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# "FORMULATION AND EVALUATION OF *CARICA PAPAYA* AND *MURRAYA KOENIGII* LEAVES EXTRACT TABLET"

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## ABSTRACT

The main aim and objectives of this research was to formulate a tablet from the combination of *Carica Papaya* and *Murraya Koenigii* aqueous and hydroalcoholic leaves extract tablets with different concentrations (10%, 20%, 30%, and 40) of Microcrystalline cellulose (MCC) as a binder using the direct compression method. The experimental methods and evaluation ofthe tablet's physical properties (i.e., weight variation, friability, hardness, disintegration time, dissolution time, and physical appearance) was done using standard methods of extracts i.e. alkaloids and flavonoids was determined by the spectrophotometry method and Thin Layer Chromatography (TLC). The results of The tablet was light brown and had both flat top and bottom, a specific odor and a bitter taste. The physical properties of the tablet were in accordance with pharmaceutical standards. The Conclusions of this study has been concludedthat MCC concentration can be used as a binder to formulate *Carica Papaya* leaves extracts and *Murraya Koenigii* leaves extract tablet into high-quality and ready-to-consume tablets and hydroalcoholic extract is more suitable for consume as compare to aqueous extract tablet.

**KEYWORDS:** *Carica Papaya* Extract, *Murraya Koenigii extract, PhytochemicalScreening, Herbal Tablet.*

## 1. INTRODUCTION

*Carica Papaya* plant is commonly called 'papaya tree', belongs to family Caricaceae. It is a rich source of phytonutrients, minerals, vitamins, and other compounds such as alkaloids, flavonoids, tannins, and Saponins, which have antioxidant activity and potential as an antihyperglycemic agent (E. Rustiani *et. al.*, 2017). The different parts of the *Carica papaya* plant proved to have medicinal value including leaves, seeds, latex and fruit. *C. Papaya* has a wide variety of medicinal properties including anticancer, antimicrobial, anti-diabetic, antiviral, anti-inflammatory, antihypertensive, wound healing activity, free radical scavenging activity and increase in thrombolytic count or treatments for dengue fever, etc.

*Carica Papaya* contains two important biologically active compounds vis: chymopapain and papain which are widely used for digestive disorders. It showed that papaya derived papain, caricain, chymopapain, and glycine endopeptidase can improve acidic pH conditions and pepsin degradation. Other active compounds of *Carica papaya* are lipase, or CPL, a hydrolase, which is tightly bonded to the water-insoluble fraction of crude papain and is thus considered as a "naturally immobilized" biocatalyst. The latex, ripe fruits, unripe fruits, seeds, seeds juice, root, leaves, flower and stem bark of C. papaya are used as antimicrobial, anthelmentic, antimalarial, antifungal, antiamoebic, hepatoprotective, male and female antifertility, immunomodulatory and against histminergic (Nisar Ahmad *et. al.*, 2011).

*Murrraya koenigii* plant is commonly called 'curry patta', belongs to family Rutaceae, and is traditionally used in India as spice for its characteristic flavour and aroma. The aromatic leaves are considered as tonic, anthelminthic, analgesic, digestive and appetizer. The leaves are used for treatment of piles, inflammation, itching, fresh cuts, dysentery, vomiting and dropsy. *Murrraya koenigii* leaves contain a variety of active pharmacological agents including carbazole alkaloids, flavonoids, furanocoumarins, terpenoids and tannins. It has been reported that curry leaves are rich source of magnesium, zinc, iron and copper (Purnima A. *et. al.*, 2014). Anaemia is defined as reduction of hemoglobin concentration, RBC count, or packed cell volume to below normal levels. As a result the oxygen carrying capacity of blood is reduced. Anaemia is a common disease that affects people of all ages but elder population,

young women of child bearing age and infants are at greater risk. There are many types of anaemia and in all types there is decrease in circulating RBC.

Blood is a specialized body fluid that delivers necessary substances to the cells such as nutrients and oxygen and transports waste products away from the cells. It accounts for 7% of human body weight with an average density of approximately 1060 kg/m3 and is composed of plasma and several kinds of cells which include erythrocytes, leucocytes and thrombocytes. Platelets are involved in many pathophysiological processes including hemostasis and thrombosis, clot retraction, vessel constriction and repair, inflammation including promotion of atherosclerosis,host defense and even tumor growth/ metastasis (Njagi J Muriithi *et. al.,* 2015).

The Carica Papaya leaves extracts are mainly used in treatment of dengue increase in platelet count and RBC's. The Murrraya koenigii leaves extract mainly used in treatment of hematological disorders increase in hemoglobin count.

**Advantages of *Carica Papaya* Leaves** (A. Roshan *et. al.,* 2014)**:** The major advantages of *carica papaya* leaf are as follows,

1. Treat Dengue fever.
2. Cancer Cell Growth Inhibition.
3. Anti malarial and Anti-plasmodium Activity.
4. Good for Liver.
5. Lowers Blood Sugar Levels.
6. Cure to Your Menstrual Pain.
7. Helps Treat Skin Problems.
8. Promotes Hair Growth.
9. Increase appetite.
10. Meat tenderizer.
11. Relieve nausea.

**Advantages of *Murraya Koenigii* Leaves** (V. Jain *et. al*., 2012)**:** The major advantages of *Murraya koenigii* leaf are as follows,

1. Weight Loss.
2. Alleviate Diarrhoea.
3. Treat Indigestion.
4. Prevent Nausea & Morning Sickness.
5. Fight Infection.
6. Anti-diabetic Properties.
7. Good for Eyesight.
8. Fight Oxidative Stress.
9. Heal Wounds.
10. Fight Cancer.
11. Lower Cholesterol Levels.
12. Hair Care.
13. Protect the Liver.

**TABLETS**

A tablet is a pharmaceutical oral solid dosage (OSD) form or solid unit dosage form. Tablets are also being defined as solid pharmaceutical dosage form containing medicaments with or without suitable excipients and prepared either by compression or moulding. A tablet may be formulated to deliver an accurate dosage to a specific selected site; it's usually taken oral, but may be Route of administration like buccal, sublingual, rectal or intra vaginal. It comprises a combination of active substances and excipients, usually in powder form, pressed or compactedfrom a powder into a solid dose.

**Advantages and Disadvantages of tablets** (Banker G. S.*et. al,*. (1987)

**a) Advantages of tablets includes**

- Tablets are simple and convenient to use.
- Tablets provide accurately measured dosage of active ingredient.
- They are lightest and most compact amongst all oral dosage forms.
- They are easiest and cheapest for packaging and transportation.
- Better suited to large scale production than other oral dosage form.
- Manufacturing processes and techniques can provide tablets with special properties, as an example, fast dissolving or sustained release formulations.

**b) Disadvantages of tablet includes**

- Difficult to swallow just in case of children, elderly patients and unconscious patients.
- Drugs with poor wetting, slow dissolution properties, may be difficult to formulate as a tablet, as that will provide adequate bioavailability.
- Slow onset of action as compared to parenteral, liquid orals and capsules.
- It is difficult to formulate a high dose poorly compressible Active pharmaceutical ingredient (API) into a tablet of suitable size for human use.

**Tablet manufacturing methods** (Bramhankar D.M. *et. al*,. (1995)

Tablets are manufactured by dry granulation, wet granulation, or direct compression method.

**a) Dry granulation**

Dry granulation is a process in which there is no use of liquids. The process involves the formation of slugs. Then the slugs are screened or milled to produce granules. The granules formed are then compressed to form tablet.

**b) Wet granulation**

Wet granulation is the process in which a liquid is added to a powder in vessel equipped with any type of agitation that will produce agglomeration or granules. These granules after drying are compressed to form or make tablets.

**c) Direct compression**

The term direct compression is used to define the method by which the tablets are compressed directly from powder blends of active ingredient and suitable excipients, which will flow uniformly within the die

cavity and forms a firm compact.

## 2. EXPERIMENTAL WORK

### 2.1 Identification, Collection and Authentication of plant material

#### 2.1.1 *Carica Papaya* Linn.

The plant of *Carica Papaya* was collected from central india of vidarbha region in Nagpur district and Yavatamal district (Mategaon, Sawargaon, Ghati, Sangavi (Umar), Kamptee and Nagpur) Maharashtra, India in month of July. The plant was botanically identified and confirmed from the Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU), Nagpur. The plant specimen was dried its herbarium sheet was prepared and it wasauthenticated by Dr. N. M. Dongare at University Department of Botany, Nagpur. Specimen Voucher No. 10303.

