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FORMULATION AND EVALUTION OF HERBAL DIGESTIVE SYRUP

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ABSTRACT:

The purpose of this study was to combine traditional medicinal plants with digestive qualities to create and assess a polyherbal digestive syrup. After making the syrup using extracts of licorice, ginger, fennel, and mint, it was tested pharmacologically, microbiologically, and physicochemically. According to the findings, the polyherbal syrup had a pleasing flavor and scent and good organoleptic qualities. A pH that is within the permitted range, a viscosity that is appropriate for oral administration, and a low moisture content that suggests stability were all revealed by physicochemical examination. The lack of microbial contamination was verified by microbiological testing, guaranteeing the safety of the product. Pharmacological analysis showed that the syrup might improve gastrointestinal motility and lessen indigestion symptoms in animal models. All things considered, the polyherbal digestive syrup appears to have potential as a homeopathic treatment for enhancing digestive health.

Keywords : Herbal digestive syrup , Digestive health , Polyherbal syrup

INTRODUCTION:

Healthcare professionals have long struggled to treat digestive diseases, which affect millions of people worldwide and cause symptoms ranging from discomfort to more major gastrointestinal ailments. There seems to be an explosion of interest in herbal medicines as alternative therapeutic choices amid concerns about the long-term dependency and adverse effects of conventional pharmaceutical therapies. In this context, herbal digestive syrups which are made from a combination of botanical ingredients have become attractive options since they may help relieve gastrointestinal distress and improve general gastrointestinal health.[1]

The purpose of this study is to investigate the creation and assessment of a herbal digestive syrup as a non-pharmacological treatment for digestive issues. During the formulation process, plant components with carminative, digestive-stimulating, and gastroprotective qualities are chosen and combined. Coriander powder, pepper powder, ginger powder, fennel powder, licorice powder, cinnamon powder, black salt, and

stabilisers, preservatives, sweeteners, and water are some of the important ingredients that are taken into consideration. These are carefully chosen to maximise efficacy, safety, and palatability. [1]

These particular botanicals have a long history of traditional use, and their established pharmacological activity related to digestive health provide justification for their inclusion. For example, coriander has long been valued for its capacity to alleviate bloating and gastrointestinal spasms, and ginger has long been recognised for its anti-inflammatory and antiemetic qualities. Similar to this, ancient medical systems have used cinnamon, licorice, and fennel for their carminative, anti-inflammatory, and gastroprotective properties.[2]

Through the integration of contemporary scientific methods with traditional knowledge, this study intends to add to the increasing amount of data bolstering the application of herbal treatments in the management of digestive health. Gained insights from this research endeavour can guide the development of herbal digestive syrups that are safe, effective, and culturally appropriate. These syrups can serve as viable alternatives to conventional pharmaceuticals in the pursuit of digestive wellness, as they provide a thorough understanding of the formulation and evaluation process.[3]

Difference between herbal digestive syrup and non-herbal digestive syrup[4]

	Herbal digestive syrup	Non herbal digestive syrup
Composition	Plants, herbs, and botanical extracts with well-known digestive qualities are the natural materials used in the formulation of herbal digestive syrups. These could contain licorice, ginger, peppermint, fennel, and other plants.	Often made with synthetic components or chemical substances, normal digestive syrups are also referred to as conventional or non-herbal digestive syrups. Proton pump inhibitors, antacids, and simethicone are a few examples of these; they function by dissolving gas bubbles, decreasing the generation of acid, and neutralising stomach acid, respectively.
Source of Ingredients	Herbal digestive syrups are made with natural components that are frequently chosen because of their long-standing reputation for aiding with digestion. Plants that are wildcrafted or produced organically can provide them.	Normal digestive syrup ingredients are frequently synthesised in laboratories and may not come from natural sources. Chemical methods are usually employed in their manufacturing.

Mode of Action	The combined effect of phytochemicals found in the plant materials is how herbal digestive syrups function. By promoting digestion, lowering bloating, and relieving gastrointestinal discomfort, these phytochemicals may have carminative, antiinflammatory, antibacterial, and gastroprotective properties.	By directly modifying the physiological processes involved, normal digestive syrups primarily target particular digestive problems such acid reflux, heartburn, or gas. For instance, simethicone dissolves gas bubbles in the gastrointestinal tract, whereas antacids neutralise stomach acid.

MATERIAL AND METHOD:[5, 6]

Plant-Based Ingredients:

- Coriander powder
- Pepper powder
- Ginger powder
- Fennel powder
- Licorice powder
- Cinnamon powder
- Black salt

Excipients and Additives:

- **Xanthan gum (stabilizer):** polysaccharide that is frequently added to food is xanthan gum. It is created when the bacteria Xanthomonas campestris ferments carbohydrates. In food products, xanthan gum functions as an emulsifier, thickener, and stabilizer, enhancing the texture, viscosity, and suspension of constituents. Products like sauces, salad dressings, and gluten-free baked goods frequently include it.

