showed slightly slower effervescence, while F3 showed rapid and complete effervescence, indicating better performance.

Table 1: Effervescence Time

Batch	Effervescence Time (sec)
F1	95
F2	78
F3	62

2. pH Determination

The pH of all formulations was found to be within an acceptable range, indicating suitability for oral administration without causing irritation.

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Table 2: pH of Solution

Batch	pH
F1	6.52 ± 0.01
F2	6.68 ± 0.02
F3	6.75 ± 0.01

3. Moisture Content (Loss on Drying)

Low moisture content was observed in all batches, confirming good stability and reduced risk of premature effervescence.

Table 3: Moisture Content

Batch	Moisture Content (%)
F1	1.85 ± 0.01
F2	1.62 ± 0.01
F3	1.40 ± 0.04

4. Particle Size Analysis

The granules were found to have a fairly uniform particle size distribution. F3 showed more uniformity compared to other batches.

Table 4: Particle Size Distribution

Batch	Average Particle Size (μm)
F1	720
F2	680
F3	640

5. Drug Content Estimation

All batches showed uniform distribution of herbal extract. F3 showed slightly higher content due to increased extract concentration.

Table 5: Drug Content

Batch	Drug Content (%)
F1	96.2
F2	97.5
F3	98.6

Among all batches, F3 showed the best performance, with excellent flow properties, rapid effervescence, low moisture content, and uniform drug distribution. Hence, F3 can be considered as the optimized formulation.

IV. CONCLUSION

The present study successfully developed polyherbal effervescent granules using *Bauhinia variegata* (Kachnar) and *Clitoria ternatea* (Aparajita) through hydroalcoholic extraction. Phytochemical screening confirmed the presence of important bioactive constituents supporting their therapeutic potential. The formulated granules exhibited good flow properties, low moisture content, acceptable effervescence time, and uniform drug content, indicating stability and quality. Among all batches, F3 showed superior performance in terms of flowability and rapid effervescence. Overall, the formulation was found to be stable, palatable, and suitable for oral administration, suggesting its potential as a supportive herbal approach for managing inflammatory bowel disease. However, further pharmacological and clinical studies are required to establish its safety and efficacy.

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