Project Report
FORMULATION AND CHARACTERIZATION OF HERBAL TABLETS FOR THE MANAGEMENT OF DENGUE

Submitted to

ATMIYA UNIVERSITY
School of Pharmaceutical Sciences
FACULTY OF HEATH SCIENCES

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DECLARATION

We, all hereby declare the Work is presented in the project report entitled Formulation and Characterization OF Herbal Tablets For The Managements Of Dengue
It is an authentic record of work carried out by us during the studying period of semester 8 at and under the guidance of Atmiya University, Rajkot, and is being submitted for partial fulfillment of the requirement for the award of a bachelor's degree in B.pharm. This is not submitted anywhere else for the award of any other degree/diploma.

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FORMULATION AND CHARACTERIZATION OF HERBAL TABLETS FOR THE MANAGEMENT OF DENGUE

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ABSTRACT

As a formulation, tablets are made with plant extracts, such as vasaka powder and the extracts of Carica papaya and Embelica officinalis. The process of dry granulation was used to create these pills. In this article, herbal pills were made using an extract of the fruits of Embelica officinalis and the leaves of Carica papaya. Cold extraction and maceration techniques were used to get extracts from Carica papaya leaves, while the maceration process was used to extract fruit from Embelica officinalis. After drying, the three extracts were combined. To create granules, these extracts were subsequently impregnated with various excipients, including lubricants, super disintegrating agents, binding agents, and diluents. Then, these granules were assessed using a variety of factors, including Hausner's Ratio, void volume, Carr's Index, tapped density, bulk density, and angle of repose. After that, the machine was used to punch these grains into the appropriate size and form for tablets. The physical appearance, weight variation, friability, disintegration time, hardness test, and thickness of the tablets were investigated after they were prepared. Additionally, the taste and sweetness of the tablets are taken into consideration when determining their acceptance. Recent research has demonstrated the potential benefits of papaya leaf herbal extract as an anti-inflammatory, anti-tumor, immunomodulatory, and wound-healing agent, including as an antioxidant. The fresh pulp of amla fruit contains 400–550 mg of ascorbic acid, which is a good natural source of vitamin C. It is also abundant in minerals, including calcium, iron, and phosphorus. Amla is utilized as an immunomodulatory drug, which boosts the patient's immunity. The study's objective is to design, develop, and optimize a dengue dosage form. It is predicated on the mingling of chemical and synthetic chemicals with natural plant substances to create an efficient unit dosage form that will improve patient compliance. Vasaka possesses anti-inflammatory properties. Adhatoda Vasica possesses antimicrobial and antibacterial properties. it is useful for treating dengue.

KEYWORDS: *Papaya, Amla, Vasaka Extracts, Herbal tablet, Dengue, Immunomodulatory, Platelets.*

1. INTRODUCTION

Various plants serve as a source of raw materials and other resources, traditional knowledge about them is crucial to the fields of herbal medicine and pharmaceuticals. Because they meet so many needs for people, including fire wood, feed, timber, and many more, plants are valuable resources. As a result, indiscriminately taking these forest resources leads to environmental instability and forest degradation. For more than two millennia, the conventional medical system has been utilized methodically to cure ailments. Approximately 85% of conventional medications come from plants. (1) It is commonly known that mosquitoes play a significant role as disease vectors, dispersing diseases including dengue, filariasis, Japanese encephalitis, and malaria. (2). The fresh and dried fruits of the Emblica officinalis Gaerth plant are known as amla. FAMILY: Euphorbiaceae. The incidence of dengue, a viral infection, has rapidly risen in humans through extensive transmission by the bites of infected female Aedes aegypti mosquitoes. Dengue Haemorrhagic Fever (DHF) or severe dengue was initially documented during the dengue epidemics in Thailand and Philippines in 1950s; it is now becoming the leading cause of sickness and mortality in several Asian and Latin American countries, including India. Four different types of closely linked virus serotypes responsible for dengue are DENV-1, DENV-2, DENV-3 and DENV-4. These viruses are predominantly transmitted when infected female mosquito A. aegypti bites healthy individuals. Once infected, humans act as carriers and provide favorable environment for multiplication of the virus, which subsequently gets transferred to uninfected vectors during bites [3]. Patients suffer with eminently high fever along with some associated symptoms such as moderate to severe headache, pain in joints and behind eyes, vomiting, rashes and inflamed glands. If not handled well, dengue becomes complicated and patient suffers due to respiratory distress, fluid

accumulation, severe bleeding, organ damage etc. which becomes fatal in critical cases [4].