**Fig. 1: Authenticated sheet of *Carica papaya* leaves.**

#### 2.1.2 *Murraya Koenigii* Linn.

The plant of *Murraya Koenigii* was collected from central india of vidarbha region in Nagpur district and Yavatamal district (Mategaon, Sawargaon, Ghati, Sangavi (Umar), Kamptee and Nagpur) Maharashtra, India in month of July. The plant was botanically identified and confirmed from the Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU), Nagpur. The plant specimen was dried its herbarium sheet was prepared and it wasauthenticated by Dr. N. M. Dongare at University Department of Botany, Nagpur. Specimen Voucher No. 10304.

**Fig. 2: Authenticated sheet of *Murraya Koenigii* leaves.**

### 2.2 Extraction of the *Carica papaya and Murraya Koenigii* leaves

#### 2.2.1 Aqueous extraction of *Carica papaya and Murraya Koenigii* leaves

- The leaves were shed dried for about 7-8 days and powdered with the help of mixer orgrinder.
- 250 g of powdered leaves were macerated in aqueous mixture with 1000 ml distilled water it was kept aside or for maceration for about 48 hrs.
- After 48 hrs, the mixture was filtrate through Whitman filter paper no. 1 and distillation of filtrate was done to get concentrate extract. The yield of the extract wasfound to be 40 g. The extract was stored in freeze for further uses (Hassan Yankuzoa, et. al., 2011).

## 3. PRECOMPRESSION PARAMETER

### A. Bulk density

It is the ratio of bulk mass of powder to the bulk volume. It is detected by (□b). Bulk density is used to find out homogenicity.

**Bulk density (□b)** = M/Vb

Where, M- is the mass of the sample, Vb- is the bulk volume.

### B. Tapped density

It is the ratio of weight of the powder to the minimum volume occupied in measuring cylinder. Tapped density is determined by placing a graduated cylinder containing a known mass of drug or formulation on a mechanical tapper apparatus which is operated at a fixed number of taps (1000) until the powder bed reached a minimum volume. It is denoted by (□t). **Tapped density (□t)** = weight of powder blend / minimum volume occupied in cylinder.

### C. Compressibility Indices

#### C.1 Carr's index

Based on the apparent bulk density and the tapped density, the percentage compressibility of the powder mixture was determined by the following formula-

**Carr's index** = Tapped density-Bulk density × 100/ Tapped density

**Table No. 1**

| Carr's index (%) | Flow ability |
|---|---|
| 5-15 | Excellent |
| 12-16 | Good |
| 18-21 | Fair to Passable |
| 23-35 | Poor |
| 33-38 | Very poor |
| >40 | Extremely poor |

#### C.2 Hauser's ratio

It is an indirect index of ease of measuring of powder flow. Lower Hauser's ratio (< 1.25) indicates better flow properties than higher ones (> 1.25).

**Hauser's ratio** = Tapped density / Bulk density

**Table No. 2**

| Hauser's ratio | Flow ability |
|---|---|
| <1.25 | Good |
| > 1.25 | Poor |

## 4. POST-COMPRESSIONAL STUDIES OF PREPARED TABLETS

The tablets were evaluated for various parameters after consideration of pre-formulation to overcome errors during formulation preparation. These are like appearance, thickness, weight variation, hardness, disintegration study, drugs content and in-vitro drug release.

### A. Physical appearance

The general appearance of tablet was studied visually in terms of shape, colour, odour andtexture.

### B. Thickness

The tablet thickness was calculated by using Vernier Callipers. Tablet was put in between two jaws vertically and thickness was measured and 3 tablets were used for this test and areexpressed in mm.

### C. Weight variation

Weight variation test is run by weighing 20 tablets individually, calculating the average weight and comparing individual tablet weight to the average. The weight variation test would be a satisfactory method of determining the drug content uniformity of tablets.

**Table No. 4**

| Average weight of tablet (in mg) | | % Deviation |
|---|---|---|
| As per USP-30 / NF-25 | As per IP-2007 | |
| Less than 130 mg | Less than 80 mg | 10 |
| 130 mg to 324 mg | 80 mg to 250 mg | 7.5 |
| More than 324 mg | More than 250 mg | 5 |

### D. Hardness

Hardness also termed as tablet crushing strength. The tablet hardness was determined by Monsanto hardness tester. The tablet was placed lengthwise between upper and lower plungerand force applied by turning a threaded bolt until the tablet fractures and measured hardness of tablet in $kg/cm^2$.

### E. Friability

It is determined by Roche apparatus (Friabilator), where number of tablets was subjected to combined effects of abrasion and shock by utilizing a plastic chamber that

revolves at 25 rpm, dropping tablets from 6 inches distance operated at 100 revolutions. Pre-weighed tablets were dusted and re-weighed and according to standard limit friability should be less than 1%. It is calculated by formula-

$$\%\textbf{Friability} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \times 100$$

**F. Drug Content**

Initially 5 tablets was weight and then powdered. The powdered tablet was transferred into 100 ml volumetric flask and 50 ml ethanol was added, the solution was sonicated for about 15 minutes, and then volume was adjusted up to the mark. From the initial solution 1ml was pipette out in 100 ml volumetric flask and the volume was adjusted to 100 ml with ethanol. Then the absorbance was recorded at two different nm (264 nm and 264.4 nm) respectively.

**G. Disintegration Time**

5 tablets were placed in the tubes along with a plastic disc over the tablets. The disc imparts pressure on the tablets. The tubes were allowed to move up and down in the media as 29-32 cycle per minute in pH 6.8 phosphate buffer media maintained at 37$^{o}$c. Time required to passall tablets through the mesh was determined as its disintegration time.

**H. In-vitro Drug Release**

Dissolution profile of tablet was determined at 37±0.5$^{o}$c at the stirring rate of 50 rpm using the USP type- II dissolution apparatus in 900ml of 0.1 N HCL and phosphate buffer pH 7.4. Various aliquot samples were withdrawn with replacement simulated fluid of same amount at 20, 40, 60, 80, 100 and 120 min respectively, every twenty minute interval for about 2 hours. Samples were filtered using Whitman filter paper and taken absorbance at wavelength of 264 nm and 264.4 nm by UV spectrophotometer.

In-vitro dissolution studies for the prepared tablet formulations were carried out using type-II apparatus at 50 rpm. The dissolution media used was 900 ml of 0.1N HCl, and phosphate buffer pH 7.4 media were used as dissolution media for first two hours and the next 24 h respectively and maintained at 37 ºC ± 0.5 ºC. 5 ml aliquots were withdrawn at the specified time intervals. An equal volume of fresh media was replenished after each sampling to maintain the constant volume of the medium. The samples were analyzed at 264 nm and 264.4 nm using UV-visible spectrophotometer (priyanka ayare *et. al.*, 2019).

## 5. RESULTS

### 5.1 Authentication of *Carica Papaya* and *Murraya koenigii* leaves

The leaves were dried and authenticated from Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. The leaves were identified of *Carica Papaya* Linn, Family Caricaceae and *Murraya koenigii* Linn, Family Rutaceae.

**Preliminary phytochemical screening of the extracts of *Carica Papaya* and *MurrayaKoenigii*:**

**1. Solubility**

Solubility of the extract in various solvents shown in table no. 5

**Table No. 5: Solubility of the aqueous and hydro alcoholic extract.**

| Sr. No. | Solvents | Solubility of aqueous extract | Solubility of hydroalcoholic extract |
|---|---|---|---|
| 1 | Water | Soluble | Soluble |
| 2 | Ethanol | Soluble | Soluble |
| 3 | Phosphate buffer pH7.4 | Soluble | Soluble |
| 4 | 01 m HCL | Soluble | Soluble |
| 5 | Methanol | Soluble | Soluble |
| 6 | Petroleum ether | Sparingly soluble | Sparingly soluble |
| 7 | Chloroform | Soluble | Soluble |
| 8 | Ethyl acetate | Soluble | Soluble |
| 9 | n-Hexane | Sparingly soluble | Sparingly soluble |
| 10 | Diethyl ether | Sparingly soluble | Sparingly soluble |

The Aqueous and Hydroalcoholic extract of *Carica Papaya* and *Murraya koenigii* were soluble in water, ethanol, 01 m HCL, Phosphate buffer pH 7.4, methanol, chloroform, ethyl acetate, and sparingly soluble in petroleum ether, n-heaxane, and diethyl ether.

**2. Phytochemical screening of dried leaves**

The various ash values and extractive values determined quantitatively are shown intable no. 6.

