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## A Comparative Phytochemical Analysis of *Abhavitha* and *Bhavitha Choorna* of the whole plant of *Centella asiatica* Linn. Urban

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### ABSTRACT:

The drug *Mandukaparni* (*Centella asiatica* Linn. Urban) has been extensively used as medicine and also used for in homely preparations. In *Ayurveda*, *Bhavana* is a principal *samskara* (pharmaceutical procedure) being used to potentiate the drug and induce additional therapeutic properties in it. This process was carried out in the powdered whole plant (*abhavitha choorna*) of *Mandukaparni* (*Centella asiatica* Linn.Urban), by soaking it overnight into its own *swarasa* (fresh juice). The preliminary phytochemical evaluation of *abhavitha choorna* and *bhavitha choorna* (processed powder) of *Mandukaparni* (*Centella asiatica* Linn.Urban) was done and the water insoluble ash, tannin, extractive values and successive solvent extractive values were found more in *bhavitha choorna* when compared to *abhavitha choorna* of the drug, which revealed that the *bhavana* process can increase the potency and efficacy of the drug. The aim of present study is to compare the findings of phytochemical analysis of the both *abhavitha* and *bhavitha choorna* of the drug.

**Key words:** *Mandukaparni*, phytochemical analysis, *Abhavitha choorna*, *Bhavitha choorna*, *Centella asiatica* Linn.Urban.

### INTRODUCTION

The drug *Mandukaparni*, botanically identified as *Centella asiatica* Linn. Urban,<sup>1</sup> has been regarded as one of the best memory enhancing and psychotropic drug<sup>2</sup> therapeutically useful in some diseased conditions like *Kshataksherna*<sup>3</sup>, *Kasroga*<sup>4</sup> *Udara roga*<sup>5</sup> etc. Phytochemicals are naturally occurring biologically active chemical compounds presents in the plants, which are responsible for different pharmacological actions and also helpful in the identification and authentication along with the confirmation about genuinity and efficacy of a particular

drug. Some researches on the drug *Mandukaparni* (*Centella asiatica* Linn.Urban) reported presence of various phytoconstituents such as alkaloids, flavonoids, terpinoids, phenols, tannins, saponins, alkane, glycosides, amino acids and minerals in it.<sup>6,7</sup> *Samskara* is explained by Acharya Charaka as a pharmaceutical procedure of transformation of inherent attributes and the addition of extra properties to a drug or substance As per one of the reference mentioned in *Bhaishajya Ratnavali*,<sup>8</sup> *bhavana* is that, the powdered drugs soaked in the liquid (*swarasa*,



*hima*, *kwatha* etc.) at night should be kept for sundry and this procedure has to be repeated for seven times. The *bhavitha choorna* is the powder obtained after *bhavana* process subjecting to the plain powder of the crude drug. The most important benefit of *bhavana* is in dose reduction up to smaller dose of producing comparatively higher effect, as the *bhavana* potentiates the drug. *Bhavitha choorna* of the drug *Mandukaparni* (*Centella asiatica* Linn.Urban) for this clinical study was prepared by repeating *bhavana* process by three times to avoid symptoms like headache, dizziness and drowsiness due to drug's direct effect on the CNS at higher dose as reported by some studies in the past.<sup>9</sup> In the present study is aimed to compare the findings of phytochemical analysis obtained for the *abhavitha* and *bhavitha choorna* of dried whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban).

## MATERIALS AND METHODS

### Collection of the drug

The drug *Centella asiatica* (Linn.) Urban. was freshly collected from Puthiyakavu village, Ernakulam district, Cochin, Kerala. Physical impurities like weed etc. mixed in collected drug was cleaned manually.

### Preparation of *abhavitha choorna*

Freshly collected drug was washed with water thoroughly to remove residual physical impurities and dried further. A sufficient quantity of dried whole plants of the drug were then fine powder of the drug was obtained by sieving it through mesh no. 120.

