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## Research Article

### PHARMACOGNOSTIC AND PHYTOCHEMICAL EVALUATION OF BELLENTE GIDA (*MUSSAENDA BELILLA* BUCH.HAM.) A FOLKLORE CLAIM

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#### ABSTRACT

Traditionally used medicinal plants have recently received the attention of the pharmaceutical and scientific committees. Hence there is a need to develop new effective traditional drugs with scientific validation. One such plant is *Mussaenda belilla* Buch-Ham which belongs to Rubiaceae family locally called as Bellante gida in south canara district Karnataka. It is a climbing shrub. Local people use the leaf juice as shampoo for hair as it is good for hair.

The present study deals with the pharmacognostic and phytochemical study, analytical parameters, organoleptic tests, macroscopic and microscopic study, physical tests. Taste with tongue method showed kashaya madhura rasa. The drug contains carbohydrates, proteins, alkaloids, tannins and phenolic compounds in Aqueous and alcoholic extracts. HPTLC study showed total 9 peaks at 254nm and 10 peaks at 366nm. It also contains calcium, iron, sulphates, chlorides like In-organic compounds.

It contains the mucilage which is soothing to eyes, hairs. It contains proteins, tannins, phenol, calcium, iron acts as Raktha sthambhaka, Raktha vardhaka, Vrana ropana, and Tvak prasada. So it need further experimental and clinical study.

#### INTRODUCTION

Ayurveda emphasizes the importance of the drugs next to the physician among the quadruples of treatment. Comprehensive knowledge of the drug is of prime importance to physician.<sup>[1]</sup> The study of traditional knowledge about plant species has contributed a number of vital drugs. Documentation of the medicinal plants through ethano-botanical studies enables the development of contemporary drugs and treatments as well as for plant conservation.

The plant *Mussaenda belilla* Buch.-Ham. which belongs to Rubiaceae family, locally called as Bellantegida or Bellottigida in south Canara District, Karnataka. It is a climbing shrub, branchlets tomentose, densely hirsute, enlarged calyx, Lobes with white colour.<sup>[2,3]</sup>

This plant traditionally used for insomnia, conjunctivitis, ulcers, jaundice, anemia, menorrhagia, dry cough & also its leaf juice used like shampoo for hair by the local peoples.<sup>[4,5]</sup>

These need to be analyzed and standardized by scientific parameters, so that their usage can find wide applications. The present study has been undertaken to study the pharmacognostic and analytical parameters.

#### MATERIALS AND METHODS

##### Collection of plant material

**Collection-** The plant leaves of Bellante gida (*Mussaenda bellia* Buch) from the surrounding areas of Sullia township of Dakshina kannada, District in Karnataka, was collected and dried for powdering. Pharmacognostical study was carried out at Department of Dravya Guna vijnan of KVG. Ayurveda Medical college sullia and Arya vaidyashala kotekal kerala state.

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### Organoleptic study

As there is no mention in the classics about the plant *Bellantte gida* (*Mussaenda bellia* Buch. The drug is quite new to Ayurveda, no reference regarding the rasa, guna, virya and vipaka of the plant can be found. But acharyas have given guidelines in order to find out the rasa, guna virya and vipaka of the drug.

### Drtermination of Taste

The taste with tongue method was followed. 30 Healthy volunteers, of Ayurvedic students, for each test drug who may not make mistakes in expressing the rasa they perceive, were selected. They were asked to wash and clean their mouth. After five minutes gap 5 grams of powder was served to these volunteers and asked to taste the powder and to record the rasa and anurasa they feel. The taste which is perceived immediately considered as Pradhana Rasa later as anurasa<sup>[4]</sup> The method followed was blind method, in which volunteers were not told about the identity of drug.<sup>[5]</sup>

### Physico- chemical analysis

The dried leaves of *Bellantte gida* (*Mussaenda bellia* Buch- was powdered and subjected to various analysis. Physico-chemical and Phytochemical screening were carried out as per the guidelines given in Pharmacopoeia of India. Physico-chemical parameters such as Moisture contents (loss on drying at 105<sup>o</sup>), Total ash value, Acid insoluble ash, Water soluble ash, pH values were determined.

