

**PHYSICOCHEMICAL AND PHYTOCHEMICAL ANALYSIS OF SIDDHA HERBAL  
MEDICINE MUKKADUGU KUDINEER**Dr. Arumugam A.\*<sup>1</sup>, Shanmugapriya C.<sup>2</sup>, Meenakumari R.<sup>3</sup> and Muralidharan P.<sup>4</sup><sup>1</sup>PG Scholar, Department of Kuzhanthai Maruthuvam, Government Siddha medical College, Chennai 106, Tamilnadu, India.<sup>2</sup>Lecturer, Department of Kuzhanthai Maruthuvam, Government Siddha medical College, Chennai 106, Tamilnadu, India.<sup>3</sup>Professor and HOD, Department of Kuzhanthai Maruthuvam, Government Siddha medical College, Chennai 106, Tamilnadu, India.<sup>4</sup>Professor and Head of the Department of Pharmacology and Toxicology, C.L.BaidMetha College of Pharmacy, Chennai 97, Tamilnadu, India.**\*Corresponding Author: Dr. A. Arumugam,**

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**ABSTRACT**

Mukkadugu kudineer is a polherbal formulation originated from Siddha system of medicine. It is mainly used for Kattu maantham (Functional dyspepsia). Though the individual herbs used in the formulation have the previous record of standardization, there is no record on the formulation hence the same is aimed. The present study of physicochemical and phytochemical analysis will be used as tools for authentication and standardization of polyherbal formulation "Mukkadugu kudineer".

**KEYWORDS:** Mukkadugu kudineer, Physicochemical, Phytochemical analysis, Siddha polyherbal formulation.**INTRODUCTION**

Siddha is the indigenous of Indian system of medicine practiced in South India especially in Tamil Nadu. While accepting its benefits global community demands evidence based scientific explanation to understand the concept of Siddha system of medicine and demands quality matching International standards to reassure the efficacy of Siddha medicine.<sup>[1]</sup> Mukkadugu kudineer is a classic Siddha drug chosen from the text book of Balavagadam, it is indicated for Kattu maantham (Functional dyspepsia). The use of scientific tools are essential to validate the traditional claim. Though the Siddha drugs are considered to be safe and effective. It is duty of the physicians to standardize the formulation. The drug is a polyherbal formulation and all ingredients

included are very effective in curing GIT disorder like functional dyspepsia.<sup>[2]</sup> The main aim of this study is to evaluate the physic chemical character and phytochemical analysis of the drug Mukkadugu kudineer.

**MATERIALS AND METHODS****Identification and authentication of the Drug**

All the raw drugs were authenticated by the pharmacognosist at Govt.Siddha Medical College (GSMC), Arumbakkam, Chennai 106, Tamilnadu, India.

**Purification of the drugs**

All the raw drugs were purified as per the methods mentioned in Siddha literature.<sup>[3]</sup>

**Ingredients<sup>[4]</sup>**

Its ingredients and formulation composition are tabulated in **Table.1.**

Tamil name	Botanical name <sup>[5]</sup>	Part used	Quantity(gm)
Chukku	<i>Zingifer officinale</i>	Root	10gm
Milagu	<i>Piper nigrum</i>	Fruit	10gm
Thippili	<i>Piper longum</i>	Fruit	10gm
Omam	<i>Carum copticum</i>	Seeds	10gm
Vellai poondu	<i>Allium sativum</i>	Bulb	10gm

**Therapeutic dosage**

15ml, Twice a day, After meals, 14 days.

**Method of preparation**

The drug were procured from the shop and purified. They were made into a coarse powder. Water is added and boiled to get 1/8 measure of the decoction. Filtered and consumed.

**Physicochemical Analysis****Preparation of standard solution**

0.2g of ferric ammonium Sulphate was dissolved in distilled water containing 10ml of concentrated hydrochloric acid and the volume was made up to 250ml with distilled water. From this stock solution 1, 2, 3, 4 & 5ml was pipette out into 5 different 50ml volumetric flask and 5ml of 10% aq. Hydroxylammonium chloride solution was added and the pH was adjusted between 3 to 5 using 2M sodium acetate buffer solution and 4ml of 1, 10-phenanthroline was added and finally the volume was made up to 50ml with distilled water. After 15-20 min. the absorbance was noted at 515nm. The standard curve of concentration Vs absorbance was plotted.

**Preparation of Test Solution**

0.21g of test sample was taken with 50ml of 6N hydrochloric acid and boiled for 2-3 min. Then it was filtered and the volume was made up to 250ml with distilled water. From this 5ml of solution was pipette out into 50ml volumetric flask and the same procedure was followed as in the preparation of standard solution. After 15-20 min. the absorbance was noted at 515nm. From the absorbance the corresponding concentration was determined by extrapolation of calibration curve.

**Determination of specific gravity**

Fill the dry sp. gravity bottle with prepared samples in such a manner to prevent entrapment of air bubbles after removing the cap of side arm. Insert the stopper, immerse in water bath at 50°C and hold for 30 min. Carefully wipe off any oil that has come out of the capillary opening. Remove the bottle from the bath, clean and dry it thoroughly. Remove the cap of the side and quickly weigh. Calculate the weight difference between the sample and reference standard.