**Table No. 6: Ash values determination of extract.**

| Sr. No. | Parameters | C.P. Aqu. | C.P. Hyd. | M.K. Aqu. | M.K. Hyd. |
|---|---|---|---|---|---|
| 1. | Total ash value | 44.28% | 36.98% | 46.66% | 33.82% |

**Table No. 7: Acid insoluble ash value.**

| Sr. No. | Parameters | C.P. Aqu. | C.P. Hyd. | M.K. Aqu. | M.K. Hyd. |
|---|---|---|---|---|---|
| 1 | Acid insoluble ash value | 35.70% | 28.76% | 36.66% | 25.00% |

Total ash value were found to be more in percentage yield of aqueous and hydroalcoholic extract as compared to acid insoluble ash value It indicates that the polar constituents are present more in the hydroalcoholic extract as compared to aqueous extract.

**3. Preliminary screening of the extract**

The result of preliminary phytochemical screening of the aqueous and hydroalcoholic extract was mentioned in table no. 7 and 8.

**Table No. 8: Preliminary Screening of *Carica Papaya* aqueous and hydroalcoholicextract.**

| Sr. No. | Test | Aqueousextract | Hydroalcoholicextract |
|---|---|---|---|
| 1. | **Test for Alkaloids**Dragendorff's test Mayer's test Hager's test Wagner's test | +<br>+<br>+<br>+ | +<br>+<br>+<br>+ |
| 2. | **Test for Flavonoids**<br>Shinoda test Lead acetate test Alkali test | +<br>+<br>+ | +<br>+<br>+ |
| 3. | **Test for Carbohydrate**<br>Molisch's test | - | - |
| 4. | **Test for Glycoside** | - | - |
| 5. | **Test for Proteins**<br>Millions test | - | + |
| 6. | **Test for Tannins**<br>Potassium dichromate test | - | + |
| 7 | **Test for Steroids**<br>Salkowski test | - | + |
| 8 | **Test for Saponins**<br>Foam test | - | + |

The aqueous and hydroalcoholic extract of *Carica Papaya and Murraya koenigii* leaves shows the presence of Alkaloids, Flavonoids, Carbohydrate, Glycoside, Proteins, Tannins, Steroids, and Saponins. The Aqueous extracts shows absence of Alkaloids, Flavonoids, Carbohydrate, Glycoside, Proteins, Tannins, Steroids, and Saponins.

**Table No. 9: Preliminary Screening of *and Murraya koenigii* aqueous andhydroalcoholic extract.**

| Sr. No. | Test | Aqueousextract | Hydroalcoholic extract |
|---|---|---|---|
| 1. | **Test for Alkaloids**Dragendorff's test Mayer's test Hager's test Wagner's test | +<br>+<br>+<br>+ | +<br>+<br>+<br>+ |
| 2. | **Test for Flavonoids**<br>Shinoda test Lead acetate test Alkali test | +<br>+<br>+ | +<br>+<br>+ |
| 3. | **Test for Carbohydrate**<br>Molisch's test | + | + |
| 4. | **Test for Glycoside** | + | + |
| 5. | **Test for Proteins**<br>Millions test | + | + |
| 6. | **Test for Tannins**<br>Potassium dichromate test | + | + |
| 7 | **Test for Steroids**<br>Salkowski test | - | + |
| 8 | **Test for Saponins**<br>Foam test | - | + |

The aqueous and hydroalcoholic extract of *Carica Papaya and Murraya koenigii* leaves shows the presence of Alkaloids, Flavonoids, Carbohydrate, Glycoside, Proteins, Tannins, Steroids, and Saponins. The aqueous extracts shows absence of Alkaloids, Flavonoids, Carbohydrate, Glycoside, Proteins, Tannins, Steroids, and Saponins.

### 5.2 MORPHOLOGICAL CHARACTERISTICS OF HYDROALCOHOLICEXTRACT

Color, odour and taste were shown in table no. 5.5 and 5.6.

**Table No. 10: Morphological Characteristics of *Carica papaya* aqueous andhydroalcoholic extract of leaves**.

| Sr. No. | Test | Characteristics of Aqueous extract | Characteristics of Hydroalcoholic extract |
|---|---|---|---|
| 1 | Color | Greenish black | Greenish black |
| 2 | Odour | Characteristics | Characteristics |
| 3 | Taste | Very Bitter | Bitter |

**Fig. 3: *Carica papaya* aqueous.**

**Fig. 4: *Carica papaya* hydroalcoholic.**

**Table No. 11: Morphological Characteristics of *Murraya Koenigii* aqueous andhydroalcoholic extract of leaves.**

| Sr. No. | Test | Characteristics of Aqueous Extract | Characteristics of Hydro Alcoholic Extract |
|---|---|---|---|
| 1 | Color | Greenish black | Greenish black |
| 2 | Odour | Characteristics | Characteristics |
| 3 | Taste | Slightly Sweet | Slightly Sweet |

**Fig. 5: Murraya Koenigii aqueous.**

**Fig. 6: *Murraya Koenigii* hydroalcoholic.**

### 5.3 THIN LAYER CHROMATOGRAPHY OF *CARICA PAPAYA* AND *MURRAYA KOENIGII* AQUEOUS AND HYDROALCOHOLIC EXTRACT

#### 5.3.1 TLC OF *CARICA PAPAYA* AQUEOUS AND HYDROALCOHOLIC LEAVESEXTRACT

Spots were detected using UV light (UV chamber) and iodine chamber and spraying agent$H_2SO_4$.

#### 5.3.2 TLC OF *MURRAYA KOENIGII* AQUEOUS AND HYDROALCOHOLICLEAVES EXTRACT

Spots were detected using UV light (UV chamber) and iodine chamber and spraying agent$H_2SO_4$.

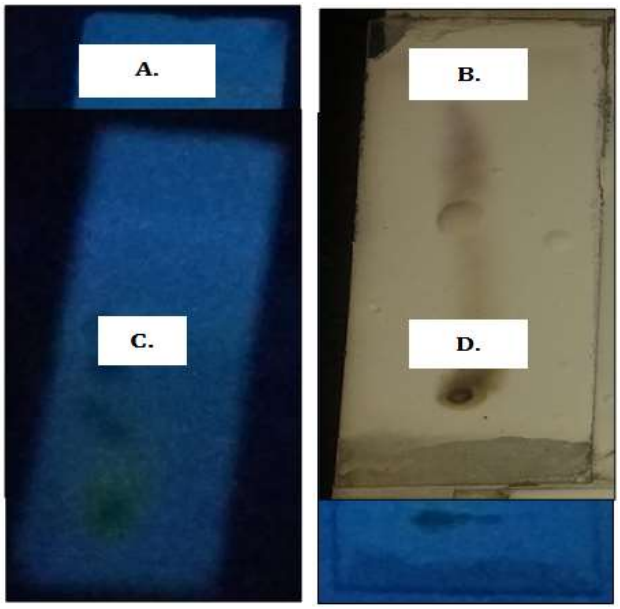


**Fig. 7: Thin Layer chromatographies of A. Carica papaya aqueous extract B. *Carica papaya* hydroalcoholic extract C. *Murraya koenigii* aqueous extract D. *Murraya koenigii*hydroalcoholic extract.**

**Table No. 12: TLC Rf Value of *Carica Papaya* and *Murraya Koenigii* aqueous andhydroalcoholic extract.**

| Drug | Solvent system used | Ratio | No. of spots | Distance travelled by solute | Distance travelled by solvent | Rf Value |
|---|---|---|---|---|---|---|
| *Carica papaya* aqueous extract | Chloroform:Ethanol | 7:3 | 2 | 1.2<br>3.4 | 5.8<br>5.8 | 0.20<br>0.58 |
| *Carica papaya* Hydroalcoholic extract | Toluene: Methanol | 6:4 | 3 | 1.4<br>3.1<br>5.1 | 5.9<br>5.9<br>5.9 | 0.23<br>0.52<br>0.86 |
| *Murraya koenigii* aqueous extract | Ethyl acetate:Methanol: Water | 8:1:1 | 4 | 1.2<br>2.6<br>2.9<br>3.2 | 5.6<br>5.6<br>5.6<br>5.6 | 0.21<br>0.46<br>0.51<br>0.57 |
| *Murraya koenigii* hydroalcoholic Extract | Chloroform:Methanol | 8:2 | 3 | 1.3<br>2.5<br>5.1 | 5.8<br>5.8<br>5.8 | 0.22<br>0.43<br>0.87 |

**5.4 UV VISIBLE SPECTROSCOPY/ UV SCANNING**

The UV Scanning of *Carica papaya* and *Murraya koenigii* aqueous and hydroalcoholic extract showed the maximum absorbance at 264.4 nm, 264 nm and 268 nm, 221.8 nm.

