

Formulation And Evaluation of Polyherbal Tablet For Digestion Problem By Using Papaya, Amla And Fennel Seeds

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Abstract- Enzymes are dissolution large complex molecules like proteins, carbohydrates, and fats into smaller ones. They are secreted by the salivary glands and gastric mucosa of the stomach, pancreas, and small intestine, also present in many fruits and vegetables in significant amounts. The objective of this study was to review the available literature on the naturally available enzyme on food like fruits and vegetables and the impact of heat on their activity. Foods that contain natural digestive enzymes include Amla, papayas, and fennel seeds indicating that enzyme disintegration is influenced by temperature.

Keywords- Digestive enzymes, Natural enzymes, Digestion, Dissolution.

I. INTRODUCTION

Digestive disorders are diseases that affect the digestive tract (also called the gastrointestinal system). The gastrointestinal system includes the digestive system, which is made up of the following organs: The esophagus, liver, stomach, Small and large intestines, gallbladder, pancreas. Digestive disorders can range from mild to severe, depending on the severity of the disorder.

- **Common gastrointestinal disorders include:**

Gastric reflux disease
Cancer
Irritable bowel syndrome
Lactose intolerance

- **The most common gastrointestinal disorders are:**

Bleeding
Bloating
Constant constipation
Diarrhoea
Heartburn
Pain, nausea and vomiting

Papaya, amla and fennel seeds processed products have been found to have a positive effect on digestive disorders or diseases. Also use to improve the immunity power. This combination has been used as a traditional

treatment for gastrointestinal functional dys-order in countries where papaya plants are grown and fennel seeds and amlais used. Clinical studies have shown that the ingredients of this processed product can help to treat mild digestive dysfunctions in both young and adults. Patients with GI tract disorder constipation and loose stools and heartburn have been found to benefit from this combination. This study looked at the treatment effectiveness of this combination in patients with irritable bowel symptoms. The goal of this clinical study was to evaluate the treatment effectiveness in patients with a functional digestive tract disorder under randomised controlled conditions.

- **Papaya:-**

Papaya, scientifically known as *Carica papaya*, is a widely cultivated fruit crop in tropical and subtropical regions. It belongs to the Caricaceae family and is available throughout the year. This fruit is highly nutritious, packed with essential vitamins such as vitamin C, vitamin E, and vitamin A. Additionally, it contains minerals like potassium and magnesium, as well as pantothenic acid, folic acid, and fiber. Papaya also contains papain, a digestive enzyme that effectively addresses allergies, sports injuries, and trauma. Furthermore, papaya strengthens the heart and helps prevent and combat heart disease, heart attacks, strokes, and stomach cancer. It is a powerhouse of enzymes, with unripe fruits containing papain and chymopapain, while ripe fruits contain B carotene, carotenoids, cryptoxanthin, monoterpenoids, and seeds containing distinct enzymes. The leaves of the papaya plant are rich in zinc, manganese, iron, potassium, and other minerals. Numerous studies have demonstrated the plant's medicinal properties, including antioxidant, antihypertensive, wound healing, hepatoprotective, anti-inflammatory, antimicrobial, anthelmintic, tumor-fighting, malaria prevention, blood sugar-lowering, anti-ulcer, and immune modulatory properties.



Fig . 1 Papaya fruits

Papaya is known for its effectiveness in treating various digestive and abdominal disorders. It is a remedy for dyspepsia, hyperacidity, dysentery, and constipation. Papaya aids in protein digestion due to its rich source of proteolytic enzymes. The digestive enzyme papain, extracted from papaya, is dried into a powder and used to aid in digestion. Regular consumption of ripe papaya fruit helps with habitual constipation and may even prevent premature aging. Papaya is considered a beneficial remedy for abdominal disorders, and its skin is known to be effective in treating wounds. The enzymes papain and chymopapain, along with antioxidant nutrients in papaya, have been found to lower inflammation and aid in healing burns. Individuals with conditions worsened by inflammation, such as asthma, rheumatoid arthritis, and osteoarthritis, may experience relief as the severity of their condition decreases with the intake of these nutrients. Papaya also boosts the immune system by increasing resistance to coughs and colds through its vitamin A and C contents. Including papaya in your diet ensures a good supply of these essential vitamins for maintaining good health. The constituents of *Carica papaya* exhibit an alkaline combination, similar to borax or potassium carbonate, which have shown positive results in treating various skin conditions and promoting the absorption of glandular tumors. Green papaya fruits are used to address high blood pressure, dyspepsia, constipation, amenorrhea, general debility, expelling worms, and stimulating reproductive organs.

