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# Qualitative and quantitate phytochemical investigation of *Viscum articulatum* Burm f. stem.

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**Abstract**
*Viscum articulatum* Burm f., an extra pharmacopeia drug of *Ayurveda* known as *Madanga*. The folklore of Odisha, belongs to family Santalaceae. Ethno pharmacologically whole plant of *V. articulatum* is claim to be used in the management of rheumatoid arthritis, analgesic and wound healing activity. It is unexplored from the pharmacognostical and phytochemical aspects for proper scientific evaluation of the plant for its authentication, physicochemical parameters, phytochemical screening, qualitative and quantitative of *V. articulatum* has been carried out as per standard protocol.

**Keywords:** qualitative, quantative, phytochemical, madang, viscum, articulatum

## Introduction
*Viscum articulatum* is among the most common plants used in Indian folklore. The species is native and is commonly used in preparation in India, China, Australia as different formulations for the different treatment and control of rheumatoid arthritis, analgesic, anti-thrombotic, blood purifier and wound healing activity [1, 2]. Due to its diverse global presence and ability to combat multiple health complications, this plant can be exploited for developing multiple modern drug forms after proper scientific validation and value addition. In this connection, this study aimed to proper scientific authentication and validation of *V. articulatum.*
It consists of various phytochemical compounds various glycosides these species also contain of various Visartiside A to F and various glycosidal, phenolic [3] and flavonoid compounds.
These research works consist of the macroscopic, microscopic transverse section and powder microscopic study, physicochemical parameters, phytochemical screening, qualitative and quantitative of *V. articulatum.* Due to the therapeutic significance, trade demand of these species. Hence the study is being designed and develops the standard protocol for authentication and standardization of the correct plant material of *V. articulatum.*

## Material & Method
### Collection of plant material
*V. articulatum* was collected as growing naturally at the Gandhamardana hill Ranges, Balangir district of Odisha (20°52′26″N82°50′34″E) during the month of November 2018 as per standard procedure [4] and authentication of drug (Specimen no. IPGTRA/BP/01) from Central National Herbarium, BSI, Kolkata.

### Physico-chemical parameters
Physico-chemical parameters like moisture content (loss on drying at 105°C), methanol soluble extractive value, water soluble extractive value, total ash value and acid insoluble ash value were done [5, 6].

### Preliminary phytochemical screening and quantitively estimation of phyto-chemical parameters
Preliminary phytochemical analysis was performed in methanol extract and water extract for the confirmation of present/ absent of phytochemical such as Alkaloids, Carbohydrates, Fats and fixed oils, Flavonoid, glycoside, terpenoids, tannin, protein, amino acids, starch and mucilage present in *V. articulatum.* In quantitive phyto-chemical analysis 1 mg/ml stock solution is being taken. Total Carbohydrate [7], Protein [8], Total Phenol Content [9], Total flavonoid content [10], Tannin [11] and Terpenoid [12] are being quantified using specified standards for the study are being performed.

## Result
### Organoleptic character
The organoleptic character of *V. articulatum* stem powder were performed and the results are depicted. [Table 1]

### Physico-chemical analysis
The physico-chemical parameters of *V. articulatum* stem powder were performed and the results are depicted. [Table 2].

### Preliminary phyto-chemical qualitative and quantitative analysis
The qualitative and quantitive phyto-chemical analysis were performed in both water and methanol extract of *V. articulatum* stem powder are depicted. [Table 3] and [Table 4].

## Discussion
Plants are one of the main sources of dietetic supplements that contribute to healthy maintenance. Past metabolic screening data showed that the plant's capacity was largely

caused by bioactive compounds [13]. The identification and authentication of *V. articulatum* stem physicochemical tests revelled presence of Glycoside, tannins, flavonoid, terpenoidal steroids and phenols qualitatively, Whereas quantitative data revelled the higher amount of carbohydrates followed by protein, phenol, flavonoid, tannin and terpenoid was being used for knowing the phytoconstituents are qualitatively and quantitative present in the plant. All results show genuine samples and are free of adulteration. The use of *V. articulatum* stem an ingredient may serve to develop a new medicinal in the future.

**Table 1:** Organoleptic character of *V. articulatum*

| Parameters | Description |
|---|---|
| Colour (Fresh) | Greenish |
| Colour (dry) | Brownish light green |
| Odour | Aromatic |
| Taste | Bitter |
| Touch | Smooth |
| Size | 4-4.5 cm |
| Shape | Round to flatted |

**Table 2:** Physico-chemical analysis of *V. articulatum*

| Powder parameters | Results |
|---|---|
| pH | 6.5 ± 0.54 |
| Loss on drying (%w/w) | 4.76 ± 0.07 |
| Ash value (%w/w) | 1.80 ±0.01 |
| Acid insoluble ash (%w/w) | 0.05 ± 0.01 |
| Alcohol soluble extractive (%w/w) | 32.74 ± 0.10 |
| Water soluble extractive (%w/w) | 47.21 ± 0.94 |

Mean±SD (n=3)

**Table 3:** Qualitative phyto-chemical analysis of *V. articulatum*

| Phyto-constituents | Tests | Water extract | Methanol extract |
|---|---|---|---|
| Alkaloids | Mayer's Reagent | -- | -- |
| | Wagner's test | -- | -- |
| | Dragen dorff's test | -- | -- |
| Carbohydrates | Molisch test | ++ | ++ |
| | Fehling's Test | ++ | ++ |
| Fats and fixed oils | Filter paper test | -- | -- |
| Flavonoid | Shinoda's Test | ++ | ++ |
| Cardiac glycoside | Keller-killiani test | ++ | ++ |
| Saponin glycoside | Foam test | ++ | ++ |
| Anthraquinone | Borntragers test | ++ | ++ |
| Steroids & Terpenoids | Salkowski test | ++ | ++ |
| Tannins & Phenolic compounds | 5% $FeCl_3$ | ++ | ++ |
| Proteins | Biuret test | -- | -- |
| | $K_3Fe(CN)_6$ | -- | -- |
| Amino acids | Ninhydrin test | -- | -- |
| Starch | I2-KI | ++ | -- |
| Mucilage | Ruthenium red | ++ | ++ |

Present ++ Absent --

**Table 4:** Quantitative phyto-chemical analysis of *V. articulatum*

| Name of the test | Quantitative extract (in µg/ml) |
|---|---|
| Total Carbohydrates content | 1772.48±160.94 |
| Total Protein content | 542.66±81.95 |
| Total Flavonoid content | 253.82±52.11 |
| Total Tannin content | 255.30±27.06 |
| Total Terpenoid content | 12.10±5.23 |
| Total Phenolic content | 319.66±20.13 |

Mean±SD (n=3)

## Conclusion

Botanically *Madanga* plant is identified as *Viscum articulatum* Burm f. This study is very useful in identifying, authentication and assessing the quality of *V. articulatum* by using the means of qualitatively and quantitively phytochemically. It will be useful as a reference tool to properly verify the correct plant material and to track quality for finished formulation with the use of *V. articulatum* part for the therapeutic purpose.

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