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# EXPLORING HERBAL POTENTIAL: FORMULATION AND EVALUATION OF *CISSUS WOODROWII* STEM TABLETS

**PATIL PN[*1, 2], GILHOTRA RM[1], SHARMA S[1], DHAKAD PK[1] AND WADKAR KA[3]**

1. School of Pharmacy, Suresh Gyan Vihar University, Mahal Jagatpura Jaipur, Rajasthan India, 302017
2. Department of Pharmaceutical chemistry, Dr. J.J. Magdum Trust's, Dr. J.J. Magdum Pharmacy College, Jaysingpur, Dist-Kolhapur, Maharashtra, India, 416101
3. Department of Pharmacognosy, Teerthankar Education Society's, Dr. Shivajirao Kadam College of Pharmacy, Kasabe Digraj, Taluka-Miraj, Dist-Sangli, Maharashtra, India, 416305

***Corresponding Author: Dr. Pallavi N. Patil: E Mail: reachpallu58@gmail.com**

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## ABSTRACT

Herbal medicine, encompassing various plant-based products, has gained widespread popularity due to the perceived health benefits and cultural practices. However, the overexploitation of certain medicinal plants poses a threat to their survival. Consequently, there is a growing interest in underutilized plant species that possess potential medicinal properties yet lack extensive research. *Cissus woodrowii*, a member of the Vitaceae family, is one such species known for its traditional medicinal uses. This study focuses on the formulation of herbal tablets using *Cissus woodrowii* stem powder. Various evaluation parameters including bulk and tapped density 0.513333± 0.015275g/ml and 0.590667± 0.004041 g/ml respectively, Hausner's ratio (1.159333±0.478175), Carr's index (0.00145±0.427265), angle of repose (26.12333±8.582867), weight variation (247.5±8.291562), hardness (4-5 kg/cm$^2$), and disintegration time (18 min) were assessed to ensure the quality of the tablets. The results indicate that the formulated tablets meet the prescribed standards, demonstrating promising potential for further development and utilization in herbal medicine.

**Keywords: *Cissus woodrowii*, Wet granulation, Herbal tablets, Evaluation of tablet**

## INTRODUCTION

WHO define herbal medicine is any product that contains active components of a plant. This definition encompasses a wide range of products, including but not limited to herbs, herbal materials, substances, preparations, and complete products **[1]**. Because of the excessive harvesting of many species for their nutritional and medicinal properties, plant populations are in a particularly fragile state. However, there are a number of plants that contain phytochemicals that have the potential to have beneficial effects on humans, but none of these species have been subjected to extensive research **[2]**. Such plants are referred to as "underutilized" due to the fact that there is a scarcity of scientific information regarding the possible applications of these plants. Finding and researching plants that are not being utilized to their full potential will help relieve the problem of overexploitation of many species. When they are having health issues, more than eighty percent of the world's population now seeks for herbal treatments as their first line of defense. In current years, there has been a prevalent escalation in demand for herbal cures, functional meals that are beneficial to one's health, and additional drugs **[3]**.

There are 350 different species that belong to genus *Cissus*, which is a member of family *Vitaceae* and is utilized in traditional medicine all over the world to treat a wide variety of ailments. It is possible that the wild population of this plant species would decrease as a result of the fact that between 200 and 500 metric tons of this plant species are sold annually, as stated by the National Medicinal Plant Board of India **[4-6]**.

Because it is simple to administer, patient compliance is high, there are less sterility constraints, and dose forms may be designed in a flexible manner, the oral route has become one of the most preferred routes for drug delivery. Tablets are described as solid preparations that include one or more active substances and are characterized by their unit dose and evidence of temperature. Tablets and capsules, which are examples of conventional drug delivery systems, frequently breakdown quickly in the gastrointestinal tract, which allows for absorption into the bloodstream **[7]**. This results in abnormally high quantities of the drug in the plasma fluid. In this research we focus on the preparation of herbal tablet from the *Cissus woodrowii* stem.

## MATERIAL AND METHODS

Stem of *Cissus woodrowii Santapau* collected from local regeion of Kolapur, Maharashtra, India.in month of July 2023. Plant was then authenticated by approved botanist of Shivaji University, Kolhapur and Herbarium sheet was deposited with the voucher name (PNP/ SUK/ CW/001) and also from Botanical Survey of India, Pune of

Herbarium sheet was deposited with the voucher name PNPCW-1 **[9]**.

All analytical grade ingredients are used. Distilled water was used to clean the collected steams. For many days, the stems were left to dry at room temperature. To dry the stem thoroughly, a hot air oven is employed. A fine powder is made by collecting the dried stem and grinding it in a mixer **[10]**. Formulation excipients include methylcellulose (as a disintegrant), magnesium stearate (a lubricant), lactose (a diluent), and talc (a lubricant and a tablet aesthetic enhancer). Wet granulation is prepared with the help of these three excipients, one of which being acacia.