### Preparation of *bhavitha choorna* (processed powder)

The *abhavitha choorna* of the whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban) was subjected to *bhavana process* according to the reference quoted in *Bhaishajya ratnavali*.<sup>8</sup> A sufficient quantity of drug was crushed and *swarasa* (fresh juice) was prepared for *bhavana*. The *abhavitha choorna* of the drug was taken in a clean tray and evenly spread in a thin layer. The prepared *swarasa* was filtered and gradually poured into the fine powder in the way that the *swarasa* get drained into the *choorna*. The powdered drug got completely submerged in *swarasa* and a thin layer of *swarasa* was leftover superficially on the layer of fine powder. After that complete soaking of each and every fine particles of the drug was ensured by using a clean thin rod. Further the tray was slowly shaken uniformly on both sides to ensure proper spreading of *bhavana dravya* in the fine particles of

the *choorna*. The tray was then covered with a clean thin cotton cloth to avoid dust or any contamination and then left overnight as same. Next morning the tray was kept under sunlight to get it dried in the shade. After drying of top layer of soaked drug, it was stirred using a clean rod to ensure its uniform drying. Once properly dried, it was again powdered to remove lumps. *Bhavana* was done in the same manner for 3 times and the process of powdering of obtained *choorna* was done after each *bhavana*. After whole procedure, the properly dried *bhavitha choorna* was made into fine powder and sieved through mesh with size-120.

### Reagents

Diluted and conc. hydrochloric acid, diluted and conc. sulphuric acid, dilute and conc. nitric acid, xylene, sodium oxalate, lead acetate solution, potassium permanganate, anhydrous sodium carbonate, sodium hydroxide solution, petroleum ether, cyclohexane, acetone, alcohol, Dragendorff's reagent, Mayer's reagent, methylene blue reagent, Wagner's reagent, Fehling's solution A&B, chloroform water, neutral ferric chloride, sodium bicarbonate solution, copper sulphate, catechol, Folin catechu phenol reagent and magnesium ribbon,.

### Apparatus

Silica crucible, Bunsen burner, Whatman filter paper, standard flask, conical flask, round bottom flask, Soxhlet apparatus, Dean and stark's apparatus, Clevenger's apparatus, heating mantle, water condensers, hot air oven, muffle furnace, glass beakers, glass beads, petridishes, test tubes, test tube holders, glass lids, measuring jars, funnel, glass rods, watch glass, burettes and pipettes.

### Procedure

#### Determination of the physico-chemical parameters of both the *choornas*

Physico-chemical parameters like foreign matter, total ash, water insoluble ash, acid insoluble ash, moisture content, volatile oil, fibre, tannin, total sugar, reducing sugar, phenol and pH was evaluated in the both *abhavitha* and *bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban).

#### Analysis of total ash

Total ash represents quantity of inorganic salts and impurities in the form of residual remaining after incineration of the drug in silica crucible. This ash value

tells about the possible contamination and adulteration in the crude drug powder. Total ash value for the both *abhavitha* and *bhavitha choorna* obtained was 10.7% and 9.4% respectively.

#### Qualitative analysis of ash

Ash obtained from both the powders of the drug were subjected to qualitative analysis to detect the presence of acid radicals such as carbonate, phosphate, sulphate and chloride and basic radical like potassium.

#### Determination of Extractive values

The cold water soluble, hot water soluble, cold alcohol soluble, and hot alcohol soluble extractive values of both test samples of the drug *Mandukaparni* (*Centella asiatica* Linn.Urban) were estimated in the study. For estimating successive solvent extractives solvents such as petroleum ether, cyclohexane, acetone and alcohol were the used for the both *abhavitha* and *bhavitha choorna* of whole plant of the drug.

#### Phytochemical parameters

Phytochemical constituents such as flavonoids, alkaloids, saponins, tannins, steroids, carbohydrates, phenols and proteins were screened to detect the presence or absence of them in both *abhavitha* and *bhavitha choorna* of whole plant of the drug. Further more qualitative analysis of successive solvents extractives was done with petroleum ether, cyclohexane, acetone and alcohol extracts of *abhavitha* and *bhavitha choorna* of whole plant of the drug *Mandukaparni* (*Centella asiatica* Linn.Urban) for detecting the presence of steroids, alkaloids, flavonoids and phenols in the same. All above mentioned procedures were performed as per the reference of standard procedures mentioned in *Ayurvedic Pharmacopoeia of India*.