The extracts obtained from solvent like Aqueous and alcohol. Preliminary chemical tests were carried out for detection of phytochemical constituents.

Inorganic analysis of ash carried out and determines the various inorganic contents<sup>[8]</sup>.

The Methonolic extract of the drug was subjected to thin layer chromatographic analysis. The solvent system employed for resolution of Phenol on thin layer chromatographs are solvents media- Butonal: Acitic acid: Water-[4:1:5] ratio and developing reagent used was phenol reagent (FCR). The qualitative evaluation of the plate was done by determining the Rf value of different spots visualised under U.V light.<sup>[9]</sup>



Fig No.1: Plant of *Bellantte gida* (*Mussaenda bellia* Buch)

## RESULTS AND OBSERVATION

### Microscopic structure

**Upper epidermis:** A single layer rectangular cell with a thick cuticle. Thichomoes, Uniserriat, and glandular trichoms Stomata : paracytic.

**Mesophyll:** a) **Palaside layer:** single laered, elongated compact parenchyma cells radially arranged. b) **Spongy parenchyma layer;** 4-6 layers

loosely arranged parenchyma cell with intercellular spaces. Some cell contains clusters of crystals.

**Collenchyma:** Situated bellow the upper epidermis and above the lower epidermis.

**Vascular bundles:** Collateral, covered pericycle. outer phloem non-lignified and xylem lignified.

**Mid rib:** Cortical parenchyma contains loosely arranged parenchyma with intercellular space. Some cells having calcium oxalate crystals.

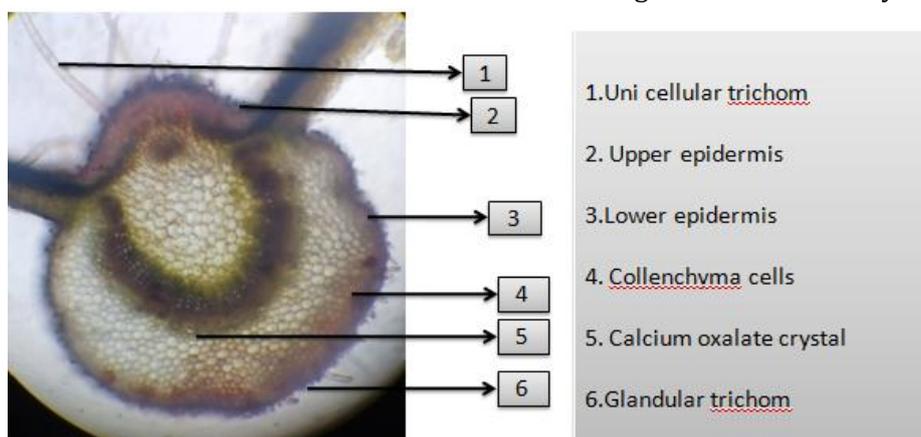
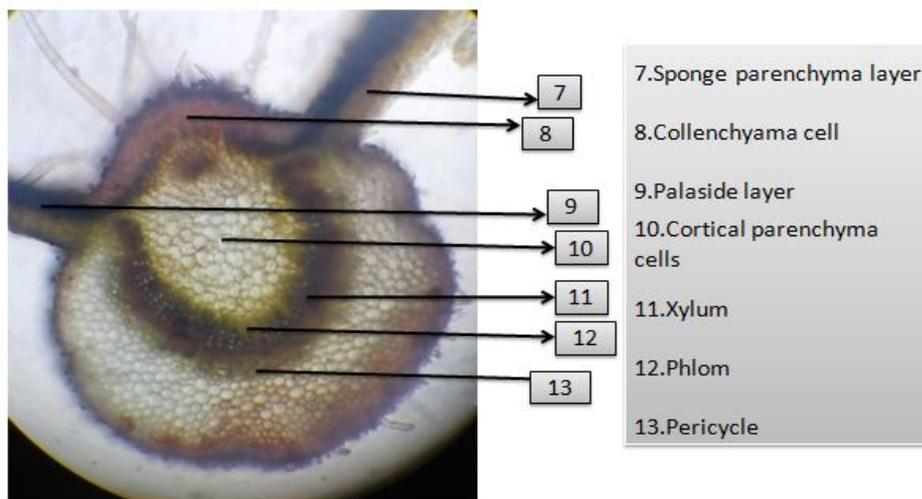