Presently, dengue is endemic in more than 100 countries across the globe including India; prior to 1970, only nine countries were reported to have epidemics of severe dengue [5]. Bhatt et al. (2013) analyzed under-reporting of the actual number of dengue cases and estimated that annually about 390 million infections occur throughout the globe [6]. In India, dengue virus was first isolated in the year 1944 in Kolkata from the serum samples of infected US soldiers [7]. In 1996, the first major epidemics of Dengue Haemorrhagic Fever (DHF) and/or Dengue Shock Syndrome (DSS) occurred near Delhi and Lucknow in Uttar Pradesh and thereafter the virus started spreading across.

Currently, the Indian population is infected by dengue viruses and sizable numbers of mortalities are recorded every year. India has a rich biodiversity and tradition of using plant-based medicines for preventive and curative healthcare.[7] Traditionally large numbers of plants are reported for their use against contagious diseases, including infection caused by viruses. During recent years, there are many online and offline published contents which demonstrate and portray use of plants and their formulations for their therapeutic effects against dengue. This paper aims to review the recent status of dengue cases, deaths and evolving curative herbal solutions adapted and reported from India to combat the disease. Data on utilization of various herbal and traditional medications popular among clinicians, patients and common public for contending dengue are also compiled.[8]

2. DRUG FORMULATION

***2.1*Papaya:** Carica papaya is a member of the Caricaceae family of fruits and vegetables. Green fruits are cooked as vegetables, but the fruit is commonly served as dessert or turned into jam, puree, or wine.

Figure 1: Showing leaf of *Carica papaya*

leaves (CPL) are used as food or medicine. The leaf extract has historically been used as an analgesic, heart tonic, and stomach discomfort remedy. The extract is also known to possess antioxidant qualities, yet there is a lack of scientific evidence on its ability to prevent acute stomach damage caused by alcohol. [9]

Papain is an enzyme that is used as a meat tenderizer, and papaya is the source of this enzyme. Phenolic substances like protocatechuic acid, p-coumaric acid, 5,7-dimethoxycoumarin, caffeic acid, kaempferol, quercetin, and chlorogenic acid are present in papaya leaf extracts. It has been demonstrated that certain substances possess antibacterial activity and can prevent the growth of microorganisms(10). The tree is extremely resistant to infestation by insects and diseases because of its high concentration of natural self-defense chemicals. Large, crown-shaped palmate leaves on carica papaya trees emerge at the top of the tree's trunk.

The diameter of the soft, hollow, cylindrical trunk varies from 30 cm at the base to approximately 5 cm at the crown. The leaves—especially the fallen ones—have a variety of uses, including as a bandage for septic wounds and a remedy for fevers, pyrexia, diabetes, gonorrhea, and syphilis.[11] Its positive effects as an anti-inflammatory, wound-healing, anti-tumor, immunomodulatory, and antioxidant have been demonstrated in recent investigations. It was found to be safe for oral consumption after a toxicity study (acute, sub-acute, and chronic toxicity) on Sprague Dawley rats given C. papaya leaf juice. Studies on the safety of C. papaya extract were conducted using the standards for acute, sub-acute, and chronic toxicity provided by the Organization for Economic Cooperation and Development. The results indicated that the extract was safe to consume by humans. It has been demonstrated that the papaya leaf contains a variety of active ingredients, including paper chymopapain, cystatin, tocopherol, ascorbic acid, flavonoids, cyanogenic glycosides, and glucosinolates, which can raise blood levels of total antioxidant activity and lower lipid peroxidation. Alkaloids, flavonoids, glycosides, saponins, and tannins are associated with anti-inflammatory properties. The extract from C. papaya leaves was also discovered to possess anti-tumor, anti-bacterial, and immunomodulatory properties. Since the LD50 of C. papaya leaves is greater than 15 g/kg of body weight, they are considered harmless. In addition, cardiac glycosides, anthraquinones, carpaine, pseudocarpaine, and phenolic chemicals are present in the leaves.[12]