## RESULTS

Observations of the preliminary phytochemical analysis done for the both *abhavitha* and *bhavitha choorna* of whole plant of the drug *Mandukaparni* (*Centella asiatica* Linn.Urban) are tabulated below:

**Table No.1** Physico-Chemical estimation of the both *abhavitha* and *bhavitha choorna* of whole plant of *Centella asiatica* Linn.Urban

**Table No.2** : Qualitative analysis of ash of *abhavitha* and *bhavitha choorna* of whole plant of *Centella asiatica* Linn.Urban

**Table No. 3:** Extractive values of *choorna* and *bhavitha choorna* of whole plant of *Centella asiatica* Linn.Urban

**Table No. 4:** Extractive values (in different solvents) of *abhavitha* and *bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)

**Table 5:** Qualitative phytochemical analysis of *abhavitha* and *bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)

**Table 6:** Qualitative analysis of successive solvent extractives of *abhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)

**Table 7:** Qualitative analysis of successive solvent extractives of *bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)

## DISCUSSION

Detailed preliminary phytochemical evaluation was done for the both *choornas* i.e. *abhavitha choorna* (powder) and *bhavitha choorna* (processed powder) of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban) to confirm the quality and authenticity of the crude drug. The results obtained were then compared with available references in literature. Reference regarding preliminary phytochemical evaluation of *bhavitha choorna* was available in MD thesis work by Mahesh PU conducted on the same drug.<sup>10</sup> The physicochemical parameters like foreign matter, total ash, acid insoluble ash of *abhavitha choorna* of *Mandukaparni* (*Centella asiatica* Linn.Urban) are available from *Ayurvedic Pharmacopoeia of India*<sup>1</sup>, *Quality Standards of Indian Medicinal Plants* by ICMR.<sup>11</sup> Foreign matter in the drug determines the presence of undesirable organic and waste materials. Absolute absence of foreign matter in both the samples which indicates purity of the drug in the present study. Ash value in the form of residuals remaining after incineration of both the *choornas* of the drug represents possible amount of inorganic salts, impurities, contamination or adulteration in them. Total ash value in the both *abhavitha* and *bhavitha choorna* obtained was 10.7% and 9.4% respectively which found comparable with the reference mentioned in the textbook *Ayurvedic*

Pharmacopoeia of India and MD thesis done by Mahesh PU. Acid insoluble ash value mainly indicates the presence of siliceous impurities in the sample. In the present study, the acid insoluble ash value obtained was 2.6% in *abhavitha choorna* and 2.2% in *bhavitha choorna* of the drug. The result of *abhavitha choorna* was under limits as mentioned in Ayurvedic Pharmacopoeia of India and two research articles by Trivedi Manisha N. *et al.*<sup>12</sup> and Rafi Sultan *et al.*<sup>13</sup> and values gain for *bhavitha choorna* was also found in normal limits compared to the literature. The percentage of water-insoluble ash of both the *choornas* was 9.45% and 7.9% respectively and were found comparable to the values mentioned in MD thesis by Mahesh PU<sup>10</sup> and was comparatively higher than a referred research article by Rafi Sultan *et al.*<sup>13</sup> Evaluated water insoluble ash in *bhavitha choorna* was also found relatable to the values noted from referred thesis work.

Measured value of moisture content in *abhavitha choorna* 10.2% was in accordance to the value mentioned in research article by Trivedi Manisha N. *et al.*<sup>12</sup> and thesis work by Mahesh PU.<sup>10</sup> Moisture content in *bhavitha choorna* (12.6%) noted slight increased than *abhavitha choorna* and found comparable to the referred thesis work. This slight raised moisture content in *bhavitha choorna* notified may be due to repeated *bhavana* process during drug preparation. Results obtained on volatile content were same as the literature i.e. 1% volatile oil in both the *choornas* individually

The tannin content from *abhavitha* and *bhavitha choorna* obtained was 0.71% and 1.06% respectively which found higher than sited in literature. This noticeable increase in the tannin content may be due to the change in time of collection and climatic variations, soil texture etc. Where as comparatively more tannin content in *bhavitha choorna* was may be the because of the repeated *bhavana* procedure done in it. The Fibre content in *abhavitha* and *bhavitha choorna* were 14.83% and 13.11% as on. Values of fibre content obtained for both the *choorna* ranging between both the references i.e. clinical study done by Mahesh PU<sup>10</sup> and research article by Seema Chaitanya.<sup>14</sup>

The total sugar content in *abhavitha* was 10.88% which has decreased to 2.87% in *bhavitha choorna*. Reducing sugar was 5.88% in *abhavitha choorna* while in *bhavitha choorna* it was found to be decreased upto 1.34%. The total and reducing sugar in both the *choornas* were comparatively lesser than the values obtained by Mahesh PU<sup>10</sup> in his thesis work on same drug which may be due to seasonal variation during the collection of the drug. The

phenol content obtained in *abhavitha* and *bhavitha choorna* was 0.99% and 0.76 % respectively, which is almost similar in the both. The phenol content obtained was comparable to the literature.