**Preparation of 1% acacia solution**

With constant stirring, 1 gram of acacia powder is combined with 100 milliliters of water.

**Preparation of 1% HPMC-10 solution**

Combine one gram of HPMC-10 powder with one hundred milliliters of distilled water. Keep stirring until a jelly-like consistency is achieved.

**Preparation of 1% sodium alginate solution**

To 100 milliliters of alcohol, add 1 gram of sodium alginate powder. Make sure to stir thoroughly to ensure a thorough mixing.

**Formulation of herbal tablets**

The tablet dosage form was created using dried stem powder of *Cissus woodrowii* in this combination. The mixture was made using the wet granulation method and then pressed with a tablet cutting machine **[8]**.

**Wet granulation method**

Get the measurements right, stir everything together, and then use a mortar and pestle to grind everything into a powder. A moist mass was formed by gradually adding the produced 1% binding agent. Sieve number 22 was used to transport the wet bulk. Room temperature is used for drying the prepared granules. Now that the granules have dried thoroughly, they can be compressed.

**Table 1: Tablet formulation**

| Ingredients | Quantity | | |
|---|---|---|---|
| | F1 (mg) | F2 (mg) | F3 (mg) |
| *Cissus woodrowii* stem | 250 | 250 | 250 |
| Methylcellulose | 180 | 180 | 180 |
| Magnesium stearate | 20 | 20 | 20 |
| Lactose | 50 | 50 mg | 50 |
| Talc | 10 | 10 | 10 |
| HPMC-10 | - | 1% | - |
| Sodium alginate | - | -- | 1% |
| Acacia | 1% | - | - |

**Figure 1: Granules and herbal tablet of *Cissus woodrowii* stem**

**Bulk density**

A 100 ml dried measuring cylinder was used for bulk density test. Using following formula, pour the dried granules into measuring cylinder; To get bulk density, divide granules' mass by their bulk volume. Bulk density of granules is shown in **Table 2**.

**Tapped density**

The dry granules were poured into a 100 ml measuring cylinder to achieve tapped density. Take note of volume after 100 taps and use following formula to determine the result; the density of tapped granules is equal to their weight divided by their volume. Granule densities are tabulated in **Table 2**.

**Hausner's ratio**

If you take the bulk density of granules and divide it by their tapped density, you get Hausner's ratio. This was determined using the formula provided. **Table 2** displays the granules' flow characteristic. The Hausner's ratio can be expressed as the proportion of tapped density to bulk density.

**Carr's index**

The following method can be used to find Carr's index, also called the compressibility index. In Table 2, you can see how granules move.

This is how you find Carr's index (%): Tapped density – Bulk density / Tapped density x 100

**Angle of repose**

The funnel method was used to find the angle of repose. In **Table 2** mentioned outcomes

**General appearance of tablet**

Visual inspection revealed the tablet's color and general shape.

**Weight variation test**

The following approach was used to conduct the weight variation test. Take 20 tablets and label them as X1, X2, X3,...X20. To find average weight of twenty tablets, use formula X = (X1+X2+X3+... +X20)/20. The maximum and lower limits were used to compare the individual's weight. There are no more than two tablets that deviate from the average weight by a greater margin than the specified percentage error, and no tablets that deviate by more than twice that margin.

**Hardness and thickness test**

Twenty tablets of each formulation were tested for hardness and thickness. The Monsanto hardness tester was used for hardness testing, while the Vernier caliper was used for tablet thickness measurement.

**Friability test**

The Roche friabilator can be used in a laboratory setting to test the tablet's friability. The friabilator is run for 100 revolutions, and it consists of a plastic chamber that spins at 25 rpm. The tablets are dropped through a six-inch gap in the chamber. We reweigh the pills. It is permissible for compress pills to lose between 0.5 and 1 percent of their weight.

**Disintegration time**

The disintegration test simply measures the amount of time it takes for a batch of tablets to break down into smaller pieces under specific environmental conditions, therefore this was essentially a time-based test. The goal of this experiment was to determine how quickly a tablet may dissolve in a certain amount of time.

**RESULTS**

The herbal tablet of *Cissus woodrowii* stem was formulated wet granulation and followed by direct compression method. Outcomes of evaluation of tablets are within range of prescribed standards.

**Pre formulation study**

Granules that had been prepared were examined for a number of metrics. **Table 2** displays outcomes of study. Following evaluation of preformulation parameters, it was discovered that the granules did not contain any moisture and that the mix was composed of a consistent consistency. Following an investigation into flow rate, it was determined that there is an optimal proportion of powder blend that results in the highest possible flow rate. As a result, the findings demonstrated that the powder had an excellent flow characteristic, which does not have an impact on the process of tablet punching. **Table 2** contains the results that were obtained.