Figure 2: Showing papaya leaf with extract

Regarding the antibacterial properties of fresh and dried C. papaya leaves, not much is known. There have been reports of anti-inflammatory, anti-helminthic, and antifertility properties recently. Leaves have been applied topically to elephantoid growths and nerve aches. Malaria is treated with tea made from papaya leaves. Certain plant preparations have been shown to exhibit antiplasmodial and antimalarial efficacy. The chemical components in papaya leaves, known as karpain, are known to fight microbes that frequently impede digestive processes. It has been found that antimicrobials derived from plants are effective in treating infectious infections while also reducing a number of the negative effects frequently linked to synthetic antimicrobial medicines.[13]

2.2 **Amla**: It is made composed of both fresh and dried fruits from the Euphorbiaceae family plant Phyllanthus emblica, often known as Emblica officinalis.

Colour: Green turns pale yellow or brick

redat maturity

Odour: Odourless

Taste: Sore and Astringent

Dimensions: The diameter ranges from 1.5 to

2.5 cm on average.[14]

Shape: Depressed and Globular

Figure 3: Showing leaves and fruit of Amla (*Emblica Officinalis*)

Fruits have six trygonus seeds and four lobed, meaty fruits. They have an extremely smooth and firm look. Ascorbic acid, or vitamin C, is abundant in amla fruit and can be found in 600–750 mg of fresh pulp per 100 g. It is also abundant in minerals, including calcium, iron, and phosphorus. It has a noticeable pectin content. Roughly 75% of fresh fruit is moisture. It has been shown that dried fruits retain a significant amount of their vitamin content. It might be because tannins are present, which slow down the oxidation of vitamin C. [15] A lot of Indian medicine makes use of amla fruits. It is used to treat diarrhea, dysentery, laxatives, diuretics, and acrids. It component of "Chyawanprash" and "Triphala." E. Officinalis extract has a well-established anti-inflammatory response, lymphocyte proliferation and the histological of synovial hyperplasia is the basis for the proposed mechanism for anti-inflammation [16]

Vasaka extract: Malabar nut, or vasaka, is a significant plant that was utilized in traditional Unani and Ayurvedic therapy. There is a mention of it in the Atharvaveda. For more than 2,000 years, herbal medicines have been made from the leaves, bark, roots, and flowers of the varsaka plant.

Family: Adhatoda

vasica

Green in color

No smell

Bitter flavor

Size: The average height is between

2.2 and 3.5 meters. The leaves are 3–

10 cm broad and 10–30 cm long.

Shape: Globular and depressed

For more than 2000 years, the plant Adhatoda vasica has been widely employed in India's traditional Siddha medical system. [17] The Siddha medical system recommends several approaches to medication delivery, processing, purification, and preparation. It divides medications into two categories: internal (Ulmarunthu) and exterior (Velimarunthu). Manappaagu is one such method of parenterally administering internal medications. This process involves taking the fresh juice of any portion of the plant, mixing it with sugar or palm jaggery, heating it until it becomes stringy (Kambipatham), and then storing it. [18] Fresh leaf juice is utilized to prepare manapaagu in Adathodai Manappaagu.Adhatoda vasica (L.) Nees, a perennial shrub in the Acanthaceae family, is typically 1-2 meters tall. The Malabar nut tree is another name for the lanceolate, opposite, 10–15 cm long and 4 cm wide leaves. The blossoms are

either purple, pink, or white. The plant can be found growing in wastelands with a range of habitats and soil types over the Indian peninsula, reaching as high as 1350 meters. The leaves, flowers, fruits, and roots are widely used as a sedative-expectorant, an antispasmodic, an anthelmintic, and to treat bronchitis, colds, coughs, whooping cough, and chronic bronchitis. In Southeast Asia, several leaf formulations have been utilized for hemorrhagic and bleeding disorders since ancient times. [19]