Qualitative and quantitative estimation of pH of *abhavitha* and *bhavitha choorna* of the drug was estimated. In case of both the *choorna* of drug blue litmus paper turned into red denoting the acidic nature of both. *Abhavitha choorna* showed an acidic pH of 5.51 and *bhavitha choorna* with a pH of 6.83. pH in case of *bhavitha choorna* might be slightly increased due to *bhavana* process. The qualitative analysis of ash of *abhavitha* and *bhavitha choorna* showed the presence of all the acid radicals like carbonate, phosphate, chloride and sulphate but absence of basic radicals like potassium. Same findings were observed in literature.<sup>10</sup>

Extractive values of drugs help to determine the quality, purity, and adulteration in the drug. In the *abhavitha choorna*, cold water soluble extractive value and cold alcohol soluble extractive value analysed were 25.18% and 6.4% respectively. In *bhavitha choorna*, cold water soluble extractive and cold alcohol soluble extractive values were 32.56% and 8.87% respectively. In addition, hot water and hot alcohol-soluble extractives estimated to *choorna* were 22.3 % and 9.42% respectively whereas, in *bhavitha choorna*, hot water soluble extractive and hot alcohol-soluble extractive values were 26.5% and 12.3% respectively. Here, in both the *choorna*, the water-soluble extractive values were found higher than the alcohol-soluble extractive values. This shows that the maximum amount of active phytoconstituents in the whole plant of the drug was extracted in water. Also, hot alcohol extractive values were greater than cold alcohol extractive values whereas cold water extractives were greater than hot water soluble extractives in both *choorna* of the drug. Which revealed that drug possess more extractive values in all in cold water and hot alcohol than hot water and cold alcohol.

Successive extraction with solvents of increasing polarity from a non-polar to a more polar solvent are used to extract various compounds of a wide range of polarity. In the present study, the results obtained from successive solvent extraction of *abhavitha* and *bhavitha choorna* of whole plant were 1.3 % and 2.82% in petroleum ether, 0.17% and 0.75% in cyclohexane, 3.9% and 5.7% in acetone and 2.2% and 4.92% in alcohol respectively. The successive solvent extractive values were found more in the *bhavitha choorna* indicating its better potency compared to the

*abhavitha choorna* of the drug. The maximum extractive values were obtained in an acetone in both the *choorna* of the drug.

In the qualitative analysis of the drug reference regarding the presence of total six chemical constituents such as alkaloids, flavonoids, saponins, tannins, carbohydrates and phenols was obtained in the literature and results from present study observed similar to the literature. The qualitative analysis of successive solvent extractives for both the *choorna* were performed in petroleum ether, cyclohexane, acetone and alcohol extracts successively. Which resulted as the presence of phenol in all four extracts, alkaloids was positive in rest three extracts except alcohol and flavonoids were identified only in acetone and alcoholic extracts. Test for steroids found positive in petroleum ether and acetone extracts of *bhavitha choorna* only. Findings were similar with the referred previous MD thesis work<sup>14</sup> but steroids were found positive in petroleum ether and acetone extract of *bhavitha choorna* only in the present study which was sited in all four extracts of the drug as per the previous thesis work referred<sup>10</sup> on the same drug. Here steroids may became noticeable due to its increased concentration as a result of *bhavana* process.