Fig No.2: Microscopic Structure of *Mussaenda bellila* Buch-Ham Leaf



With Tongue Method-The Volunteers report were given below:

Table1: Results of the voluntary trails on regarding *Mussaenda belilla*Buch.-Ham.

Sr. No	Madhura	Amla	Lavana	Tikta	Katu	Kashaya
1.	-					+
2.	+					+
3.	-					+
4.	-					+
5.	+					+
6.	-					+
7.	-					+
8.	+					-
9.	+					-
10.	-					+
11.	-					+
12.	-					+
13.	-					-
14.	-					+
15.	+					-
16.	-					+
17.	+					+
18.	-					+
19.	-					+
20.	+					-
21.	-					+
22.	-					+
23.	+					+
24.	+					-
25.	-					-
26.	-					+
27.	+					+
28.	-					-
29.	-					+
30.	+					-

+ Pradhana Rasa -19; - Anurasa-11

**Table 2: Results of Physical analysis**

Sl.No.	Test parameters	Units	Results
1	Description	-	Dark brown colour powder
2	LOD	%w/w	12.87%
3	PH of 10% solution of content		5.16
4	Water soluble extract	%w/w	18.66
5	Alcohol soluble extract	%w/w	1.58
6	Ash	%w/w	7.19
7	Acid insoluble ash	%w/w	BDL