Figure 4 : Showing leaves and fruit of Vasaka (*Adhatoda vasica*)

SUBSTITUTIONS FOR DENGUE PLANTS

Andropogon citratus

Most people refer to it as citronella grass. It belongs to the Poaceae family. These plants have been used to extract citronella oil, which is then burned to ward off Aedes mosquitoes. The oil is applied drop by drop to candles and lanterns. This plant's oil-in-water nanoemulsion is also utilized to keep A. aegypti mosquitoes away. [20] This film helps keep insect repellent fresher longer by speeding up the oil's

vaporization. [21]

Boesenbergia rotunda

It is frequently referred to as Chinese ginger. It belongs to the Zingiberaceae family. These plants yielded the chemicals 4 hydroxypanduratin Aand panduratin A. [22] In an in vitro investigation, these substances demonstrated anti-dengue action against the DENV 2 NS3 protease enzyme.

Cymbopogon citratus

Most people refer to it as lemongrass. It belongs to the Poaceae family. Southeast Asian countries are home to this tropical plant. In Vero E6 cells, the methanol extract very faintly inhibits the DENV 1 serotype at a dosage of 0.001 mg mL−1, with a TCID50 of 0.075 mg mL−1. Numerous components, including homoorintine flavonoids, luteolin, and apigenin, are present in Cymbopogon citratus.[23]

Cladogynos orientalis

It goes by the name "cleaner clingfish" in general. It belongs to the Euphorbiaceae family. This plant grows wild or is cultivated throughout much of Southern and Eastern Asia. In Vero cells, C. orientalis extracts in dichloromethane and ethanol shown anti-dengue efficacy against the DENV-2 serotype. At a dosage of 12.5 μg mL−1, ethanol plant extract showed 34.85% suppression of DENV 2 serotype.[24]

Description

Macroscopic

The drug is made up of curled pieces of dried fruit pericarp that are either separated into single segments that are 1-2 cm long or united into three or four segments.[25] The pieces range in color from grey to black and have an external surface that is generally convex to somewhat concave, wrinkled transversely, and contains a few whitish specks. Occasionally, some pieces have a portion of stony testa visible, which should be removed before processing. The texture of the pieces is rough, cartilaginous, and tough.[26]

Microscopic of powder

A transverse section of the fruit reveals the following: an epicarp made up of a single layered epidermis cell that appears tabular and polygonal in surface view; the mesocarp cells are tangentially elongated, parenchymatous, and crushed; the rest is made up primarily of isodiametric larger cells with walls that show irregular thickenings; ramified vascular elements are occasionally present; isolated or in small groups, stone cells are present towards the endocarp; pitted vascular fibers with walls that appear serrated due to the pit canals leading into the lumen.The fine powder displays parenchyma cells with irregularly thickened walls, short fibers, and tracheids occasionally, as well as an epidermis with uniformly thickened straight walls. [27]

