International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 27-06-2025, Accepted: 26-07-2025, Published: 14-08-2025
Volume 10, Issue 8, 2025, Page No. 28-30

# Ethnobotanical and nutraceutical significance of *Vigna unguiculata (L.)* Walp: An underutilized legume from Jharkhand

**Dr. Monalisha Saha**
Assistant Professor, Department of Botany S. S. L. N. T. Mahila Mahavidyalaya, Jharkhand, India

**Abstract**
*Vigna unguiculata* (L.) Walp., commonly known as cowpea, is a legume of significant ethnobotanical and nutritional value, particularly among tribal populations of eastern India. This study evaluates its morphological features, traditional medicinal applications, and nutritional composition based on field surveys and laboratory analysis in five tribal districts of Jharkhand: Dumka, West Singhbhum, Khunti, Gumla, and Lohardaga. Ethnobotanical data were collected from 120 informants via structured interviews and participatory observations. Laboratory tests revealed high protein (23.4%), dietary fiber (6.8%), iron (6.7 mg/100 g), calcium (87 mg/100 g), and antioxidant contents. Field observations identified wide variability in pod length, plant height, and seed color, signifying rich genetic diversity. Despite its adaptability to poor soils and drought conditions, cowpea remains underutilized due to low market awareness and poor policy support. Integration of cowpea into public nutrition and agro-ecological programs may improve food security, tribal health, and biodiversity conservation in Jharkhand.

**Keywords:** Cowpea, *Vigna unguiculata*, ethnobotany, jharkhand, nutraceuticals, tribal knowledge, underutilized legumes

## Introduction
Jharkhand is home to diverse indigenous communities whose ethnobotanical knowledge forms an essential part of their sustenance and healthcare. Among underutilized legumes, *Vigna unguiculata* (L.) Walp., commonly known as cowpea, holds promise as a climate-resilient and nutrient-rich crop [1]. Traditionally grown in backyard gardens, it is consumed by Santhal, Ho, Munda, and Oraon tribes in various forms—soups, roasted seeds, and herbal decoctions.
Despite its nutraceutical benefits, cowpea cultivation in Jharkhand is limited. Enhancing its use can play a key role in addressing protein-energy malnutrition, especially in tribal areas. This research investigates the plant's agro-morphological variability, ethnomedicinal relevance, and nutritional composition to promote its revival as a dietary and cultural asset.

## Materials and Methods
### a. Study Area and Participant Selection
The study was conducted in five tribal-dominated districts of Jharkhand. Data were collected from 120 informants (62 female, 58 male), selected using purposive and snowball sampling.

### b. Ethnobotanical Documentation
Semi-structured interviews and focus group discussions were conducted in local dialects. Use Value (UV) and Informant Consensus Factor (ICF) were calculated using methods from [2].

### c. Morphological and Field Analysis
Local cowpea landraces were collected from 15 villages and cultivated for field testing. Morphological traits including pod length, plant height, seed color, flowering period, and days to maturity were recorded.

### d. Nutritional Analysis
Proximate and mineral analysis followed AOAC standard methods [3], including:
- Protein (Kjeldahl)
- Fiber (enzymatic-gravimetric)
- Iron, calcium, and zinc (atomic absorption spectrometry)
- Total phenolics (Folin–Ciocalteu method)

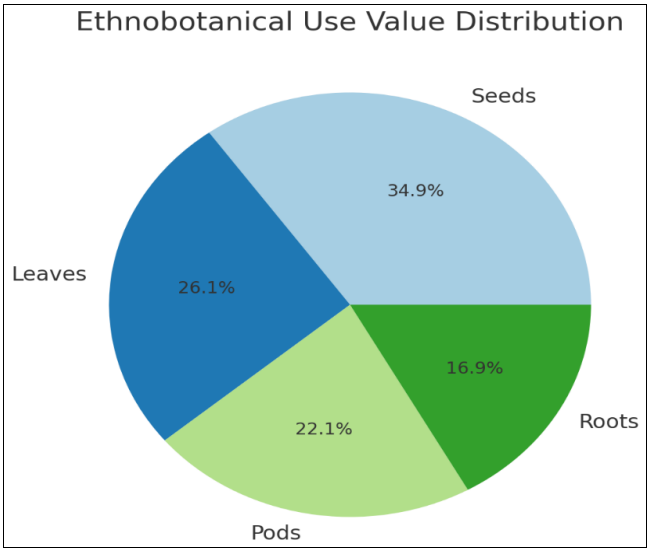
### e. Statistical Analysis
Means and standard deviations were calculated using SPSS 25.0. Ethnobotanical data were coded and analyzed for UV and ICF values.

## Results and Discussion
### a. Ethnobotanical Findings
Table I outlines the plant parts used and their associated traditional uses:

**Table 1:** Ethnobotanical Uses of *V. unguiculata* in Jharkhand

| Part Used | Traditional Use | Mode of Use | Tribe |
|---|---|---|---|
| Seeds | Anti-diabetic, energy food | Roasted or boiled | Santhal |
| Leaves | Fever, diarrhea | Decoction | Ho |
| Pods | Digestive health | Stewed with spices | Munda |
| Roots | Skin infection | Crushed and applied | Ho, Oraon |

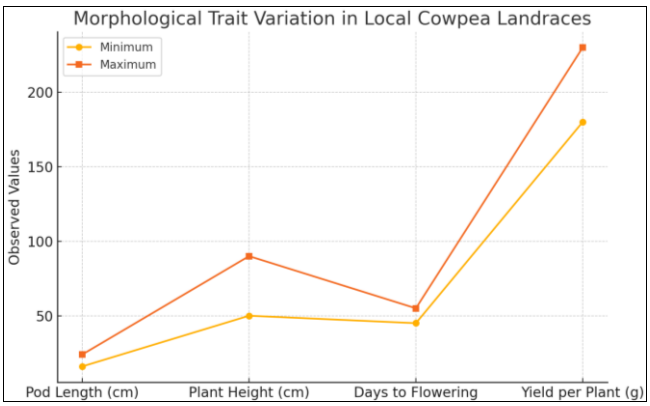
- Highest Use Value (UV) was recorded for seeds (0.87), followed by leaves (0.65).
- ICF for gastrointestinal ailments was high (0.91), indicating strong cultural consensus.