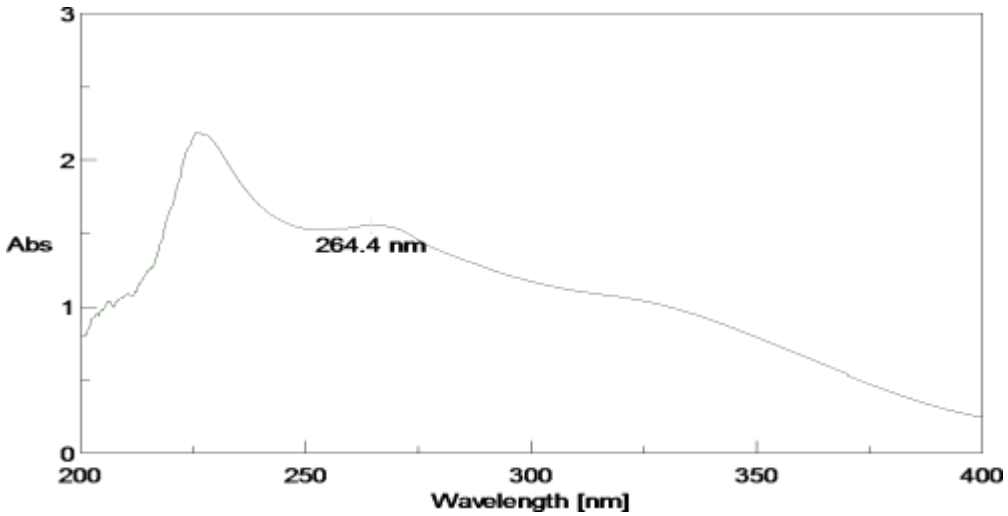


**Fig. 8: UV Spectrum of *Carica papaya* aqueous and hydroalcoholic extract in 0.1 n HCL at 264.4 nm**

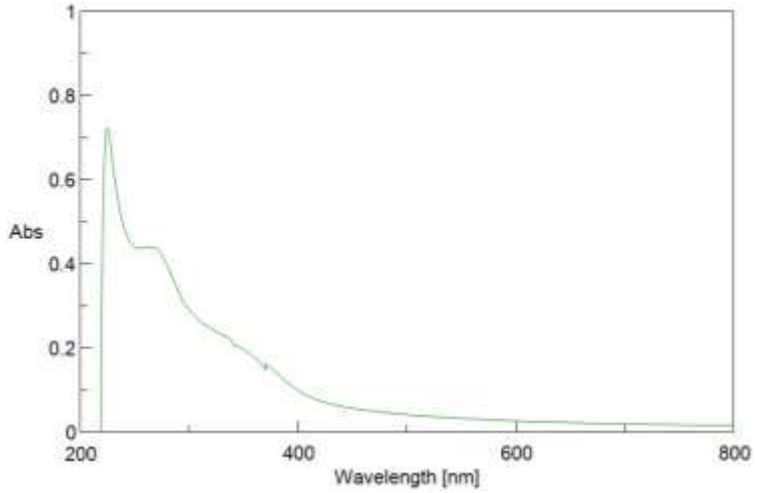


**Fig. 9: UV Spectrum of *Carica papaya* aqueous and hydroalcoholic extract in Phosphatebuffer pH 7.4 at 264 nm.**

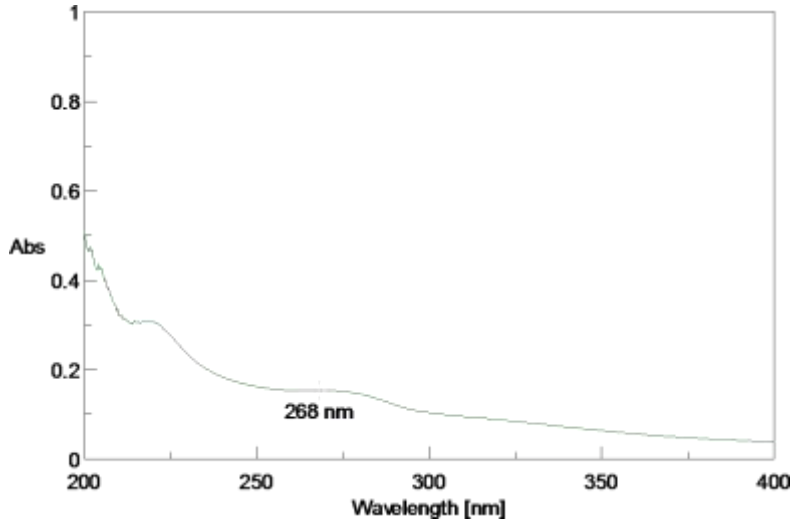


**Fig. 10: UV Spectrum of *Murraya Koenigii* aqueous and hydroalcoholic extract in 0.1 nHCL at 268 nm.**

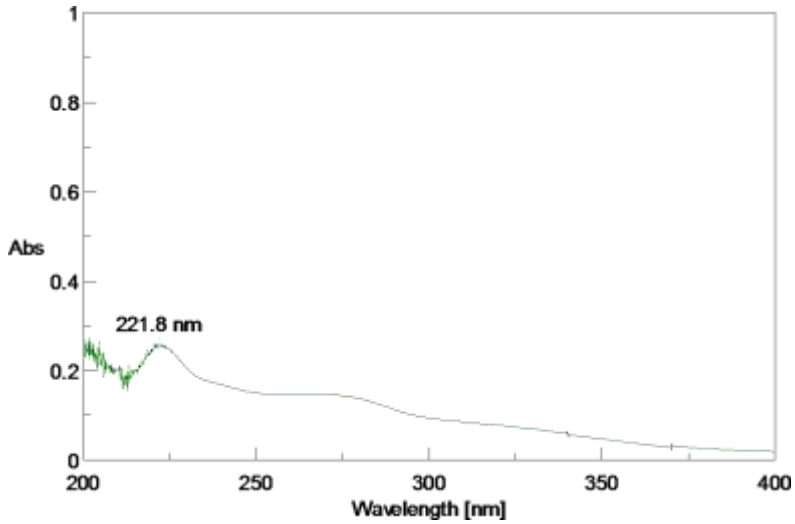


**Fig. 11: UV Spectrum of *Murraya Koenigii* aqueous and hydroalcoholic extract in Phosphate buffer pH 7.4 at 221.8 nm.**

### 5.5 STANDARD CALIBRATION CURVE OF PLANT EXTRACTS

Standard calibration curve of both the plant extracts i.e. *Carica papaya* and *Murraya koenigii* were prepared for 20 µg/ml to 100 µg/ml concentration in 0.1 n HCL at λmax and pH 7.4 phosphate buffer at λmax respectively. The graph of absorbance v/s concentration was plotted and date was subjected to linear regression analysis.

**Table No. 13: Calibration data of *Carica papaya* aqueous extract at 0.1 N HCL.**

| Sr. No. | Concentration (µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.1698 |
| 3. | 40 | 0.3832 |
| 4. | 60 | 0.5621 |
| 5. | 80 | 0.782 |
| 6. | 100 | 0.9838 |

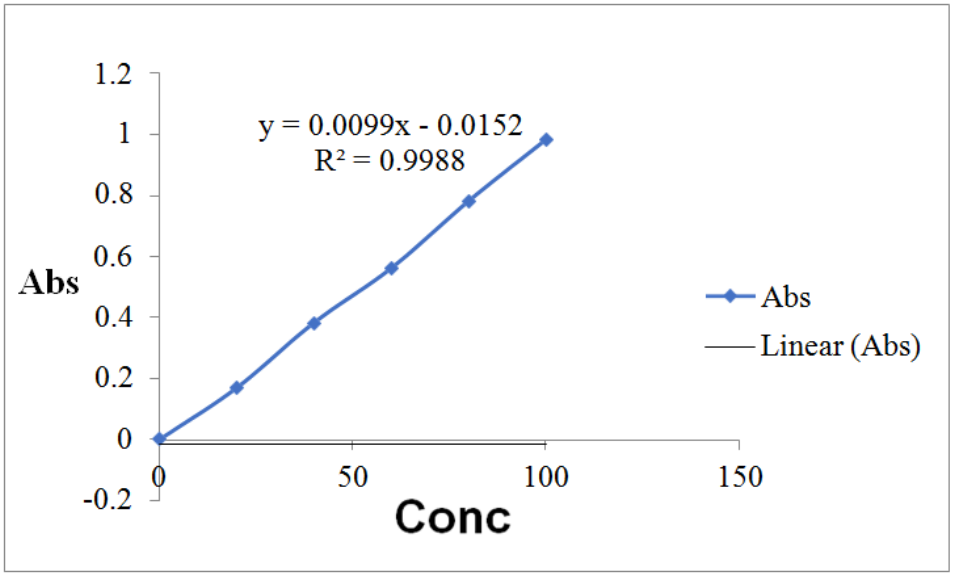


**Fig. 12: Calibration curve of Carica papaya aqueous extract at 0.1 N HCL.**

**Table No. 14: Calibration data of *Carica papaya* hydroalcoholic extract at 0.1 N HCL.**

| Sr. No. | Concentration (µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.5639 |
| 3. | 40 | 1.0627 |
| 4. | 60 | 1.5098 |
| 5. | 80 | 1.9098 |
| 6. | 100 | 2.3497 |

