

---

Original Research Article

DOI - 10.26479/2015.0102.03

## BIOCHEMICAL ASSESSMENT OF NUTRACEUTICAL FROM *VERBENA BIPINNATIFIDA*

P.B. Dandge\*, P. J. Kasabe, S.S. Shinde, S.S. Patil and S.D. Kalasgonda D

Department of Biochemistry, Shivaji University, Kolhapur, MS, India.

---

**ABSTRACT:** Medicinal plants have a key role in the play to overcome various diseases. The present need is the supplementary diet which should have medicinal as well as nutritional significance. Plants and animals are the traditional sources of micronutrients for man; so it has becomes necessary to screen out the most prominent sources among the known and unknown understanding. This study therefore sought to establish the nutraceutical assurance of *Verbena bipinnatifida* (L). The plant is excellent source of some essential amino acids with 4.683 mg/g of proteins, 66.66 mg/g of ascorbic acid, 1.956 mg/g of reducing sugars and prevalence of heavy metals like Cu, Ni, Fe, Mn, Zn, Ca, and Mg. Apart from these nutritional supplements it also contains 0.13 mg NAE/g of alkaloids and 2.321 mg GAE/g of phenolic compounds. The presence of significant amount of phenolic compounds, ascorbic acid and alkaloids is suggested that it may have a potent antioxidant activity. The plant extracts also shown antibacterial activity against *E.coli* and antifungal Activity against *Fusarium oxysporum* at preliminary level.

---

**KEYWORDS:** *Verbena bipinnatifida*, Nutraceutical, heavy metals, antioxidant

---

**\*Corresponding Author: Dr. P.B. Dandge Ph.D.**

Department of Biochemistry, Shivaji University, Kolhapur, MS, India

India\*Email Address: [pb\\_d\\_biochem@unishivaji.ac.in](mailto:pb_d_biochem@unishivaji.ac.in)

---

## 1.INTRODUCTION

Verbena or vervains (*Verbena bipinnatifida*) included in the family verbenaceae, use in herbalism and folk medicine, usually as herbal tea. It is reported to have anti-inflammatory, gastroprotective, cicatrizing activities and wound healing activities (1). It may act as a galactagogue and possibly sex steroid analogue and sometimes used as abortifacient, stimulation of lactation & treatment of dysmenorrheal, jaundice, gout, kidney stone & headache (2). Sometimes used as domestic herbal remedy, used to treat minor injuries, sores and gum disease. The leaves and flowering stems are analgesic, antibacterial, anticoagulant, astringent, and mildly diuretic (3). The root is astringent; used in the treatment of dysentery. It strengthens as well as correct diseases of the stomach, liver and spleen; it has antiinflammatory and analgesic activity which is used for topical administration (4). Medicinal plants play a major role in the health care sector of developing nations for the management of diseases. Thus herbal medicines have a prominent role to play in the pharmaceutical markets and health care sector of the 21<sup>st</sup> century. Even though a lot of photochemical and bioactivity studies have been carried out on a number of medicinal plants in, not much has been reported on the heavy metal contents of these plants. This study therefore sought to establish the presence, quantity and prevalence of six heavy metals (Cu, Zn, Fe, Mn, Ni and Cd) and its medicinal value.

## 2. MATERIALS AND METHODS

### Collection of Plant Material

Leaves of *Verbena bipinnatifida* were collected from the herb cultivated at botanical garden as well as wildy grown at the forest region of the Shivaji University of Maharashtra, India. The plants were identified with the help of recent floral description. Present study is to evaluate its potential by quantifying its bioactive compounds. Also the nutritional, health promoting as well as medicinal properties of the plant species are uncovered here. Samples were prepared in three forms as aqueous extract, methanol extract and acetone extract at concentration 100 mg/ml.

### 1.Assessment of nutritional supplement:

Here the various nutritional components which can be supplemented were checked from the plant source. Essential amino acids were detected by thin layer chromatography. The protein content of the aqueous extract was determined by using lowry's method. The Vitamin C concentration is quantified by using 2, 6- Dichlorophenolindophenol (DCPIP) Method

### 2.Assessment of health promoting supplements:

For the qualitative Phytochemical analysis, aqueous extract, methanol extract and acetone extract of leaves of *Verbena bipinnatifida* plant were tested by using standard protocols (5, 6).

### Quantitation of total alkaloids:

Here the health promoting or medicinal components from plant source were quantified. The total alkaloids were quantified by using nicotinic acid as a standard alkaloid and results were quoted as

mg of nicotinic acid equivalent per gram (mg NAE/g)

**Quantitation of total phenolics:** The total phenolic compounds were quantified by using gallic acid as a standard phenol and results were quoted as mg of gallic acid equivalent per gram (mg GAE/g).