Causative Organism for Dengue

Essentially, viruses are made up of genetic material (DNA strands

and nucleic acids) and a capsular envelope composed of proteins, which

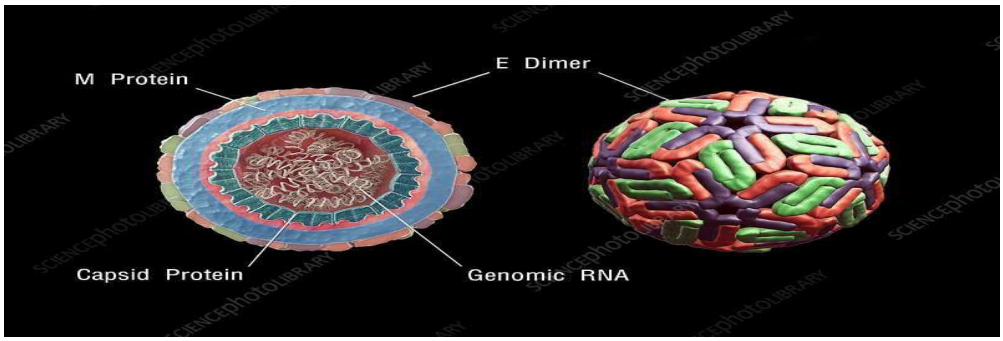

Figure 5 : Showing Structure of Dengue

Virus is frequently coated in a bilayer of phospholipids (PL) with proteins embedded in it. They rely on the infected cell for growth and replication but lack a metabolic system. It is necessary to selectively block the metabolic mechanisms that support viral replication in infected cells in order to reduce viral replication therapeutically. [28]This can only

Three structural protein genes (C, M, E), seven NS protein genes, and a positive-stranded encapsulated RNA virus Aedes aegypti serves as the vector for the arthropod-borne viral disease dengue, which is caused by one of four potential virus serotypes from the Flaviviridae family: 1, 2, 3, and 4. A specific antiviral medication is not currently available to treat dengue illness. The protective immunity to the homologous serotype is known to be induced by each infection episode, but this immunity is only temporary and partial against recurrent infection by the other serotypes. Dengue Haemorrhagic Fever (DHF) is significantly increased by secondary infection, potentially as a result of antibody-dependent intensification. The classic dengue trifecta of fever, headache, and rash is how a patient with dengue fever usually presents. Numerous more nonspecific symptoms are linked to DF, and patients may advance to DHF, which usually presents as bleeding, abdominal pain, or even cardiac

collapse.[29] Dengue has a sudden onset and three distinct phases in its clinical course: the febrile period, the critical phase, and the recovery phase. Before the fever goes down and shock sets in, thrombocytopenia—defined as a drop in platelet count below 1.0,000,000/mm3 from baseline—and hemoconcentration—defined as an increase in haematocrit of 20% or more—can be identified during the critical phase. C. papaya extract passed safety tests based on OECD recommendations for acute, subacute, and chronic toxicity, and the results indicated that it was safe for ingestion by humans. The goal of the current investigation was to ascertain and explore the conventional wisdom that CPLJ elevates platelet counts in patients suffering from DHF and DF. [30]

3. MATERIALS AND METHODS

3.1 Material used

Locally grown papaya (Carica papaya), amla (Emblica officinalis), and vasaka (Adhatoda vasica) are the plants used, and they have all been verified in a lab. Sigma Aldrich provided the following ingredients: lactose, starch, magnesium stearate, talc, methyl parabens, mannitol, sucrose, sodium starch glycolate, and ethanol. Chemicals supplied by CDH included sodium saccharin, calcium carbonate, vanillin, and sodium carbonate. The remaining ingredients are all of analytical quality.

3.1.1 Preparation of extracts.

3.1.1.1 Maceration

50g of freshly chopped leaves were added to 200 ml of distilled water to create an aqueous extract of Carica papaya. For two days, the combination was stored at room temperature. After the extract-containing water was filtered and collected at the conclusion of the first day, it was reconstituted with 200 milliliters of fresh distilled water, and the maceration process was resumed for the next day. Both extracts were finally mixed.

Figure 6 : Showing *Carica papaya* Extract

3.1.1.2 Concentration of Extract

For 48 hours, the mixture was heated to 50–60˚ C. A straightforward decoction process of the aqueous extract is used in the procedure, and the soluble chemicals are then heated to a higher temperature of 70–75˚C for three hours, or until the solvent entirely evaporates. The product was kept at a consistent temperature to prevent burning. Weighing the dry product that was produced allowed us to record the yield.

3.1.2 Preparation of extracts of *Emblica officinalis*: -

Purchased botanical specimens The amla pericarp was dried and then blended into a coarse powder. One kilogram of coarse powder was macerated for 72 hours, and then the material was thoroughly macerated for 48 hours using 60% ethanol as the solvent. The solvents were recovered using distillation at 750ºC to 800ºC with the aid of a rotating vacuum evaporator after being decanted and filtered through filter paper. The extracts were kept in an airtight container at

room temperature after being dried under a desiccator.