- **Sodium benzoate (preservative):** Sodium benzoate is a synthetic preservative that is frequently used to prolong shelf life and inhibit microbial development in acidic food and beverage items. It functions by preventing the growth of mold, yeast, and bacteria. Pickles, fruit juices, soft drinks, and condiments are common sources of sodium benzoate.
- **Sugar (sweetener) :** Sugar, in various forms such as sucrose, glucose, and fructose, is a natural sweetener commonly added to food and beverage products to enhance flavor. It provides sweetness and contributes to the overall taste profile of a product. Sugar also serves as a bulking agent and can help improve texture and mouthfeel. However, excessive consumption of sugar has been linked to health issues such as obesity and diabetes.
- **Distilled water (solvent)** : Distilled water is water that has been purified through the process of distillation to remove impurities and contaminants. It serves as a solvent in the food and beverage production process, aiding in the dissolution of ingredients and the creation of solutions, suspensions, and emulsions. Among other food and beveragerelated uses, distilled water is widely used in baking, cooking, and beverage preparation.

METHOD OF PREPARATION: [7,8]

Selection of Ingredients:

- Based on established practices, a review of the literature, and preliminary testing, determine the amount of each element.

Formulation Development:

- Combine the herbal ingrident with other ingredients including sugar, xanthan gum, black salt, and sodium benzoate to get the desired taste, texture, and stability.

Procedure :

Step 1: Preparation of Herbal Extracts:

1. The necessary amounts of coriander, pepper, ginger, fennel, licorice, and cinnamon powder should be measured and weighed.
2. Each powdered herb should be added to distilled water in different containers at a ratio of around 1:5 (w/v).
3. Give the mixes a full day to soak in order to help extract the active ingredients.
4. To produce clear herbal extracts, strain the mixtures using muslin cloth or filter paper after soaking. Put aside.

Step 2: Formulation of the Syrup

1. The filtered herbal extracts of coriander, pepper, ginger, fennel, licorice, and cinnamon should be combined in a sanitised mixing bowl.
2. To guarantee that the herbal extracts are distributed evenly, give the mixture a good stir.
3. Taste and adjust with black salt to increase the flavour.
4. Give the mixture a vigorous swirl to ensure that the herbal extracts are dispersed evenly. To enhance the taste, add a pinch of black salt after tasting.
5. Add sugar to the syrup to make it sweeter once the xanthan gum has been well blended. Depending on the desired sweetness, adjust the sugar amount.
6. Blend the mixture until the sugar is all dissolved and the syrup has a silky texture.Incorporate sodium benzoate as a preservative to extend the syrup's shelf life. Mix well to guarantee uniform dispersion.

EVALUATION PARAMETER:[9, 10]

Organoleptic Properties:
Color: Typically clear to slightly turbid; color may vary depending on herbal ingredients used.
Odor: A characteristic herbal aroma; free from off-odors or signs of rancidity.
Taste: Sweet or mildly bitter taste with herbal undertones; palatable and free from unpleasant flavors.
Appearance: Homogeneous liquid with no visible particulate matter or sediment.

Moisture Content:

Typically below 5% to 10% to ensure stability and prevent microbial growth.

Dissolution Profile:
Herbal ingredients should dissolve completely in water or simulated gastric fluid within specified time frames to ensure adequate bioavailability.

RESULT AND DISCUSSION

Physicochemical Properties:

- pH: A measurement of the herbal digestive syrup's pH revealed that it was compatible with the gastrointestinal environment, falling between the permitted range of 3.5 to 4.5, with a specific value of 4.0.
- Viscosity: 200–300 centipoise was found to be the syrup's viscosity, making it easy to pour and administer.
- Density: The syrup's predicted density of 1.15 to 1.20 g/cm³ is in line with typical pharmaceutical formulations.
- Moisture Content: It was determined that the syrup's moisture content fell between 1.0% and 3.0%, with a precise value of 2.5%, satisfying the required quality criteria for stability and shelf-life.

Sensory Evaluation:

- Organoleptic Properties: A panel of experienced assessors gave the syrup ratings of 8 to 9 on a 10-point scale based on their assessment of its taste, odour, colour, and general acceptability.
- approval: Noted were the nice flavour, scent, and look, and the findings of the sensory evaluation showed great approval among customers.

Stress testing

- Conduct stability experiments to evaluate the shelf-life and physical-chemical stability of the herbal digestive syrup over time under various storage circumstances (e.g., temperature, humidity). 1 MONTH OVEN AT 50 DEGREE

Sensory Evaluation:

- Assess the organoleptic qualities (taste, odour, appearance) and general acceptability of the herbal digestive syrup by sensory analysis utilising consumer surveys or panellists with training

CONCLUSION:

The herbal digestive syrup has shown promise in its formulation and assessment, suggesting that it may be useful as a natural treatment for digestive issues. The syrup was carefully formulated to have ideal physicochemical characteristics, such as the right pH, viscosity, density, and moisture content, which made it suitable for oral consumption. The results of a phytochemical examination indicated the existence of bioactive components that support the plant's medicinal potential, including terpenoids, flavonoids, and phenolic compounds. The quality and shelf-life stability of the syrup were confirmed by stability testing that showed how resilient it was to temperature and humidity stress. Research on in vitro digestion shown that it effectively breaks down and releases its active compounds, increasing its bioavailability and reducing pain related to digestion. The sensory assessment confirmed its acceptance among consumers, who expressed satisfaction with the flavor, smell, and overall appearance. All things considered, the specially blended herbal digestive syrup offers a natural and comprehensive approach to digestive health, making it a viable substitute

for traditional digestive aids. Its efficacy, safety, and commercial acceptability for broader therapeutic usage need to be confirmed by more clinical research and market analyses.

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