• **Botanical classification:-**

Botanical name:-	<i>Carica Papaya</i>
Common name:-	Papita, Paw-Paw.
Kingdom:-	Plantae
Class:-	Magnoliopsida
Taste:-	Sweet
Family :-	Caricaceae
Genus :-	Carica
Species:-	Papaya.L
Uses:-	Digestion, antioxidants, anti-inflammatory

Table no 1. Botanical classification of papaya fruits

• **Amla:-**

Emblemium officinalis, also known as *Phyllanthus Emblica*, is a plant species in the Euphorbiaceae family. It is native to India, where it grows in both wild and cultivated conditions. The fruits of this plant are globose, depressed, and bright yellow green when ripe. They have distinct ridges and a sour, astringent taste, followed by a slightly sweet taste. The main components of this plant are vitamin C (2%) and tannins (gallic acid, ellagic acid, and embricol) as well as two alkaloids (phyllantidine, and phyllantine) and pectin (pectin) and minerals. It can be used to treat a variety of ailments, such as Asthma, Bronchitis, Diabetes, Cephalalgia, Hyperacidity, Peptic ulcer, Eye Diseases, Inflammation, Cardiac Disorders, Anemia, Colic, Flatulence, Diarrhea and Dysentery. It can also be used to treat intermittent fevers.



Fig. 2 Amla fruit

• **Botanical classification:-**

Kingdom	Plantae
Botanicalname	<i>Phyllanthusemblica</i>
Commonname	Amla
Family	Euphorbiaceaea
Genius	Phyllanthus
Species	Emblica
Taste	Sweet, bitter, sour
Use	Antibacterial & astringen indigestion

Tableno.2BotanicalclassificationofAmla

Fennel seeds:-

F. vulgare is an Apiaceae plant from the genus “Foeniculum” with aromatic and medicinal properties. This resilient perennial herb has yellow flowers, feathery leaves and is native to Asia and Southern Europe. There are many types and races of *F. vulgare*, ranging from wild to domesticated, with varying sizes, aromas and flavours of

fruits. Most of the varieties are grown in Russia and Romania, Hungary and Germany, France, USA and Japan, and India. Seeds are used for alcoholic beverages and baked goods, as well as for ments, fish meals and herbal blends. The major phytochemicals found in this plant are phenols (a glycosaminoglycant), phenolic (a glycoside), volatile fragrance (a volatile fragrance compound) and fenone (a flavouring compound). Many infectious diseases, including those caused by bacteria, fungi, viruses and mycobacterials, are treated with this plant due to its anti-inflammatory and anti-inflammatory properties, as well as anti-cancer, anti-hepatitis, anti-hypoglycemic and anti-epileptic. It also has hypoglycemic and estrogenic properties.



Fig . 3 Fennel seeds

• **Biological classification:-**

Kingdom	Plantae
Biological name	<i>Foeniculum vulgare</i>
Commonname	Saunf , fennel seeds
Family	Apiaceae
Genius	Foeniculum
Spices	Vulgare
Taste	Anise-flavored
Use	Digestion

Table no 3. Biological classification of fennel seeds

II. MATERIAL AND METHODS

• **Collection and Drying of the plant material:-**

The plant part of the fennel seeds Amla and papaya procured to the market .The plant part Of fennel seeds, Amla and papaya were collected As a whole and dried in shade. In fresh condition, it is then Oven-dried at reduced temperature

(40°C) to make suitable for grinding purpose. The ginger crushed in the mixed grinder To a coarse powder. The coarse powder is then stored in an airtight container or polybags and kept in a cool, dark, and dry Place for further. All other ingredients used to college.

Preparation of Amla powder :-

- Fresh Amla
- Drying
- Washing Until clean with running water
- Sizes cut using knife with thickness
- Using the mortar pestle or blender to reduce the size
- Use a 60 no mesh sieve
- Powder of Amla.

Preparation of papaya powder:-

- Unripe papaya
- Drying
- Wash until clean with running water
- Sizes cut using knife with thickness
- Using the mortar pestle or blender to reduce the size
- Use a 60 no mesh sieve
- Powder of Unripe papaya.

Preparation of fennel seeds powder:-

- Fresh fennel seeds
- Drying
- Using the mortar pestle or blender to reduce the size
- Use a 60 no mesh sieve
- Powder of fennel seeds.

Formulation

Serial no	Excipients	Role	Quantity in mg
1	Unripe papaya (extract)	API	15.26 mg
2	Amla (extract)	API	14.8 mg
3	Fennel seeds powder	API	17.3 mg
4	Lactose	Filler	3 mg
5	Gelatin	Binder	3.5 mg
6	Starch soluble	Disintegrant	2.5 mg
7	Magnesium stearate	Lubricants	2 mg
8	Methyl paraben	Preservative	2 mg

Method of formulation of tablet Preparation of granules:-

- Wet granulation is extensively employed in the pharmaceutical industry as the primary method of granulation.
- This technique entails introducing a liquid solution, either with or without a binder, to powders. The result is the formation of a wet mass or granules through the combination of the powder and an adhesive, rather than through compaction.
- Afterwards, the wet mass is dried and sized to obtain granules. The liquid that is added binds the moist powder particles through a combination of capillary and viscous forces while in the wet state.
- During the subsequent drying process, more durable bonds are formed, leading to the creation of agglomerates.