3.1.3 Preparation of extracts Adhatoda vasica:-

Purchased botanical specimens The pericarp of Adhatoda vasica was dried, then a blender was used to coarsely powder it. One kilogram of coarse powder was macerated for 72 hours, and then it was thoroughly macerated for 48 hours using chloroform. The solvents were recovered using distillation at 750ºC to 800ºC with the aid of a rotating vacuum evaporator after being decanted and filtered through filter paper. The extracts were kept in an airtight container at room temperature after being dried under a desiccator.

Figure 7 :Showing Vasaka extract

Figure 8 : Showing Amla Extract

3.1.4 Preparation of tablets

3.1.4.1 Dry granulation method

To make the concentrated extract of Carica papaya and Amla more bulky and transform it into a powder mass with passable flow properties and compressibility, it was combined with extractives like sodium starch glycolate, methyl paraben, starch, sodium saccharin, vallinin, calcium carbonate, and mannitol. To get homogeneous granules, it was run through sieves nos. 8 and 12, breaking up any lumps before adding talc and magnesium stearate. The granules' total weight was recorded and assessed.

Figure 1: Showing batch F1 Tablets

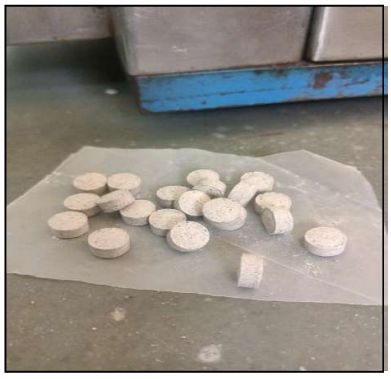

Figure 2: Showing batch F2 Tablets

3.1.4.2 Procedures of Evaluation Parameters of Granules

3.1.4.2.1 Angle of Repose

When powder is dumped onto a horizontal surface using a funnel, gravity will cause it to condense into a cone shape. The angle of repose is the angle formed by the cone's sides and the horizontal. An approach that is rather easy to use for estimating the flow attribute of powder is the angle of repose. High angle of repose particles flows poorly, whereas powders with a low angle of repose flow freely. After passing 10 grams of grains through a funnel, a mound was created. The following formula was used to get the angle of repose:

$$\text{Angle of Repose } (\theta) = \text{Tan}^{-1} \frac{\text{Height (h)}}{\text{Radius (r)}}$$

3.1.4.1 Bulk Density

This is acquired in order to determine the precise volume of grains being inserted into the cylinder. In the formula, initials are utilized. Bulk density is computed using the following formula, which is also referred to as the fluff and poured density:

$$\text{Bulk Density} = \frac{\text{Mass (M)}}{\text{Volume (V)}}$$

3.1.4.2.2 Tapped Density

With the use of a tap density equipment, which fills the cylinders with powder and taps them, it is achieved. Following a few intervals, the cylinder's volume is recorded, and the following formula is used to determine the granules' tapped density:

$$\text{Tapped density} = \frac{\text{Weight of granules (W)}}{\text{Volume of granules after 50 taps } (V_{50})}$$

3.1.4.2.3 Carr Index

Following the acquisition of the tapped and fluff density, the following formula is used to determine the Carr's Index using a 100 ml measuring cylinder:

$$\%\text{age Compressibility} = \frac{\text{Tapped density} - \text{Fluff density}}{\text{Tapped density}} * 100$$

3.1.4.2.4 Hausner's Ratio (H.R.)

After calculating the tapped density using the formula below, this ratio is obtained:

$$\text{H.R.} = \frac{\text{Tapped density}}{\text{Poured density}}$$

3.1.4.2.5 Void Volume

The bulk volume and tapped density measurements are used to calculate the granules' volume. This is derived using the following formula and shows the air volumes that are being generated in the granules during tapping:

$$\text{Void Volume} = \text{Bulk Volume} - \text{Tapped Volume}$$

3.1.4.3Granule Evaluation Parameter Procedures

3.1.4.3.1 Weight Variation

Ten tablets were chosen at random and given separate weights. The formula below is used to compute the tablets' average, while the formula below is used to get the standard deviation:

$$\text{Standard Deviation (S.D.)} = \sqrt{\frac{\text{Deviation}^2 (D^2)}{\text{No. of tablets (N)}}}$$

3.1.4.3.2 Hardness test

The equipment from Pfizer and Monsanto is used in this test. In this, the tablet is pressed while remaining in its designated spot within the device. The average hardness is computed and the pressure measured by the pressure gauge is noted down.