A previous research work on quantitative estimation of asiatic acid, asiaticoside & madecassoside in two accessions of *Centella asiatica*<sup>15</sup> by Gupta Abhishek *et.al*.2014 has reported identification of its main active phytoconstituents like terpinoids such as asiatic acid, asiaticoside & madecassoside at maximum refractive index 0.98, 0.99 and 0.99 subsequently through its HPTLC study. In present study also, HPTLC study of the *bhavitha choorna* of the drug found with increased concentration of chemical constituents of respective same maximum refractive index (0.98, 0.99 and 0.99), supporting the enhancement in pharmacological potential of the drug after *bhavana* process when compared with *abhavitha choorna*. So these augmented effect of *bhavana* process on active principles of crude drug powder can ultimately show the additive therapeutic effect in different conditions.

## CONCLUSION

The phytochemical evaluation of a drug or formulation helps to determine the presence of phytoconstituents that provides evidence to support its therapeutic potency and effect. In the preliminary phytochemical evaluation of *abhavitha* and *bhavitha choorna* of *Mandukaparni* (*Centella asiatica* Linn.Urban), quantitative increase in tannins, moisture content, pH value, extractive values and

successive solvent extractive values was found more in *bhavitha choorna* when compared to *abhavitha choorna* of the drug, which substantiates that the *bhavana* process can increase the potency and efficacy of the drug. Hence the dosage of the drug can be reduced. Decrease in rest of the phytochemicals like total and quantitative ash values, fibre content, sugar and phenols may *laghu guna* imparted in *bhavitha choorna* due to soaking in swarasa of the whole plant of the same drug.

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## REFERENCES

1. Ministry of health & family welfare, dept. of AYUSH New Delhi. *Ayurvedic Pharmacopoeia of India*, Government of India, Part –I, Vol. 4, 2008,p.69
2. Sharma P.V Agnivesa. *Charaka Samhita* vol 2. Trans. Chikitsastana ch. 1:3, sh. 30,31, Varanasi: Chaukhambha Orientalia; 2014.pp.23
3. Sharma P.V Agnivesa. *Charaka Samhita* vol 2. Trans. Chikitsastana ch. 11, sh. 91-92 Varanasi: Chaukhambha Orientalia; 2014.pp.351
4. Murthy K.R, Vagbhata. *Ashtanga Samgraha*, Trans, (*Chikitsa sthana*), 2012, ch.5, sh. 66-67 *Chaukhambha Orientalia Varanasi*;Vol.2 (*Chikitsa sthana*), 2012.pp.318
5. Sharma P.V Agnivesa. *Charaka Samhita* vol 2. Trans. Chikitsastana ch. 13: Chaukhambha Orientalia; 2014.pp.181,
6. Pal RS, Pharmacognostic review and phytochemical screening of *Centella asiatica* Linn.; *Journal of Medicinal Plants*; ISSN 2320-3862 *JMPS* 2016; 4(4): 132-135
7. Samy et al, 2011 *Nature Precedings* : hdl:10101/npre.2011.6033.1 : 14 Jun 2011
8. Mishra B, . *Bhaishajya rathnavali*. Trans. Misraprakarana. Chap. 4, Paribhasha prakaranam: Sloka 89 Varanasi:Chaukhambha prakasan;2009;p. 313.
9. Gohil KJ, Patel JA, Gajjar AK. Pharmacological Review on *Centella asiatica*: A Potential Herbal Cure-all. *Indian J Pharm Sci.* 2010 Sep;72(5):546-56. doi: 10.4103/0250-474X.78519. PMID: 21694984; PMCID: PMC3116297.

10. Mahesh PU, A Clinical evaluation on the efficacy of *Mandukaparni* (*Centella asiatica* Linn. Urban) in Psoriasis, Department of Dravyaguna Vijnana, 2011
11. Tondon Neeraj and Sharma Madhu. Quality Standards of Indian Medicinal Plants, Medicinal Plants unit Indian Council Research, New Delhi, year 2010, vol. 8, p.11
12. Trivedi Manisha N. et. al., Pharmacognostic, Phytochemical and Microbiological Studies of the Plants *Centella asiatica* (Linn.) Urban and *Withania somnifera* (Linn.) Dunal Treasured as Intelligence Boost. Research J. Pharm. and Tech. 4(11): Nov. 2011; Page 1707-17
13. Sultan RA, Mahmood ZA, Azhar I, Hasan MM, Ahmed S. Pharmacognostic and phytochemical investigation of aerial parts of *Centella asiatica* Linn. International Journal of Phytomedicine. 2012;4(1):125-33.
14. Seema Chaitanya CH, *Pharmacognostic and pharmacological aspects of centella asiatica*; Int. J. Chem. Sci.:9(2),2011,784-794 ISSN 0972-768X ISSN 0972-768
15. Gupta Abishek et. al, Indian Journal of Pharmaceutical Education and Research,2014;48(2):65-69 Pharmacognosy & Ethnopharmacology Division, CSIR-National Botanical Research Institute, Lucknow-226001, *Centella asiatica* (L) Urban,doi:10.5530/jper.48.2.9