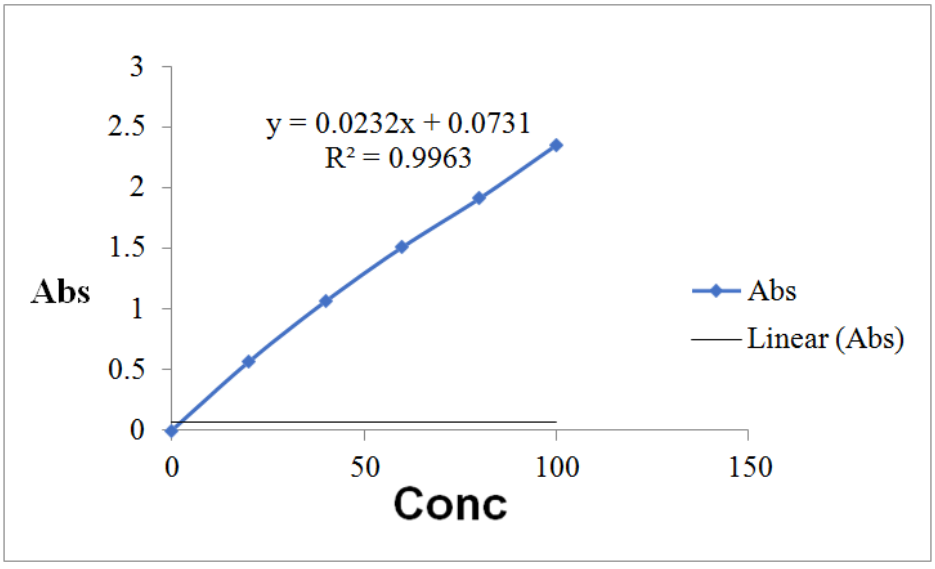


**Fig. 13: Calibration curve of *Carica papaya* hydroalcoholic extract at 0.1 N HCL.**

**Table No. 15: Calibration data of *Carica papaya* aqueous extract at Phosphate buffer pH7.4**

| Sr. No. | Concentration(µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.1418 |
| 3. | 40 | 0.3564 |
| 4. | 60 | 0.5759 |
| 5. | 80 | 0.7224 |
| 6. | 100 | 0.9478 |

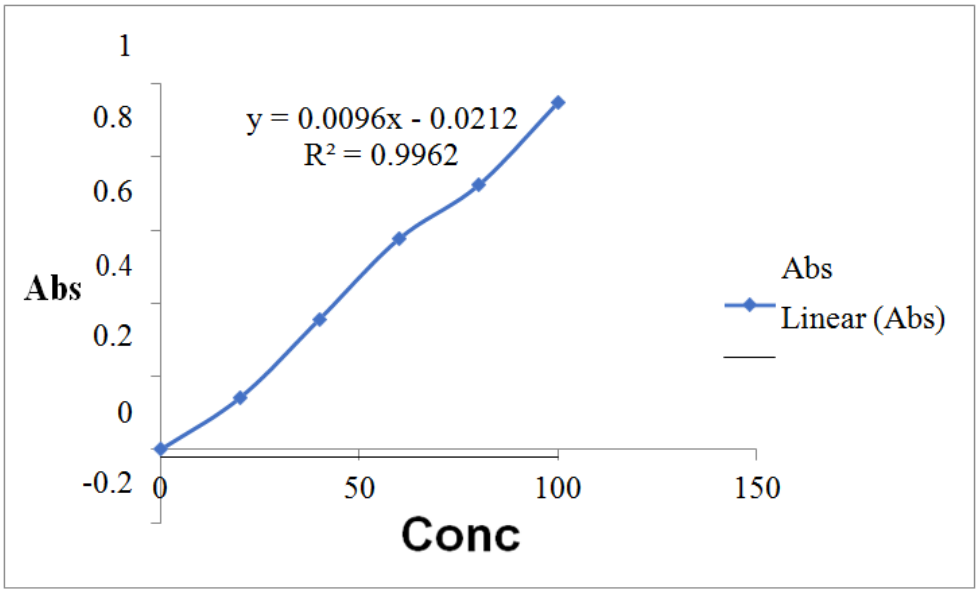


**Fig. 14: Calibration curve of *Carica papaya* aqueous extract at Phosphate buffer pH 7.4.**

**Table No. 16: Calibration data of *Carica papaya* hydroalcoholic extract at Phosphatebuffer pH 7.4.**

| Sr. No. | Concentration(µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.0987 |
| 3. | 40 | 0.1754 |
| 4. | 60 | 0.2644 |
| 5. | 80 | 0.3596 |
| 6. | 100 | 0.4519 |

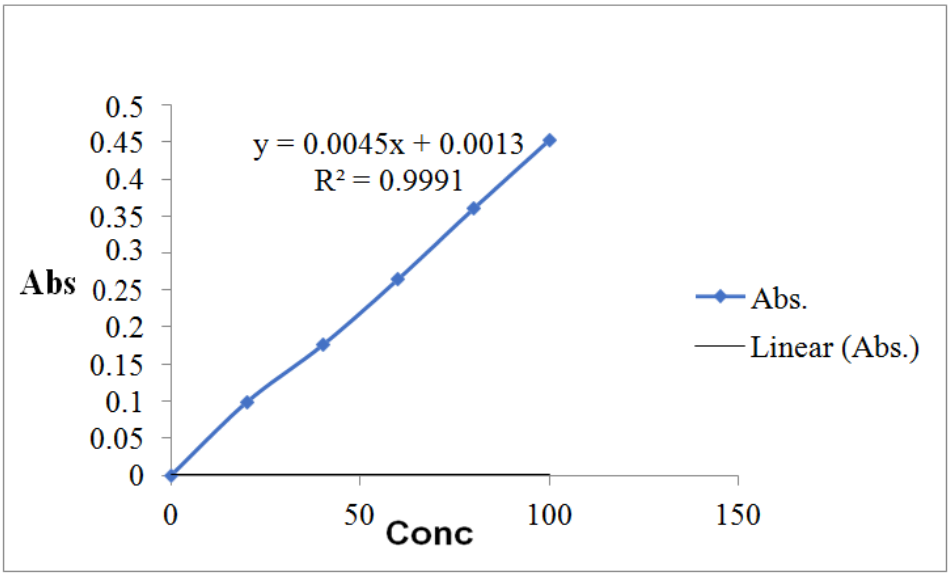


**Fig. 15: Calibration curve of *Carica papaya* hydroalcoholic extract at Phosphate buffer pH7.4**

**Table No. 17: Calibration data of *Murraya Koenigii* aqueous extract at 0.1 N HCL.**

| Sr. No. | Concentration(µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.1402 |
| 3. | 40 | 0.2462 |
| 4. | 60 | 0.35 |
| 5. | 80 | 0.4698 |
| 6. | 100 | 0.558 |

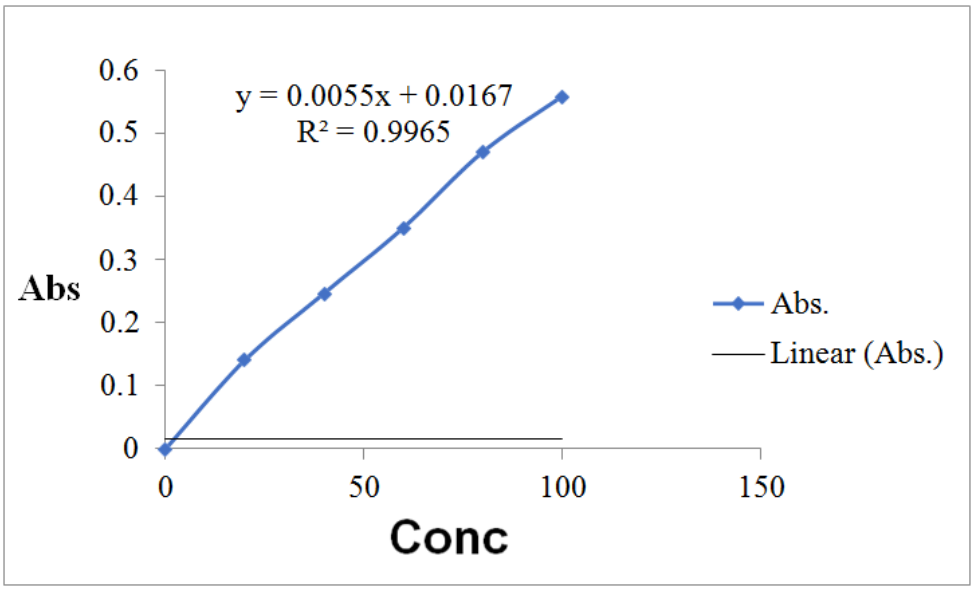


**Fig. 16: Calibration curve of *Murraya Koenigii* aqueous extract at 0.1 N HCL.**

**Table No. 18: Calibration data of *Murraya Koenigii* hydroalcoholic extract at 0.1 N HCL.**

| Sr. No. | Concentration (µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.068 |
| 3. | 40 | 0.1429 |
| 4. | 60 | 0.2057 |
| 5. | 80 | 0.2898 |
| 6. | 100 | 0.3857 |