3.1.4.3.3 Friability test

Friability apparatus is utilized in this examination. After inserting the weighted tablets, the device rotates for five minutes at a speed of 25 rpm. Occasionally, tablets are taken out of the device and weighed again. The formula below is used to calculate the friability:

$$\text{Friability} = \frac{\text{Initial weight (Wi)} - \text{Final weight (Wf)}}{\text{Initial weight (Wi)}} * 100$$

3.1.4.3.4 Acceptability test

This test determines whether or not the tablets are suitable for consumption by evaluating their acceptability. Five volunteers test the tablets' sweetness and odor, and the results are recorded in a table along with each volunteer's comments about the pills.

3.1.4.3.5 Disintegration test

To measure the disintegration time, three pills are taken. The tablets are put in the disintegration device, and the amount of time is tracked until the tablet dissolves completely. The apparatus's temperature is kept constant at 37º C.

4 RESULTS AND DISCUSSION

4.1 Results

Plant extracts were employed in the formulation of two batches of tablets. The ingredients included calcium carbonate, lactose, starch, mannitol, vallinin, sodium saccharin, magnesium stearate, talc, sodium carbonate, papaya leaves, and amla fruit extract. These are the primary materials listed in Table No. 1 that are utilized to manufacture the Trial batch as well as the F1 and F2 batches.

4.1.1 Formulations table

Table No. 1

Sr. No.	Ingredients Used	Trial Formulation	Formulation(F1)	Formulation(F2)
1.	Sodium starch glycolate	5 gm	2.5 gm	3.5 gm
2.	Lactose	50 gm	20 gm	--
3.	Starch	1.5%	1.5%	1.5%
4.	Methyl paraben	1 gm	100 mg	100 mg
5.	Mannitol	5 gm	1.5 gm	1.5 gm
6.	Sodium saccharin	--	1 gm	1 gm
7.	Magnesium stearate	1.5 gm	1.5 gm	1.5 gm
8.	Talc	2 gm	1 gm	1 gm
9.	Vallinin	1 gm	200 mg	200 mg
10.	Papaya extract	--	2 gm	2 gm
11.	Amla extract	--	1.75 gm	1.75 gm
12.	Vasaka extract	--	1.70 gm	1.70 gm
13.	Calcium carbonate	---	2 gm	2 gm
14.	Sodium Carbonate	--	5 gm	--

These are some ingredients that are used in preparation of tablets which are useful in the treatment of dengue.

4.1.2 Evaluations of Granules

For the granules of F1 & F2, the evaluation parameters Hausner's Ratio, tapped density, bulk density, Carr's Index, and void volume were performed and are displayed in Table No. 2.

Table No. 2 Showing different Evaluation parameters of Granules of F1 & F2

Sr.no	Evalution parameters	Formulation (F1)	Formulation (F2)
1	Angle of repose	0.537	0.500
2	Tapped density	0.85	0.745
3	Bulk density	0.689	0.617
4	Carrs index	18.9	17.2
5	Hausners ratio	1.234	1.207
6	Void volume	7	6

These are a few of the evaluation criteria that are applied to the granules that are used to make dengue tablets.

4.1.3 Evaluations of tablets

The evaluation parameters for the F1 & F2 are displayed in Table No. 3 and include physical appearance, acceptance test, weight fluctuation, friability, hardness, thickness, and disintegration test.

