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RESEARCH ARTICLE

COMPARISON OF PRELIMINARY PHYTOCHEMICAL EVALUATION OF FRUIT RIND OF *VIBHEETAKI* AND *BHAVITHA VIBHEETAKI* (TERMINALIABELLERICA(GAERTN.ROXB.)

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Abstract

Terminalia bellerica(Gaertn.Roxb.) (Combretaceae) is a commonly used Ayurvedic drug as single and in various Ayurvedic formulations. It is explained as *Vibheetaki* in Ayurvedic classical text books and is an ingredient of *Triphala* as well. Phytochemical evaluation of a drug helps in its standardization and to justify its use in various formulations. In this study, preliminary physical and phytochemical evaluation of fruit rind of *Vibheetaki* and *Bhavitha Vibheetaki* (*Terminalia bellerica*(Gaertn.Roxb.)including High Performance Thin Layer Chromatography was done. Qualitative analysis showed the presence of alkaloids, tannins, steroid, saponins, proteins and carbohydrates.

Introduction:-

Vibheetaki (*Terminalia bellerica*(Gaertn.)Roxb) is a drug described extensively in Brhattrayis, Lagutrayis as well as in Nighantus.Vibheetaki is beneficial to cure pathological conditions related to rasa, rakta, mamsa,medo dathus[1].The fruit kalkam of Vibheetaki is a remedy of pathological conditions related to mootra (urine) and asmari(calculus)[2]. So the fruits of Vibheetaki is found to be effective in correcting the metabolism of purins, the process of elimination of uric acid through urine[3]. Phytochemical analysis of the plant helped in confirming its genuinity. Qualitative evaluation was done to analyze the presence of phyto-constituents. High Performance Thin Layer Chromatography revealed the presence of chemical constituents which help in the identity of the drug. Quantitative evaluation of *Vibheetaki* and *Bhavitha Vibheetaki* was done to analyze the increase in potency with *Bhavana*.

Materia ls and Methods:-

Materials of Phytochemical analysis:-

Collection of the plants:-

The fruit rind of *Vibheetaki* (*Terminalia bellerica* (Gaertn.)Roxb.) was collected from the open market at the Puthiyakavu locality of Thripunithura. The samples were identified as genuine by the Pharmacognostic studies, conducted in the department of Dravyaguna Vijnanam Government Ayurveda College, Thripunithura. It was dried well in sun then powdered and kept in airtight containers. The *Bhavitha Vibheetaki* was prepared by triturating the powder of fruit rind of *Vibheetaki* (*Terminalia bellerica*(Gaertn.(Roxb.) in its own kashaya. This was then subjected to drying and then powdered. The Phytochemical analysis was done at Drug standardization unit of Department of Dravyaguna Vijnanam, Government Ayurveda College, Thripunithura.

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Fig1:-Flower,fruit, inflorescence of *Terminalia bellerica*

Figure 2:-Fruit rind of *Vibheetaki*

Process of *Bhavana* and the need for it:-

Fruit rind of *Vibheetaki* collected from the market will be washed thoroughly and dried. Then it is finely powdered to prepare the choorna. Sufficient quantity of *kasaya* of the fruit rind of Vibheetaki is prepared in the following ratio of boiling 48 g of thoroughly washed and crushed fruit rinds with 8 times of water. Then it will be reduced to $1/8^{th}$. *Bhavana* will be done by fully soaking the fine powder in the *kasaya*, and drying in shade to avoid the loss of essential phytochemicals. After attaining proper dryness, drug will be made into fine powder of mesh size-120. This process will be repeated three times for the preparation of *Bhavitha choorna* of fruit rind of *Vibheetaki*. The process of *Bhavana* aims at the quantitative increase of the essential phytochemicals so as to increase the potency of the drug.

Preliminary Physical and Phytochemical Evaluation:-

The physical and prelilminary phytochemical analysis was done by standard procedures mentioned in the Ayurvedic Pharmacopoeia of India. Physical evaluation includes Foreign matter, Total ash, Acid insoluble ash, Water insoluble ash, Moisture content, Volatile oil, Fiber content, Tannin content, Total sugar, Reducing sugar, Phenol and pH. Qualitative analysis was done to analyze the presence of steroid, flavonoid, phenol, alkaloid, tannin, carbohydrate, proteins and saponin. Extractive values include water soluble & alcohol soluble extractives and Successive solvent extraction. HPTLC was done to analyze the presence of chemical constituents in the drug.