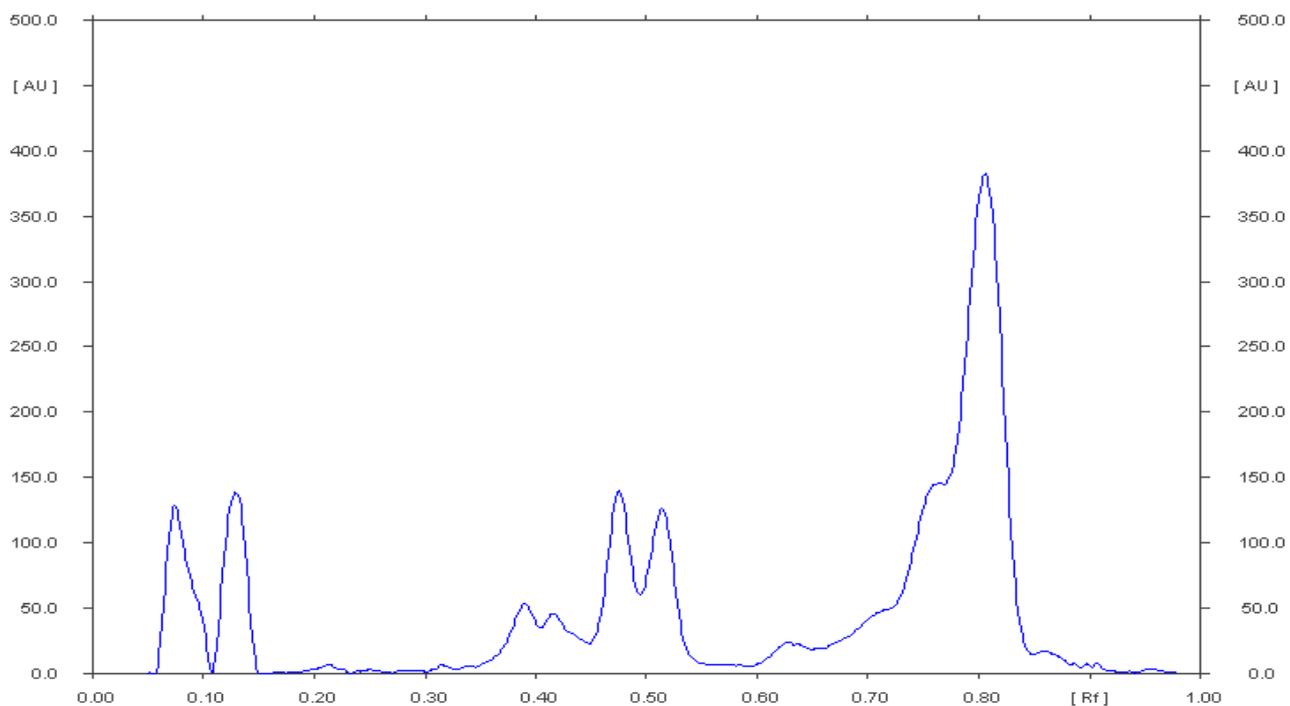
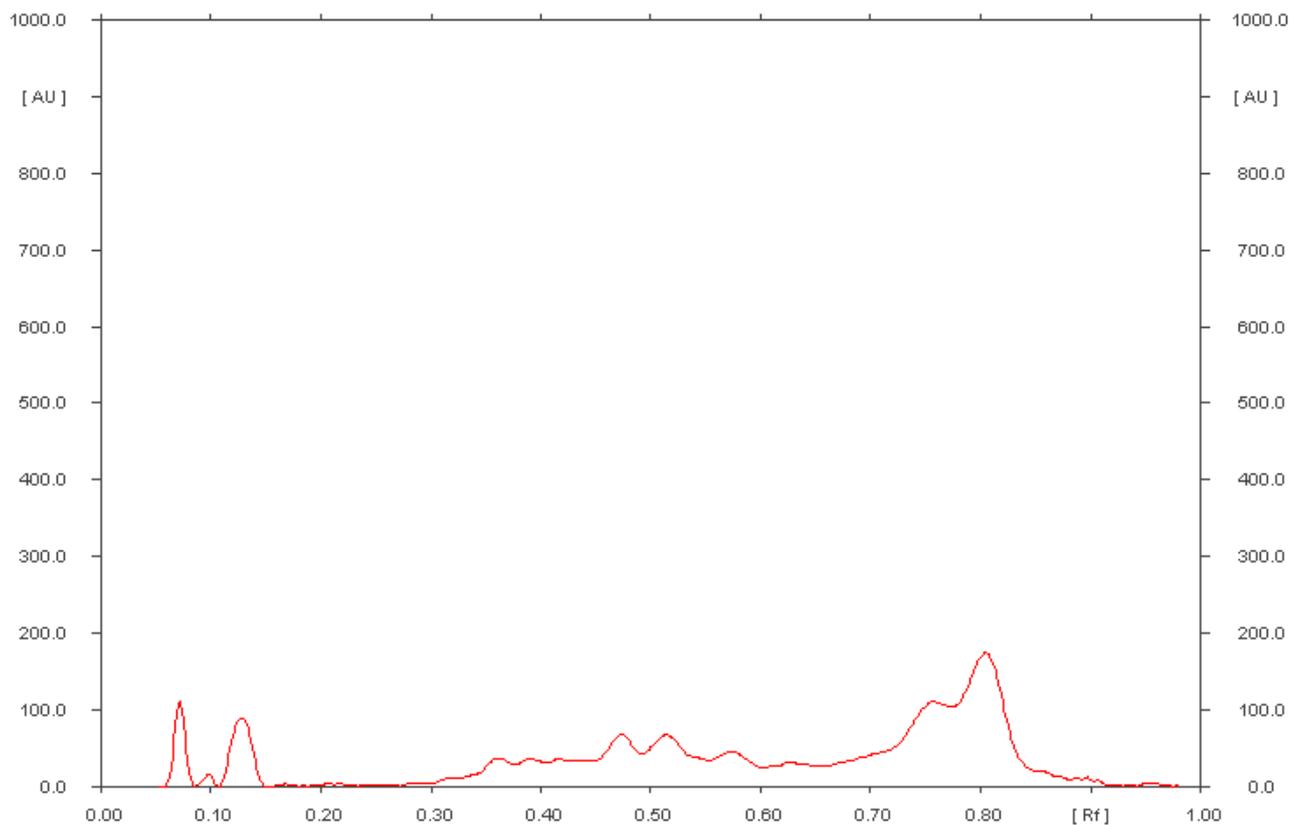
**Table 3: Results of In-Organic constitutions**