Tablet No. 4: Showing different Evaluation parameters of Granules of F1 & F2

Sr no	Evalution Parameters			Formulation (F1)		Formulation (F2)	
1	Physical Appearance	Colour		Brownish		Brownish	
		Odour		Sweeties		Sweetied	
		Taste		Sweet		Sweet	
		Shape		Round		Round	
		Flavour		Vanilla		Vanilla	
		Size	Diameter(Cm)	1		1	
			Width(Cm)	0.5		0.5	
2	AcceptanceTest	Volunteers		Flavours	Sweetness	Flavours	Sweetness
		Abhay		+++	+++	+++	+++
		Krishna		+++	+++	++	++
		Meet		--	+++	+++	+++
		Prival		++	++	--	+++
		Ekta		+++	+++	+++	+++

3	Weight Variation (gm)	0.028	0.048
4	Fribality (%)	0.32	1.66
5	Hardness Test (gm/cm)	3.75	4.0
6	Thickness Test (mm)	0.00633	0.00633
7	Disintegration Time (minutes)	7:35	7.:00

These are some of the assessment criteria used for dengue-producing tablet production.

4.2 Discussion

There was success in the development, assessment, and submission of the tables. Three batches, consisting of trial batch and medication containing batches F1 and F2, were created. Numerous distinctions may be observed between Formulas F1 and F2. Different diluents are utilized in the recipe of both batches to augment their bulkiness. Whereas calcium carbonate is utilized in F2, lactose is used in F1. Additionally, the super disintegrating ingredient, sodium starch glycolate (SSG), differs in formula between the two formulations; in formula F2, SSG is present in higher concentrations. Sodium bicarbonate is used in F1 in an effort to shorten the time it takes for tablets to dissolve. Because the patient's platelet count has reduced as a result of Dengue, papaya leaf extract is utilized to produce the formulation, which will raise the count. Amla fruit extract is used to boost the patient's immunity. Additionally, the foul taste is covered up by the sweetening chemicals.and vasaka is used to treat coughs. Additionally, flavoring ingredient is employed to cover up the

unpleasant odor. There is also a difference observed in the Granules evaluation parameters. F1 has greater values for all assessment parameters than F2. There are variations in the tablets' evaluation parameters for both F1 and F2. In terms of physical characteristics, F1 tablets are brownish-black in hue, while F2 tablets are brownish in color. Both formulations passed the acceptability test, indicating that patients can take them with ease. F1 has less weight fluctuation and friability than F2. The tablets in both formulations have the same thickness. The F2 has

less hardness and a shorter disintegration period than the F1.

5 CONCLUSION

Based on the analysis of all the data and the observed discussions, it can be concluded that the dengue tablets that were made were successful and may be used to treat the illness. In the current study, Adhatoda vasica (vasaka), fruits of Embelica officinalis, and leaf extract from Carica papaya were combined to make tablets. Papaya Carica leaf extracts were produced by maceration and cold extraction. Through the maceration process, an extract of Embelica officinalis fruits was obtained. Maceration was used to prepare Adhatoda vasica.To create granules, these extracts were impregnated with excipients such as lubricants, binding agents, and diluents. The intended size and form of the tablets were achieved by using these granules. Recent research has demonstrated the potential benefits of papaya leaf herbal extract as an anti-inflammatory, anti-tumor, and wound-healing agent, in addition to its immunomodulatory and antioxidant qualities. Ascorbic acid, or vitamin C, is abundant in amla fruit and contains 600–750 mg per 100 g of fresh pulp. It is also abundant in minerals, including calcium, iron, and phosphorus. It has a noticeable pectin content. It has been shown that dried fruits retain a significant amount of their vitamin content. The extracts from the three plants that were utilized to make the tablets are supposed to help treat the illness. As one extract—papaya leaf extract—raises the body's platelet count, another—amla fruit extract—boosts the patient's immunity, and a third—vasaka extract—is used to treat discomfort associated

with persistent cough and congested lungs. The current work could be applied as a cutting-edge Dengue infection treatment strategy. With the right ingredients, tablets made from plant extracts of Carica papaya, Embelica officinalis, and Adhatoda vasica were successfully produced. Tablets that underwent evaluation for several characteristics yielded positive findings. The results demonstrated that, when other parameters were met, the F1 formulation had a better disintegration time than the F2 formulation.

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