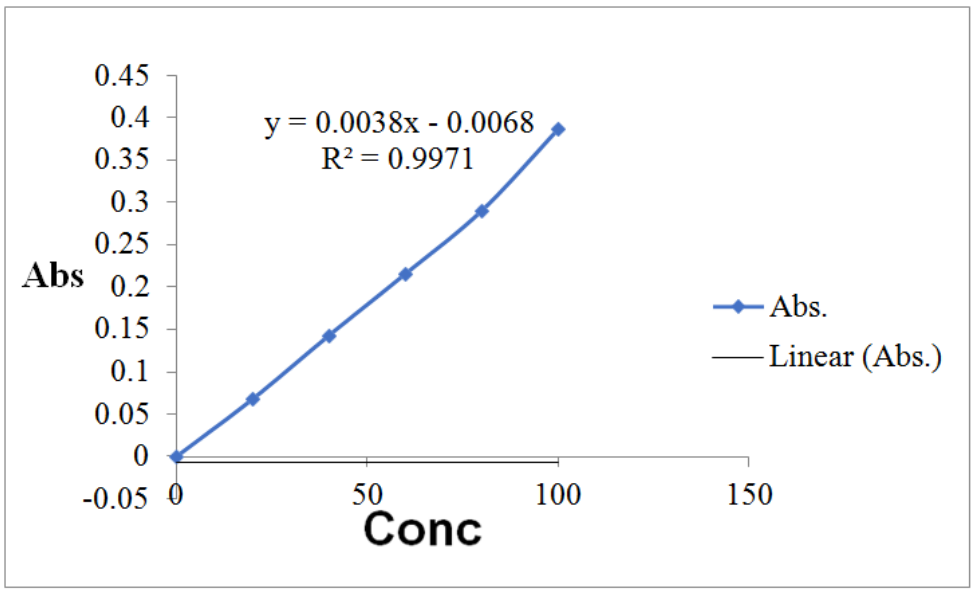


**Fig. 17: Calibration curve of *Murraya Koenigii* hydroalcoholic extract at 0.1 N HCL.**

**Table No. 19: Calibration data of *Murraya Koenigii* aqueous extract at Phosphate bufferpH 7.4**

| Sr. No. | Concentration (µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.4252 |
| 3. | 40 | 0.8656 |
| 4. | 60 | 1.4248 |
| 5. | 80 | 1.9658 |
| 6. | 100 | 2.5486 |

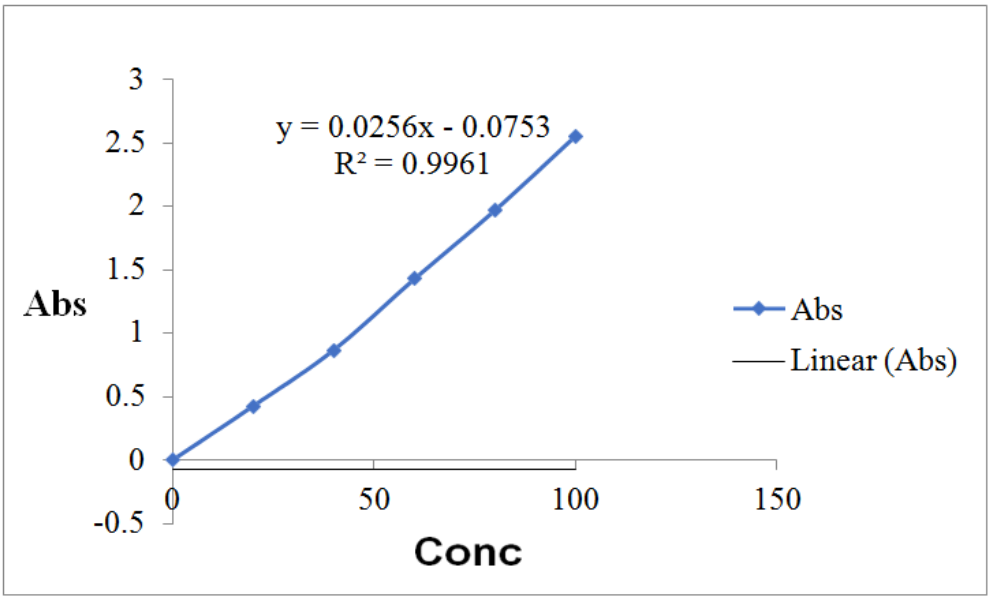


**Fig. 18: Calibration curve of *Murraya Koenigii* aqueous extract at Phosphate buffer pH 7.4.**

**Table No. 20: Calibration data of *Murraya Koenigii* hydroalcoholic extract at Phosphatebuffer pH 7.4.**

| Sr. No. | Concentration (µg/ml) | Absorbance |
|---|---|---|
| 1. | 0 | 0 |
| 2. | 20 | 0.3452 |
| 3. | 40 | 0.8695 |
| 4. | 60 | 1.2564 |
| 5. | 80 | 1.6245 |
| 6. | 100 | 2.1564 |

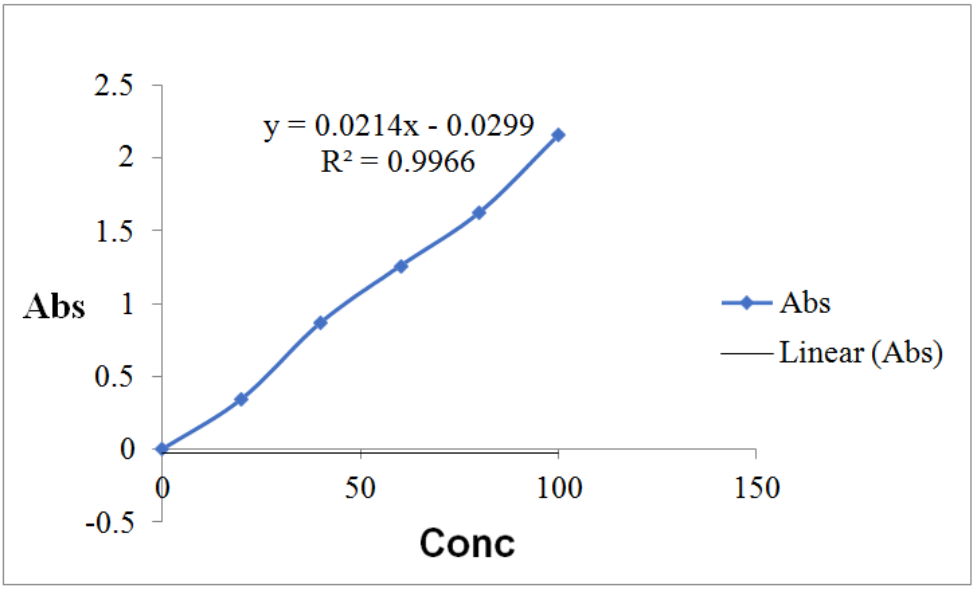


**Fig. 19: Calibration curve of *Murraya Koenigii* hydroalcoholic extract at Phosphate buffer pH 7.4.**

### 5.6 PRECOMPPRESSIONAL STUDIES OF TABLET BLEND

For formulation of direct compression tablet the blend was prepared and subjected toevaluation.