**b. Morphological Diversity (Field Test Results)**

A total of 15 landraces were evaluated over two crop seasons. Key observations include:

- **Pod length** ranged from 16–24 cm.
- **Plant height** varied between 50–90 cm.
- **Days to flowering:** 45–55 days.
- **Seed color:** brown (40%), black (30%), and mottled (30%).
- **Yield per plant:** 180–230 g (pods) under rain-fed conditions.

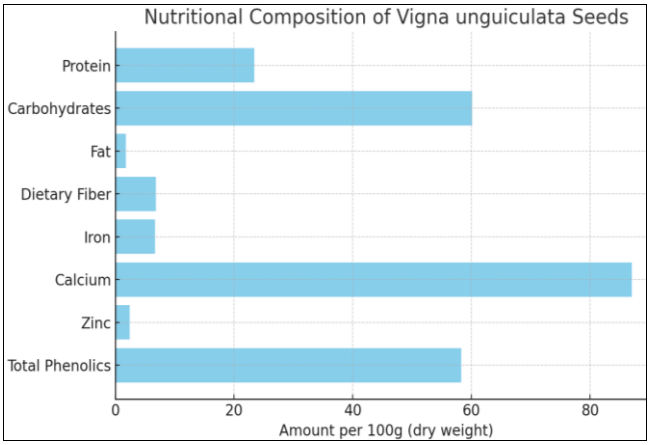



These traits reflect substantial adaptability to low-input systems and stress conditions. Notably, accessions from Dumka and Khunti districts showed early maturity and resistance to pod borers. Variation in seed color and pod shape suggests high genetic heterogeneity, which could be exploited in future breeding programs.

**c. Nutritional and Phytochemical Composition**

**Table 2:** Nutritional Profile of Cowpea Seeds (per 100 g Dry Weight)

| Component | Amount |
|---|---|
| Protein | 23.4 g |
| Carbohydrates | 60.1 g |
| Fat | 1.8 g |
| Dietary Fiber | 6.8 g |
| Iron | 6.7 mg |
| Calcium | 87 mg |
| Zinc | 2.4 mg |
| Total Phenolics | 58.3 mg GAE/g |




- The high protein content matches that of soybean [4].
- Dietary fiber and iron levels suggest potential in addressing anemia and digestive health.
- Total phenolic content confirms its antioxidant capacity, corroborating its traditional use in febrile and inflammatory conditions.

**d. Socioeconomic and Agronomic Observations**

Interviews revealed

- 78% of informants do not sell cowpea in the market.
- 65% of cultivators use home-saved seeds.
- Constraints: lack of extension services, low awareness of market potential, and preference for paddy/maize.

However, cowpea is highly favored for its drought resistance and its compatibility with intercropping in upland areas.

**Conclusion**

The study establishes *Vigna unguiculata* (L.) Walp. as a nutritionally rich, morphologically diverse, and culturally significant legume among Jharkhand's tribal populations. Its high protein and mineral content, alongside its medicinal use in treating gastrointestinal and febrile conditions, make it an ideal candidate for improving food and health security in rural India.

Despite its agronomic resilience, the crop remains underutilized due to systemic neglect, lack of policy support, and poor market integration. Conservation of its genetic diversity, coupled with efforts to revive its traditional use, is essential.

**Elaborated Conclusion**

1. **Scientific Recognition of Traditional Knowledge:** The study validates the empirical knowledge held by tribal communities regarding the medicinal and nutritional benefits of cowpea. This affirms the need to document and integrate such indigenous practices into mainstream research and education.

2. **Potential Role in Food Security:** Given its high nutritional profile, cowpea can serve as a low-cost, high-protein dietary staple for marginalized populations. Including it in government-sponsored programs like ICDS and mid-day meals could combat malnutrition.

3. **Agroecological Importance:** Its nitrogen-fixing ability and adaptability to marginal soils make it suitable for

climate-resilient agriculture in Jharkhand's rain-fed systems.

## 4. Recommendations

- Develop decentralized seed banks.
- Promote participatory varietal selection with local farmers.
- Support market linkages through FPOs and cooperative societies.
- Encourage value-added products (cowpea flour, snacks, protein powder).

In conclusion, recognizing *Vigna unguiculata* as both a functional food and cultural crop can play a pivotal role in sustainable rural development, tribal empowerment, and biodiversity conservation.

## References

1. S Padulosi, P Heywood, R Hunter, R Hazekamp, K Hodgkin. Underutilized Species Climate Change, Bioversity International, Rome, 2013.
2. SK Jain, RR Rao, An Ethnobotanical Survey of Madhya Pradesh, Journal of Economic Taxonomic Botany,1983:4(1):31–42.
3. AOAC, Official Methods of Analysis, 19th ed, Association of Official Analytical Chemists, Washington DC, 2012.
4. C Gopalan, BV Rama Sastri, SC Balasubramanian, Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad, 2014.
5. BL Maass. *et al*. Cowpea, a versatile legume for hot environments, Field Crops Research,2010:115(2):139–144.
6. R Singh, S Tudu, A Tirkey, Ethnobotanical Appraisal of Leguminous Plants in Jharkhand, Indian J. of Traditional Knowledge,2020:19(1):89–97.