Results:-

Results of physico-chemical parameters:-

Table no 1-Results of physico-chemical parameters

Sl no	Experiments	*Vibheetaki*	*Bhavitavibheetaki*
1	Foreign matter	Nil	Nil
2	Total ash	1.2%	1.9
3	Acid Insoluble Ash	1.15 %	1.4
4	Water Insoluble Ash	2.25%	2.35
5	Moisture Content	19	-
6	Volatile oil	Nil	Nil
7	Fibre	60.6%	61.8%
8	**Tannin Content**	**15.94%**	**63.75%**
9	Total sugar	3.17%	3.97%
10	Reducing sugar	2.3%	2.5%
11	Phenol	63.5 µg	_
12	pH	4	3.5

Results of alcohol and water extractive values:-

Table no 2:-Results of alcohol and water extractive values:

Sl no	Type of Extractives	*Vibheetaki*	*Bhavitavibheetaki*
1	Cold Alcohol soluble	8.12%	10.9%
2	Hot Alcohol soluble	16.4 %	16.5%
3	Cold water soluble	36.6%	42.68%
4	Hot water soluble	42.68%	54%

Results of successive solvent extraction:-

Table no 3:-Results of successive solvent extraction

Sl no	Solvents	% of extractive values of *BhavitaVibheetaki*
1	Petroleum ether	1.2%
2	Cyclohexane	4.04%
3	Acetone	9.24 %
	Alcohol	18.32%

Results of qualitative analysis of crude drugs

Table no 4:-Results of qualitative analysis of crude drugs

Sl.no	Experiment	*BhavitaVibheetaki*
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	+

Results of qualitative analysis of extractives of *Bhavitha Vibheetaki:-*

Table no 5:-Results of qualitative analysis of extractives of *Bhavitha Vibheetaki*

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

Results of qualitative analysis of ash of *Bhavitha Vibheetaki*

Table no 6:-Results of qualitative analysis of ash of *Bhavitha Vibheetaki*

Sl No	Experiment	*Bhavitha Vibheetaki*
Acid radicals		
1	**Carbonate**	**+**
2	**Phosphate**	**++**
3	**Chloride**	**-**
4	**Sulphate**	**+**
Basic radicals		
5	**Potassium**	**-**

High performance thin layer chromatography (HPTLC):-

High performance thin layer chromatography (HPTLC) was done using the methanolic extract of fruit rind of *Vibheetaki* (Terminalia bellerica (Gaertn.(Roxb.) having mobile phase as Toluene: Ethyl acetate: Formic acid: Methanol (7:5:1:0:5). The development of the plate is done in the CAMAG 10x10 cm Twin trough chamber and visualized under UV at 254 nm and 366 nm after derivatization using 10% sulphuric acid.