5.6.1 Physical properties for tablet blend

**Table No. 21: *Carica papaya* and *Murraya Koenigii* aqueous extract tablet.**

| Batch | Bulk density (gm/ml) | Tapped density (gm/ml) | Hausner's ratio | Carr's index (%) |
|---|---|---|---|---|
| **F1** | 0.41 | 0.47 | 1.14 | 12.76 |
| **F2** | 0.42 | 0.50 | 1.19 | 16 |
| **F3** | 0.39 | 0.45 | 1.15 | 13.33 |
| **F4** | 0.39 | 0.46 | 1.17 | 15.21 |

±S.D. = Standard Deviation, n=4

**Table No. 22: *Carica papaya* and *Murraya Koenigii* hydroalcoholic extract tablet.**

| Batch | Bulk density(gm/ml) | Tapped density(gm/ml) | Hausner'sratio | Carr's index(%) |
|---|---|---|---|---|
| **F1** | 0.39 | 0.45 | 1.18 | 15.55 |
| **F2** | 0.40 | 0.46 | 1.15 | 13.04 |
| **F3** | 0.37 | 0.43 | 1.16 | 13.95 |
| **F4** | 0.38 | 0.42 | 1.10 | 9.52 |

±S.D. = Standard Deviation, n=4

The pre-compression study of all batches of blend was evaluated for different derived properties are:-

1. Bulk density (between 0.40 to 0.47µg/ml)
2. Tapped density (between 0.41 to 0.49µg/ml)
3. Hausner's ratio (between 10 to 15 %)
4. Carr's index (between 1.10 to 1.18 %)

The results of Bulk density, Tapped density and compressibility indicated that the flowability of blend is significantly good. All the results of pre-compression parameters are in the acceptable range.

### 5.7 POST COMPPRESSIONAL STUDY

Tablet were prepared in batches F1 to F4 and evaluated for tablet properties like physical appearance, weight variation, hardness, thickness, diameter, friability, disintegration, dissolution.

#### 5.7.1 Physical appearance

The general appearance of tablet was found to be round in shape, brown in color, smoothtexture and odourless.

**A. Table No. 23: Results for *Carica papaya* and *Murraya Koenigii* aqueous extracttablet.**

| Batch | % Weight variation | Hardness(kg/cm$^2$) | Thickness(mm) | Diameter(mm) | Friability(%) |
|---|---|---|---|---|---|
| **F1** | 0.500.9±09 | 6.03±03 | 4.20±20 | 11.22±22 | 0.39% |
| **F2** | 0.502±02 | 6.08±08 | 4.80±80 | 11.23±23 | 0.59% |
| **F3** | 0.500±00 | 6.10±10 | 5.05±105 | 11.22±22 | 0.40% |
| **F4** | 0.501±01 | 6.20±20 | 5.10±110 | 11.21±21 | 0.59% |

±S.D. = Standard Deviation, n=4

**B. Table No. 24: Results for *Carica papaya* and *Murraya Koenigii* hydroalcoholicextract tablet.**

| Batch | % Weight variation | Hardness (kg/cm$^2$) | Thickness(mm) | Diameter(mm) | Friability(%) |
|---|---|---|---|---|---|
| **F1** | 0.502±02 | 6.08±08 | 4.80±80 | 11.23±23 | 0.59% |
| **F2** | 0.500±00 | 6.10±10 | 5.05±105 | 11.22±22 | 0.40% |
| **F3** | 0.502±02 | 5.52±48 | 5.04±104 | 11.22±22 | 0.79% |
| **F4** | 0.501±01 | 6.33±33 | 5.10±110 | 11.25±25 | 0.99% |

±S.D. = Standard Deviation, n=4

All the tablets passed weight variation test as per the percent weight variation was within the pharmacopoeias limits. Hardness was shown in the range of 6.00 to 7.00 Kg/cm$^2$ in all the formulations. Friability of all formulations was determined. The friability values of none of the formulations exceeded 1%. The results of friability indicated that the tablets were mechanically stable and can withstand rigor of transportation and handling. Thickness of all tablets was between 4.00 to 6.00 mm showing fairly uniform tableting.

**C. Table No. 25: Results for Disintegration time (min/sec)**

| Batch | CP+MK Aqueous Extract Tablet | CP+MK Hydroalcoholic Extract Tablet |
|---|---|---|
| **F1** | 118 sec. | 115 sec. |
| **F2** | 162 sec. | 288 sec. |
| **F3** | 190 sec. | 213 sec. |
| **F4** | 150 sec. | 155 sec. |

±S.D. = Standard Deviation, n=4

The results of all disintegration tablets were found to be within prescribed limits and satisfied the criteria for the tablet. The value was found to be in range 110 to 184 sec.

### 5.7.2 IN VITRO DISSOLUTION STUDIES

Dissolution study of tablet formulation was carried out in 0.1 N HCL over 120 min. and pH 7.4 phosphate buffer over 120 min. the samples were analysed by UV. This study was carriedout to check the drug release profile.

**Table No. 26: In vitro dissolution study for CP+MK aqueous extract tablet in 0.1 N HCL.**

| Time(min) | % Drug Release | | | |
|---|---|---|---|---|
| | **F1** | **F2** | **F3** | **F4** |
| 0 | 0±0 | 0±0 | 0±0 | 0±0 |
| 20 | 10.55 | 12.056 | 12.59 | 14.44 |
| 40 | 19.89 | 21.15 | 24.562 | 22.39 |
| 60 | 27.65 | 26.64 | 29.66 | 30.023 |
| 80 | 37.555 | 39.58 | 42.651 | 40.67 |
| 100 | 45.64 | 45.798 | 46.621 | 44.72 |
| 120 | 60.553 | 52.942 | 56.15 | 49.67 |

±S.D. = Standard Deviation, n=4

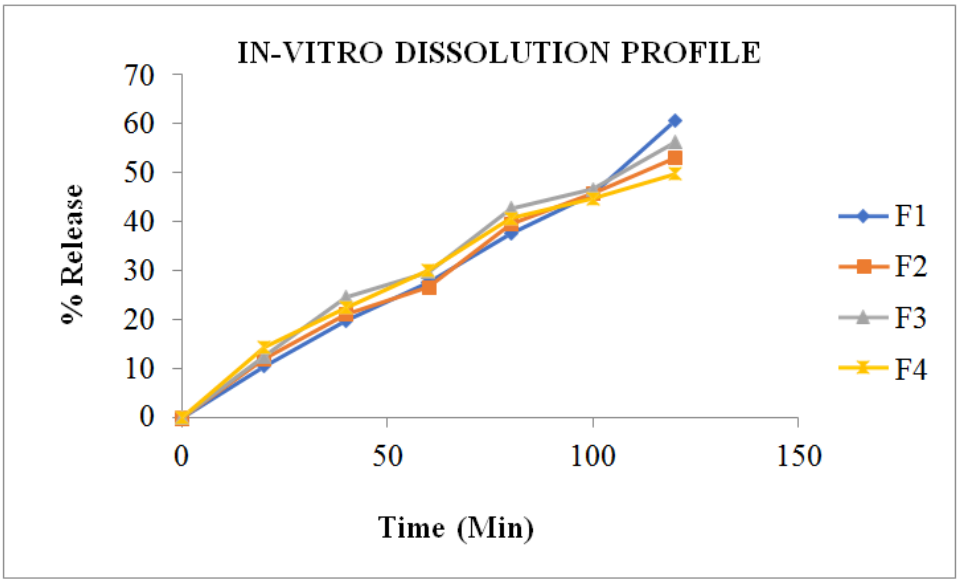


**Fig. 20: Dissolution profile for formulation from F1-F4 for CP+MK aqueous extract tabletin 0.1 N HCL.**

**Table No. 27: In vitro dissolution study for CP+MK aqueous extract tablet in pH 7.4phosphate buffer.**

| Time(min) | % Drug Release | | | |
|---|---|---|---|---|
| | **F1** | **F2** | **F3** | **F4** |
| 0 | 0±0 | 0±0 | 0±0 | 0±0 |
| 20 | 14.158 | 18.299 | 18.299 | 18.299 |
| 40 | 28.27 | 31.535 | 32.724 | 35.896 |
| 60 | 40.812 | 43.331 | 40.821 | 43.336 |
| 80 | 48.742 | 47.783 | 48.839 | 50.692 |
| 100 | 58.046 | 53.694 | 61.183 | 62.156 |
| 120 | 73.88 | 70.273 | 79.885 | 83.358 |