Sl.No.	Parameters	Result	Test Method
1	Test for Potassium	Absent	CKL/ANL/WC-013
2	Test for Magnesium	Absent	CKL/ANL/WC-014
3	Test for Iron	Absent	CXL/ANL/WC-015
4	Test for Chloride	Present	CKL/ANL/WC-016
5	Test for Sulphates	Absent	CKL/ANL/WC-017
6	Test for Phosphates	Present	CKL/ANL/WC-018
7	Test for Carbonates	Absent	CKL/ANL/WC-019
8	Test for Calcium	Absent	CKL/ALL/WC-OU
9	Test for Sodium	Absent	CKL/ANL/WC-012

**Table 4: Results of preliminary phyto-chemical tests on various extracts of *Mussaenda belilla* Buch.-Ham**

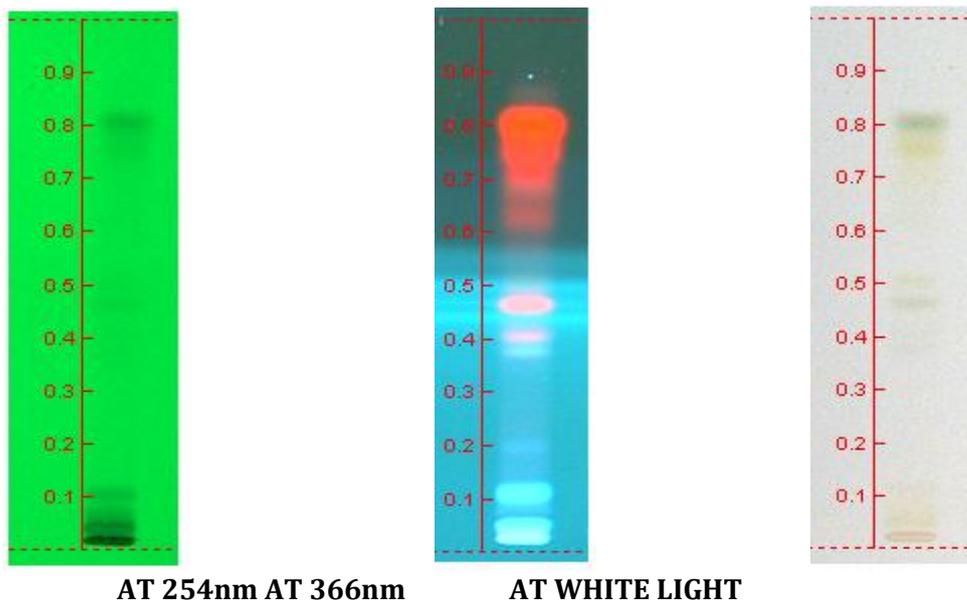
SL No	Tests	Aqueous-Ex	Alcohol -Ex	
1	Carbohydrate	Molisch's	-	-
		Fehling 's	-	-
		Benedicts	+	+
2	Starch	Iodine test	-	-
		Tannic acid test	+	-
3	Proteins	Biuret test	+	-
		Xanthoprotien test	-	-
4	Amino-acids	Ninhydrin test	-	-
5	Steroids	Salkowski reaction	-	-
		Liebermann – Burchard	-	-
		Liebermann reaction	-	-
6	Glycosides	Modified Brontrager's test for C-glycosides	-	-
7	Flavanoids	Shinoda test	+	+
8	Alkaloids	Hagers	-	-
		Wagners	+	-
9	Tannins and Phenolics	5% FeCl <sub>3</sub>	-	-
		Lead acetate	+	-
		Acetic acid	-	-
		Dil. iodine	+	-