FIG 3:-TLC PLATE VIEWS OF VIBHEETAKI PHALA CHURNA

AT 254nm **AT 366nm** **AT WHITE LIGHT**

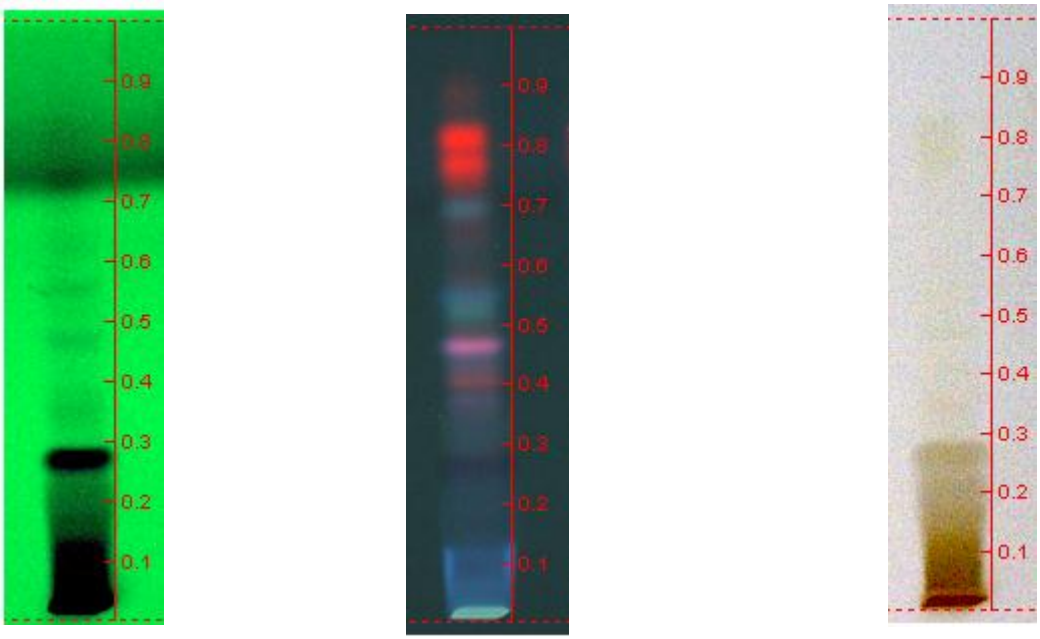

Table No 7:-Rf Value & % Area Of Vibheetaki Phala Churnaat 254nm

PEAK NO	Rf VALUE	AREA(AU)	% AREA(AU)
1	**0.11**	**2107.4**	**3.87**
2	**0.16**	**118.4**	**0.22**
3	**0.26**	**15122.1**	**27.77**
4	**0.34**	**2079.8**	**3.82**
5	**0.47**	**1862.6**	**3.42**
6	**0.55**	**2320.9**	**4.26**
7	**0.62**	**931.0**	**1.71**
8	**0.74**	**29910.4**	**54.93**

Total peak no – 08
total area – 54452.6 (au)

There is total of 8 peaks with total area of54452.6 A.U at 254 nm. 8 peaks were defined with area2107.4A.U,118.4.U, 15122.1 A.U, 2079.8 A.U, 1862.6A.U, 2320.9A.U, 931 AU,29910.4 A.U respectively. Among them the one major peak were seen at Rf 0.14 and with area % 54.93 A.U.

Table No 8:-Rf Value & % Area Of Vibheetaki Phala Churnaat 366nm

PEAK NO	Rf VALUE	AREA(AU)	% AREA(AU)
1	**0.11**	**2467.2**	**17.29**
2	**0.20**	**460.3**	**3.22**
3	**0.27**	**1437.1**	**10.07**
4	**0.34**	**483.5**	**3.39**
5	**0.37**	**144.3**	**1.01**
6	**0.47**	**1335.8**	**9.36**
7	**0.55**	**5414.0**	**37.93**
8	**0.71**	**1987.1**	**13.92**
9	**0.77**	**223.3**	**1.56**
10	**0.81**	**320.8**	**2.25**

Total peak no – 10
Total area –14273.4 (au)

There istotal of 10 peaks with total area of14273.4 A.U at 366 nm. 10 peaks were defined with area 2467.2A.U,460.3.U, 1437.1 A.U, 483.5 A.U, 144.3 A.U, 1335.8A.U, 5414 A.U, 1987.1 A.U, 223.3 A.U, 320.8 A.U respectively. Among them the one major peak were seen at Rf 0.55 and with area % 37.93 A.U

Discussion:-

The detailed phytochemical analysis was carried out to determine the quality and purity of the drug. Physicochemical parameters such as foreign matter, total ash, acid insoluble ash, water insoluble ash, moisture content, volatile oil content, fibre content, tannin content, phenol content, total sugar and reducing sugar content of the normal drug and *bhavith*a drug were estimated. . Fibre content, tannin content, total Sugar and reducing sugar content of dried powder of the *Vibheetaki* and *Bhavitha Vibheetakiphala*(*Terminaliabellerica* (Gaertn.) Roxb) were estimated as 60.6% and 61.8%; 15.94% and 63.75%; 3.17% and3.97%; 2.3% and 2.5% respectively.HPTLC analysis of the powder of *bhavita Vibheetaki phala* (*Terminalia bellerica* (Gaertn.) Roxb) were also done. In the HPTLC analysis of the drug (*Terminalia bellerica* (Gaertn.) Roxb) reveals total peaks of 8 with total area of 54452.6 A.U at 254 nm. It also reveals total peaks of 10 with total area of 14273.4 A.U at 366 nm. The tannin content present in the drug *Vibheetaki* (*Terminaliabellerica* (Gaertn.) Roxb) may be responsible for its anti hyperuricemic and anti-inflammatory properties. From the phytochemical analysis and comparison of normal and *bhavitha* drug justifies its use in different pathological conditions.

Conclusion:-

The drug *Vibheetaki*(*Terminaliabellerica* (Gaertn.) Roxb) has been widely used in traditional practices as single drug and in different formulations. It is one of the main drug well explained in all Ayurvedic classics. For giving a validation to its therapeutic properties and to standardize the drug the preliminary phytochemical analysis of the

drug had been carried out. From the phytochemical evaluation of the *bhavitha* drug, the quantitative increase of its active phytoconstituents was clearly seen. This certainly increase the potency of the drug.

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