Preparation of tablet (compression method):-

Before use, all the solid fractions and the excipients were passed through sieve No 80. The individual materials doses were precisely measured in electronic balance. Then, the diluents, binder, lactose, and dry powder were combined and passed through the sieve No 44.

To the above mixture, the required amounts of starch were added. The necessary amount of methyl paraben was added.

The wet coherent mass was formed and then sieved using sieve No 14. The dry granules were dried in hot ovens at 40 degrees Celsius for 30 minutes. The dried granules were again sieve No 22. The granules were lubricated with pure tale, magnesium stearate.

Pre formulation study:**1] Angle of repose:-**

The angle of repose, was determined by the funnel method. The accurately weighed (10gm) granules were taken in a funnel. The height of the funnel was adjusted in such a way that the tip of the funnel just touched the apex of the heap of granules the granules were allowed to flow through the funnel freely on to a clean surface. The diameter of the cone was measured and angle of repose was calculated using the equation:

$$\tan \theta^\circ = h/ r$$

Where,

H is the height of the granules cone R is the radius of the granules cone.

Sr. No	Flowability	Angle of repose
1	Excellent	<25
2	Good	25-30
3	Moderate flow	30-40
4	Poor flow	>40

Table No. 4: Angle of repose 2] Loose bulk density and Tapped bulk density:-

An accurate weighed granule from each formula was lightly shaken to break any agglomerate formed and it was introduced into a measuring cylinder. The volume occupied by the granules was measured which give bulk volume. The measuring cylinder was tapped until no further changes in volume was noted which gave the tapped volume. Both loose bulk density (LBD) and Tapped bulk density (TBD) of granules were determined using the following formulae.

LBD= Weight of the granules/ Volume of the granules
TBD = Weight of the granules/ Tapped volume of the granules. Carr's compressibility:-

The compressibility index of granules was determined using following equation

Carr's Compressibility Index (%) = [(TBD-LBD)/TBD]×100

Compressibility	Index properties
<10	Excellent
11-15	Good
16- 20	Fair
21-25	Passable
26- 31	Poor
32-37	Very poor
>38	Very very poor

Table no. 5: Carr's compressibility

3] Hausner's ratio:-

Hausner's ratio is the ratio between tapped density and bulk density.

Hausner's ratio = Tapped bulk density/ loose bulk density

Hausner ratio	Flow properties
1.00-1.11	Excellent
1.12-1.18	Good
1.19-1.25	Fair
1.25-1.34	Passable
1.35-1.45	Poor
1.46-1.59	Very poor
>1.60	Very very poor

Table no.6: Hausner Ratio



Fig . 4: Formulation of Tablet

Evaluation of tablets:-

1] **Apperance:-**

The general apperance and colour of tablets were found by visual and sensual basis.

Colour :- Brown Colour

Thikness:- 1.5 mm2

2] **Hardness test:-**

The tablet crushing strength, also referred to as the hardness test, was conducted utilizing the Monsanto hardness tester. The lower plunger of the tester was placed in contact with the tablet, and an initial reading was recorded. Subsequently, the tablets were fractured by applying force, and the resulting measurement was expressed in kg/cm².

3] **Weight variation test:-**

The process of assessing weight consistency is commonly referred to as uniformity in weight. To conduct the weight variation test, each of the 20 tablets was

individually weighed, and the average weight was calculated. Subsequently, a comparison was made between the weight of each tablet and the average weight.

4] **Friability Test:-**

The purpose of this examination is to assess the cumulative impact of abrasion and stock. The Roche Friabilator was employed as the testing apparatus. Tablets that were pre-weighed were inserted into the friabilator and spun at a rate of 25 rpm for a duration of 4 minutes. Each revolution involved dropping the tablets from a height of 6 inches. Subsequent to the elimination of fines, the tablets were reweighed, and the weight loss percentage was determined.

$$\text{Percentage friability} = \frac{\text{Initial wt} - \text{final wt}}{\text{Initial wt}} \times 100$$

5] **Disintegration test:-**

Three tablets are utilized to assess the disintegration time. These tablets are inserted into the disintegration apparatus, and the duration is monitored until complete disintegration of the tablet occurs. The temperature within the apparatus is controlled at 37° C.

III. RESULT AND DISCUSSION

Sr. No	Evaluation parameters	Result
1	Organoleptic Properties	Light brown colour
2	Angle of repose	28.30
3	Thickness of tablet	1.5±0.001mm2
4	Hardness of tablet	5.1 kg/cm2
5	Weight variation	500±5mg
6	Friability test	0.41

Table no.6: Result and Discussion

IV. CONCLUSION

The herbal tablets were prepared by combining various herbs, either individually or in combination, to enhance their synergistic effects. The formulation included unripe Carica papaya fruits, Amla fruits, and Fennel seeds. Several parameters such as hardness, thickness, pH determination, weight variation, loss on drying, and friability were evaluated to assess the quality of the tablets. The results of these tests indicated that the herbal tablets performed well.

It is worth noting that the herbs used in the tablet formulation primarily possess digestive properties.

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