Results no.1 Graph of *Mussaenda Belilla* Buch - Ham Sample at 254nm



Overview Graph of *Mussaenda Belilla* Buch - Ham Sample at 366nm

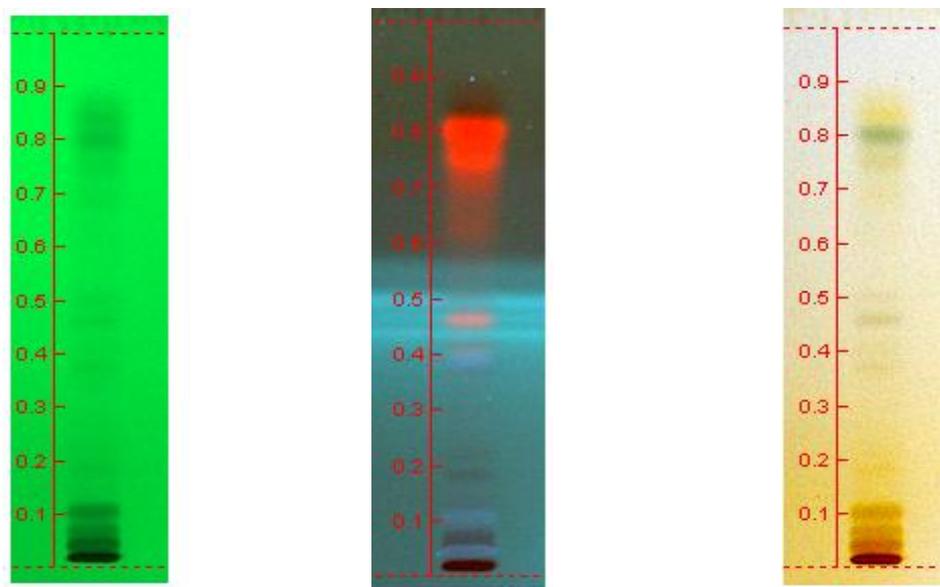
FigNo 3: TLC Plate Views of Mussaenda Belilla Buch – Ham Sample



AT 254nm AT 366nm

AT WHITE LIGHT

Derivatized TLC Plate Views of Mussaenda Belilla Buch – Ham Sample



AT 254NM AT 366NM AT White Ligh

Rf Value & % Area of Mussaenda Belilla Buch – HAM Sample AT 254nm

Peak No	Rf Value	Area (AU)	% Area (AU)
1	0.07	2672.9	10.70
2	0.13	2483.3	9.94
3	0.39	386.3	1.55
4	0.41	192.2	0.77
5	0.47	1509.1	6.04
6	0.51	1358.9	5.44
7	0.63	208.0	0.82
8	0.81	16085.4	64.39
9	0.86	86.7	0.35

Total Peak No – 09 Total Area – 24982.8 (AU)