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**Picture no. 1: *Abhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn. Urban)**



**Picture no. 2: *Bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn. Urban)**

**Table No.1 Physico-Chemical estimation of the both *abhavitha* and *bhavitha choorna* of whole plant of *Centella asiatica* Linn.Urban**

Sl no.	Parameters	<i>Abhavitha choorna</i>	<i>Bhavitha choorna</i>
1	Foreign matter	Nil	Nil
2	Total ash	10.7 %	9.4 %
3	Water insoluble ash	9.45 %	7.9 %
4	Acid insoluble ash	2.6%	2.2 %
5	Moisture content	10.2 %	12.6 %
6	Volatile oil	1 %	1 %
7	Fibre content	14.83 %	13.11 %
8	Tannin content	1.06 %	0.71%
9	Total sugar	10.88 %	2.87 %
10	Reducing sugar	5.88 %	1.34 %
.11	Phenol	0.99 %	0.76 %
12	pH	5.51 %	6.83 %

**Table No.: Qualitative analysis of ash of *abhavitha and bhavitha choorna* of whole plant of *Centella asiatica* Linn.Urban**

Sl.no.	Experiment	<i>Abhavitha Choorna</i>	<i>Bhavitha Choorna</i>
Acid radicals			
1	Carbonate	+	++
2	Phosphate	+	+
3	Chloride	+	+
4	Sulphate	+	+
Basic radicals			
5	Potassium	-	-

**Table No. 3: Extractive values of *choorna* and *bhavitha choorna* of whole plant of *Centella asiatica* Linn.Urban**

Sl.No.	Type of extractives	<i>Abhavitha choorna</i>	<i>Bhavitha choorna</i>
1	Hot Alcohol soluble	9.42 %	12.3 %
2	Cold Alcohol soluble	6.4 %	8.87 %
3	Hot water soluble	22.3 %	26.5 %
4	Cold water soluble	25.18 %	32.56 %

**Table No. 4: Extractive values (in different solvents) of *abhavitha* and *bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)**

Sl. No.	Solvents	<i>Abhavitha choorna</i>	<i>Bhavitha choorna</i>
1	Petroleum ether	1.3 %	2.82 %
2	Cyclohexane	0.17 %	0.751 %
3	Acetone	3.9 %	5.7 %
4	Alcohol	2.2 %	4.92 %



**Table 5: Qualitative phytochemical analysis of *abhavitha* and *bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)**

Sl.no.	Experiment	<i>Abhavitha choorna</i>	<i>Bhavitha choorna</i>
1	Alkaloids a. Dragendroff’s test	+	+
	b. Meyer’s test	+	+
2	Flavonoids	+	+
3	Saponins	+	+
4	Carbohydrates a. Fehling’s test	+	++
	b. Benedict’s test	+	+
5	Proteins	–	–
6	Phenols a. Ferric chloride test	++	+
	b. Lead acetate test	+	+
7	Steroids	–	–
8	Tannins a. Ferric chloride test	+	+
	b. Lead acetate test	+	+

**Table 6: Qualitative analysis of successive solvent extractives of *abhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)**

Sl.No.	Extract	Alkaloids	Flavonoids	Phenols	Steroids
1	Petroleum ether	+	–	+	–
2	Cyclohexane	+	–	+	–
3	Acetone	+	+	+	–
4	Alcohol	–	+	++	–

**Table 7: Qualitative analysis of successive solvent extractives of *bhavitha choorna* of whole plant of *Mandukaparni* (*Centella asiatica* Linn.Urban)**

Sl.No.	Extract	Alkaloids	Flavonoids	Phenols	Steroids
1	Petroleum ether	+	-	+	+
2	Cyclohexane	+	-	+	-
3	Acetone	+	+	++	+
4	Alcohol	-	+	+	-