**Table 2: Evaluation of granules**

| | |
|---|---|
| **Tapped density** | **0.590667± 0.004041 g/ml** |
| **Bulk density** | **0.513333± 0.015275 g/ml** |
| **Hausner's ratio** | **1.159333±0.478175** |
| **Angle of repose** | **26.12333±8.582867** |
| **Carr's Index (%)** | **0.00145±0.427265** |

**Physical evaluation of tablets**

Table 3 displayed the outcomes of many physical criteria, such as hardness, weight fluctuation, and tablet disintegration. The presence of filler, glidant, lubricant, and active pharmaceutical components is enough to give the tablet enough mass to reduce punching danger. The tablet's disintegration, hardness, friability and weight variation were determined to be within acceptable limits. As a result of being within the specified hardness range, the disintegration profile of the herbal medications including tablets is satisfactory. The tablet was observed to have a spherical form, a light brown hue, a smooth texture, and no discernible odour.

**Table 3: Evaluation of tablet**

| | |
|---|---|
| **Colour** | **light brown** |
| **Weight variation** | **557.5±8.29 mg** |
| **Hardness** | **4-5 kg/cm$^2$** |
| **Disintegration time** | **18 min** |

## CONCLUSION

Study highlights formulation and evaluation of herbal tablets using *Cissus woodrowii* stem powder, an underutilized plant species with potential medicinal properties. Through meticulous pre-formulation studies and formulation processes, tablets were successfully prepared using wet granulation method. Evaluation of physical parameters revealed satisfactory results within acceptable limits, indicating the quality and feasibility of the herbal tablets. The findings underscore the importance of exploring underutilized plant species for their medicinal value, thereby reducing the overexploitation of commonly used plants. Auxiliary investigation and expansion are necessary to reconnoitre therapeutic potential and commercial viability of Cissus woodrowii and similar underutilized species in herbal medicine.

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**Conflict of interest statement**

The authors declared no conflict of interest in this study.

**Authors' contributions**

The final version of the manuscript was approved by all authors.

## REFERENCES

**[1]** Kunle, Oluyemisi F, Egharevba, Henry O, Ahmadu, Peter O. Standardization of herbal medicines-A review. International journal of biodiversity and conservation. 2012 Mar 31;4(3):101-12.

**[2]** Saxena M, Saxena J, Nema R, Singh D, Gupta A. Phytochemistry of medicinal plants. Journal of

pharmacognosy and phytochemistry. 2013;1(6):168-82.

**[3]** Chen SL, Yu H, Luo HM, Wu Q, Li CF, Steinmetz A. Conservation and sustainable use of medicinal plants: problems, progress, and prospects. Chinese medicine. 2016 Dec;11:1-0.

**[4]** Tasadduq R, Gordon J, Al-Ghanim KA, Lian JB, Van Wijnen AJ, Stein JL, Stein GS, Shakoori AR. Ethanol extract of *Cissus quadrangularis* enhances osteoblast differentiation and mineralization of murine pre-osteoblastic MC3T3-E1 cells. Journal of cellular physiology. 2017 Mar;232(3):540-7.

**[5]** Dhanasekaran S. Phytochemical characteristics of aerial part of *Cissus quadrangularis* (L) and its in-vitro inhibitory activity against leukemic cells and antioxidant properties. Saudi journal of biological sciences. 2020 May 1;27(5):1302-9.

**[6]** Patil MP, Sing SK, Wadkar KA. A Review on study of underutilized plant *Cissus Woodroii* (Stapf ex Cooke) and genus Cissus. Journal of Pharmaceutical Research & Education, 2022, 7(2),:773-805

**[7]** Pal AK, Nagaich U, Bharti C, Gulati N. Formulation and evaluation of nutraceutical tablet using herbal drurs by direct compression method. Journal of Drug Delivery and Therapeutics. 2014 Mar 14;4(2):47-51.

**[8]** Chavan P, Kalshetti M, Navindgikar N. Formulation and evaluation of herbal tablets containing nyctanthes arbor-trists leaves. Int J Curr Pharm Res. 2020;12(3):22-4.

**[9]** Pallavi N Patil*, Santosh K Singh1, Kiran A Wadkar3 Exploring the Antioxidant Potential of *Cissus woodrowii* (Stapf Ex Cooke) Santapau: A Study on Leaves and Stem, International Journal of Drug Delivery Technology, Volume 13 Issue 4, October - December 2023,1392-1398.

**[10]** Patil PN, Gilhotra RM, Sharma S, Wadkar KA. Hepatoprotective and antioxidant activity of stem and leaves parts of *Cissus woodrowii* (Stapf ex Cooke) Santapau. Int J Pharm Quality Assur. 2024;15(2):588-94.