±S.D. = Standard Deviation, n=4

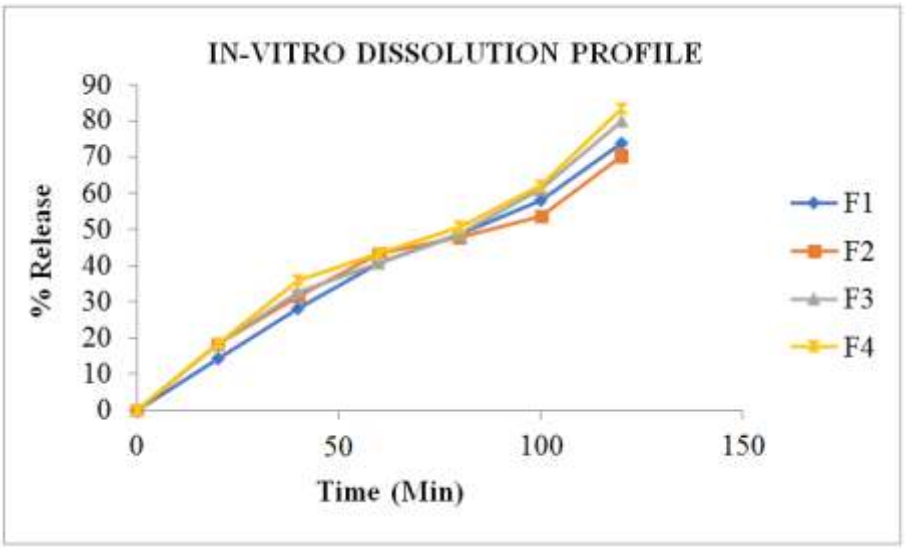


**Fig. 21: Dissolution profile for formulation from F1-F4 for CP+MK aqueous extract tabletin pH 7.4 phosphate buffer.**

**Table No. 28: In vitro dissolution study for CP+MK hydroalcoholic extract tablet in 0.1 NHCL.**

| Time(min) | % Drug Release | | | |
|---|---|---|---|---|
| | F1 | F2 | F3 | F4 |
| 0 | 0±0 | 0±0 | 0±0 | 0±0 |
| 20 | 15.95 | 14.54 | 12.054 | 16.87 |
| 40 | 22.546 | 24.516 | 21.656 | 25.545 |
| 60 | 30.165 | 31.56 | 28.86 | 31.48 |
| 80 | 40.565 | 42.21 | 44.64 | 42.852 |
| 100 | 47.564 | 48.258 | 48.468 | 46.95 |
| 120 | 58.95 | 55.796 | 62.15 | 50.55 |

±S.D. = Standard Deviation, n=4

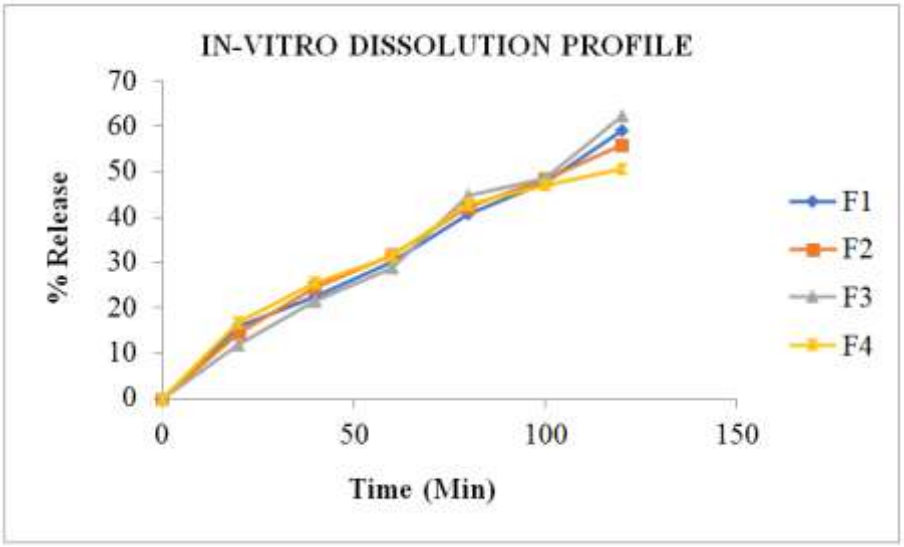


**Fig. 22: Dissolution profile for formulation from F1-F4 for CP+MK hydroalcoholic extracttablet in 0.1 N HCL.**

**Table No. 29: In vitro dissolution study for CP+MK hydroalcoholic extract tablet in pH 7.4 phosphate buffer.**

| Time (min) | % Drug Release | | | |
|---|---|---|---|---|
| | F1 | F2 | F3 | F4 |
| 0 | 0±0 | 0±0 | 0±0 | 0±0 |
| 20 | 21.556 | 17.722 | 23.977 | 24.336 |
| 40 | 26.732 | 26.672 | 28.101 | 28.101 |
| 60 | 31.074 | 33.155 | 33.907 | 33.715 |

| | | | | |
|---|---|---|---|---|
| 80 | 38.561 | 41.603 | 39.935 | 39.935 |
| 100 | 50.538 | 50.803 | 50.068 | 51.942 |
| 120 | 70.18 | 70.18 | 80.964 | 85.686 |

±S.D. = Standard Deviation, n=4

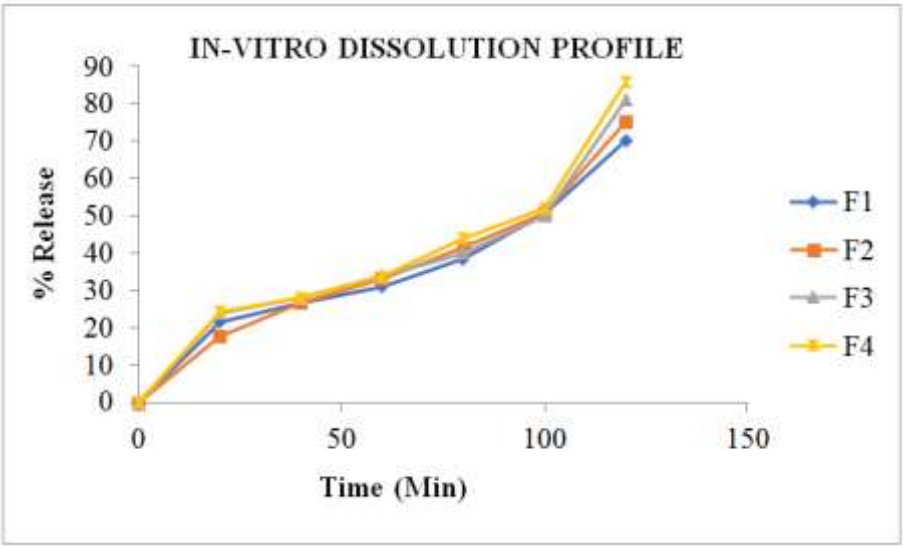


**Fig. 23: Dissolution profile for formulation from F1-F4 for CP+MK hydroalcoholic extract tablet in pH 7.4 phosphate buffer.**

## 7. CONCLUSION

From the present research was it is proved that formulation and evaluation of tablets using *Carica Papaya* and *Murraya koenigii* leaves extract was possible, UV spectra and TLC proved that the formulation of *Carica Papaya* and *Murraya koenigii* leaves extract tablets. The aerial parts of *Carica Papaya* and *Murraya koenigii* leaves were collected, dried and authenticated. The dried parts were pulverized to make course materials which are used for experimental work. Total one kg of plant material was accurately weighed and extracted withaqueous and hydroalcoholic.

The TLC studies and UV spectroscopic study were carried out on aqueous and hydroalcoholic extracts both these studies confirmed that the alkaloids, flavonoids, andtannins.

In the present study it was concluded that-

I. The *Carica Papaya* and *Murraya koenigii* leaves extract tablet was concluded MCCconcentration can be used as a binder to formulate dry *Carica Papaya* and *Murraya koenigii* leaves extract tablet to high quality and ready to consume tablets. The concentration of MCC was 10% (Formula I), 20% (Formula II), 30% (Formula III) and 40% (Formula IV).
II. The leaves of *Carica Papaya* and *Murraya koenigii* exhibited the abundant presence of flavonoids and alkaloids in 50% aqueous extract and 80% hydroalcoholic extract.
III. The total ash value of *Carica Papaya* aqueous extract was found to be 44.28% w/w. and *Carica Papaya* hydroalcoholic extract was found to be 36.98% w/w.
IV. The acid insoluble ash value of *Murraya koenigii* aqueous extract was found to be 35.7% w/w. and *Murraya koenigii* hydroalcoholic extract was found to be 28.76%w/w.
V. The studies of solubility the hydroalcoholic extracts are more soluble as compared to the aqueous extracts.

## 8. ACKNOWLEDGEMENT

The authors are thankful to Mr. Shubham Shende and Faculty of Siddhivinayak College of Pharmacy Warora, Dist. Chandrapur for their participation in the data collection."

## 9. CONFLICTS OF INTEREST

The authors declare that they have no known competing financial interests.

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