Rf Value & % area of *Mussaenda Belilla Buch - Ham* Sample At 366nm

Peak No	Rf Value	Area (AU)	% Area (AU)
1	0.07	993.3	12.97
2	0.10	123.1	1.61
3	0.13	1499.0	19.58
4	0.36	424.3	5.54
5	0.47	476.8	6.23
6	0.51	568.3	7.42
7	0.57	315.6	4.12
8	0.76	573.1	7.49
9	0.81	2616.7	34.17
10	0.90	67.0	0.87

Total Peak No - 10

Total Area - 7657.2 (AU)

**DISCUSSION**

The trial drug *Mussaenda bellilla Buch-Ham* was collected from its natural habitat. It belongs to Rubiaceae family. The reference regarding this plant is not available in *Veda*, Samhitas and Nighantu. This trial drug used as hair conditioner in the form fresh juice, and also used such conditions like Menorrhagea, Anemia, Ulcer, Diarrhea in children.

Taste is the most important chemical indicator for the identification of drug. The results showed *Kashaya* as *Pradhana rasa* and *Madhura* as *Anurasa*. Hence as per general rule, the *Guna* of *Mussaenda bellilla Buch-Ham* can be taken *Laghu*, *Snigdha* and *Pichchilla gunas*. Acharya Charaka has mentioned *Laghu*, *rooksha* as the qualities of *Kashaya rasa*. The pH value of the trial drug was 6.22, hence it can be considered as *Anushna veerya*.

The phytochemical analysis of showed *Mussaenda bellilla Buch-Ham* the presence of carbohydrates, Starch, Protein, Phenol compounds, alkaloids and tannin in Aqueous and Alcoholic extract. In-organic chemical constituents like Calcium, Iron, sulphates and chlorides present in this trial drug. That's why it can be indicated in Anemia and Menorrhagia.

HPTLC of herb has been standardized as per pharmacopoeial testing protocol. The result from HPTLC fingerprint scanned at wavelength 254 nm for methanol extract of *Mussaenda bellilla Buch-Ham* showed 9 polyvalent phytoconstituents, Rf value starting from 0.07-0.86, in which the highest concentration of phytochemical was found to be 64.39 AU %, its corresponding area 16085.4 AU. Other values of phytochemicals mentioned in table No.5. Total peak number -9 and Total area -24982.8 AU.

The result from HPTLC fingerprint scanned at wavelength 366nm for methanol extract of *Mussaenda bellilla Buch -Ham* showed 10 polyvalent phytoconstituents, Rf value starting from 0.07-0.90 in

which the highest concentration of phytochemical was found to be 34.17AU% its corresponding area 2616.7AU. Total peak number -10 and Total area - 7657.2AU.

**Probable Mode of Action**

The drug *Mussaenda bellilla Buch -Ham* has *Kashaya padhana rasa* and *Madhura anurasa*. The qualities like *Guru*, *Snigdha*, *Sheeta veerya*, *Madhura vipaka* and *Pitta*, *Kaphahara*. *Sthamabana*, *Vrana Roopana*, *Twachya* and *jwaraghna* action can be observed. Used in case of insomnia, conjunctivitis, ulcers, jaundice, anemia, menorrhagia, dry cough, used in form of shampoo for hair.

The trial drug has showed the presence of carbohydrate, proteins, alkaloids, tannins and phenolic compounds in aqueous extracts and alcoholic extracts. So it can be act as *Balya*, *Bruhana*, *Sthambhana* and *Vrana roopana*.

Phenolic compounds helps in prevention of bacterial growth and act as anti-bacterial action. So it can be used in conjunctivitis and ulcers due to presence of tannin. A protein helps in repair the tissues and carbohydrates provide energy.

**CONCLUSION**

Available textual information regarding the plant *Mussaenda bellilla Buch-Ham* is very minimum and inadequate. It is essential to do pharmacognostical and phyto-chemical analysis for standardization. The macroscopic, microscopic standards and physico-chemical screening which are obtained can be used for the identification of this herb. The current study and facts obtained may act as stepping stones for further research in the field of medicine.

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