**Table 3: Result of physicochemical analysis.**

S. No	Parameters	Mukkadugu kudineer
1.	Specific gravity	1.021g/cm <sup>3</sup>
2.	Viscosity at 50° C	0.6533 mPa.s (millipascal-second)
3.	Refractive index	2.32
4.	Weight per ml (gm/ml)	1.52±0.33
5.	Iodine value	-
6.	Saponification value (mg of KOH to saponify 1gm of fat)	-
7.	Loss on drying at 105° c	11.23 % by mass
8.	Total ash	09.06%
9.	PH	4.8

**Determination of Iodine value**

About 20 gm of oil was transferred into Iodine flask. To which 10 ml of chloroform was added and warmed slightly and cooled for 10 minutes. Followed by this about 25 ml of Wiji's solution was added in the same flask and shaken well. The flask was allowed to stand for 30 mins and refrigerated for an 1hour. Then about 10 ml of KI solution was added to this and titrated against 0.1 N Sodium thiosulphate solutions until the appearance of yellow color. 1 ml of starch indicator was added and again titrated against the sodium thiosulphate solution from the burette. Disappearance of blue color indicates end point. Repeat the above procedure without taking sample and note the corresponding reading for blank titration.

**Determination of saponification value**

About 2 gm of test sample was transferred into the round bottomed flask. To this about 20 ml of 0.5 N alcoholic KOH solutions was added to the round bottomed flask. Repeat the same procedure without taking the sample for blank titration. Reflux both sample and blank round bottomed flasks for 1 hour. After reflux, allow both the round bottomed flasks to cool. Titrate the samples using 0.5 N HCl with phenolphthalein indicator. The disappearance of pink indicates the end point.

**Percentage Loss on Drying**

10gm of test drug was accurately weighed in evaporating dish. The sample was dried at 105°C for 5 hours and then weighed.

$$\text{Percentage loss in drying} = \frac{\text{Loss of weight of sample}}{\text{Wt of the sample}} \times 100$$

**Determination of pH**

Sample being oily in nature the direct litmus evaluation method was adopted to check the pH of the sample.

**Table 2: Result of organoleptic character.**

S. No	Parameter	Observation
1.	Color	Brownish color
2.	Smell	Characteristic Odour
3.	Touch	Water
4.	Appearance	Watery

### Phytochemical analysis

**Sample preparation:** The Hydro-alcoholic extract of Mukkadugu kudineer drug was subjected to preliminary phytochemical screening for the presence or absence of phyto constituents by the following methods.

#### 1. Test for Alkaloids

- The extract was treated with dilute hydrochloric acid and filtered.
- Mayer's reagent (Potassium Mercuric Iodine Solution).
- 0.5ml of the extract was treated with Mayer's reagent and the appearance of cream color indicates the presence of alkaloid.

#### 2. Test for Carbohydrates

Benedict's test: (Sodium citrate + sodium carbonate + CuSO<sub>4</sub>.7H<sub>2</sub>O).

The extract was treated with Benedict's test and heated in boiling water for few minutes. The appearance of reddish orange color precipitate indicates the presence of reducing sugars.

#### 3. Test for Glycosides

The extract was dissolved in the glacial acetic acid and few drops of ferric chloride solution was added, followed by the addition of concentrated sulphuric acid, formation of red ring at the junction of two liquids indicates the presence of glycosides.

#### 5. Test for Sterols

The extract was treated with 5% potassium hydroxide solution; appearance of pink color indicates the presence of sterols.

#### 6. Test for Phenols

The extract was treated with neutral ferric chloride solution. The appearance of violet indicates the presence of phenols.

#### 7. Test for Flavonoid's

5ml of extract solution was hydrolysed with 10%v/v sulphuric acid and cooled. Then, it is extracted with diethyl ether and divided into three portions in three separate test tubes. 1ml of diluted sodium carbonate, 1ml of 0.1N sodium hydroxide, and 1ml of strong ammonia solution were added to the first, second and third test tubes. In each test tube, development of yellow color demonstrated the presence of flavonoids.

#### 8. Test for Diterpenes

Salkowski test: 5ml of extract was mixed in 2ml of chloroform and concentrated sulphuric acid was carefully added to form a layer. A reddish brown colouration of the interference indicates the presence of diterpenes.

#### 9. Test for Quinones

The extracts were treated separately with Alc. KOH solution. Appearance of colors ranging from red to blue indicates the presence of Quinones.

#### 10. Test for Triterpenes

5ml of extract was mixed in 2ml of chloroform and concentrated sulphuric acid was carefully added to form a layer. A reddish brown colouration of the interference indicates the presence of triterpenes.

**Table 3: Results of phyto chemical analysis of 'Mukkadugu kudineer'.**

S. No.	Phyto - Components	Inference
1	Alkaloid	Present
2	Carbohydrate	Absent
3	Glycoside	Present
4	Saponins	Present
5	Phytosterols	Present
6	Phenols	Present
7	Flavonoids	Present
8	Diterpenes	Present
9	Quinones	Present
10	Triterpenes	Present

The above table shows the presence of secondary metabolites such as alkaloid, glycoside, saponin, phytosterols, phenols, flavonoids, quinones, di and tri terpenes. Presence of this phytochemicals indicates their clinical validation

### DISCUSSION

In the present study it is concluded that the organoleptic characters and physicochemical parameters<sup>[6]</sup> such as the specific gravity (1.021g/cm<sup>3</sup>), Total ash value (09.06%), Refractive index (2.32), PH (4.8). The phytochemical analysis of the drug Mukkadugu kudineer has the presence of secondary metabolites such as alkaloid, Glycosides, saponin, phytosterols, phenols, flavonoids, quinones, di and tri terpenes.

### CONCLUSION

Based on the above results, Physiochemical and Phytochemical analysis can be assumed that the drug "Mukkadugu kudineer" has validated the traditional claim.

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