### 3. Assessment of antimicrobial activity:

Here the plant extract is evaluated for its antimicrobial activity, for this purpose both gram positive and gram negative bacteria and fungi were taken for the study. The well-known well diffusion method was performed (6).

### 4. Detection of metals by atomic absorption spectroscopy:

Leaves extract of the *Verbena bipinnatifidae* was evaluated for metal study using atomic absorption spectroscopy. Metals like Cu, Ni, Fe, Cd, Mn, Zn, Ca, Mg were evaluated. (7).

## 3. RESULTS AND DISCUSSION

**Table 1: Detection of essential amino acids**

Amino acid detected	Arginine	Serine	Proline	Methionine
Acetone extract		+		+
methanol extract	+	+	+	
Water extract	+	+	+	+

**Table 2: Assessment of nutritional supplement:**

Nutritional Supplements	
vitamin C	66.66 mg/g
Reducing sugars	1.956 ± 0.1382 mg/g
Proteins	4.683 ± 0.349 mg/g

**Table 3: Quantification of total alkaloids**

Alkaloids	
Acetone Extract	Methanol Extract
130.818 ± 0.037 µg/ml	98.85 ± 2.354 µg/g

**Table 4: Quantitation of total phenolics**

Phenolics		
Acetone Extract	Methanol Extract	Water Extract
2.314 ± 0.018 mgGAE/g	2.321 ± 0.029 mgGAE/g	1.458 ± 0.031 mgGAE/g

**3. Assessment of Antimicrobial Activity:**

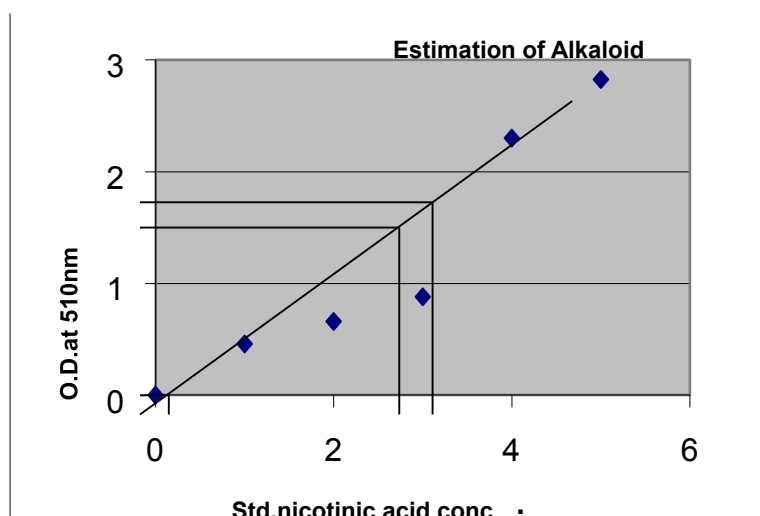
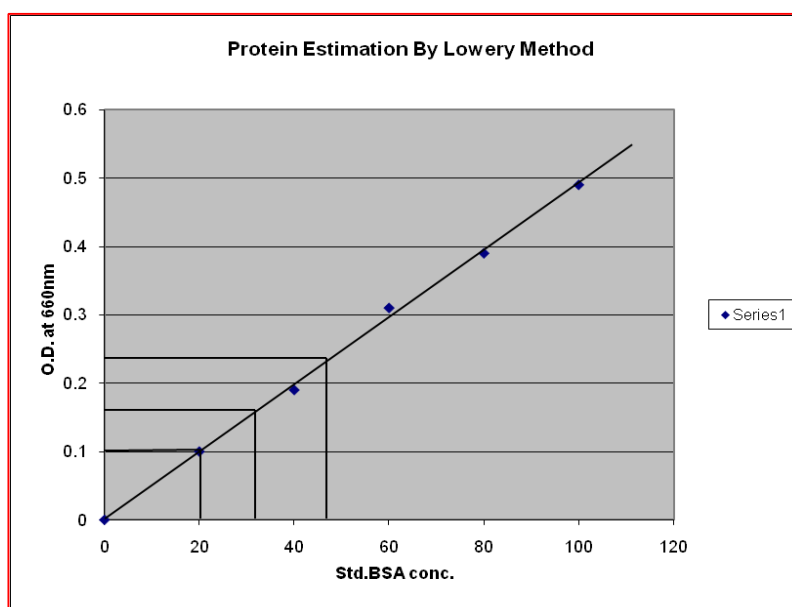
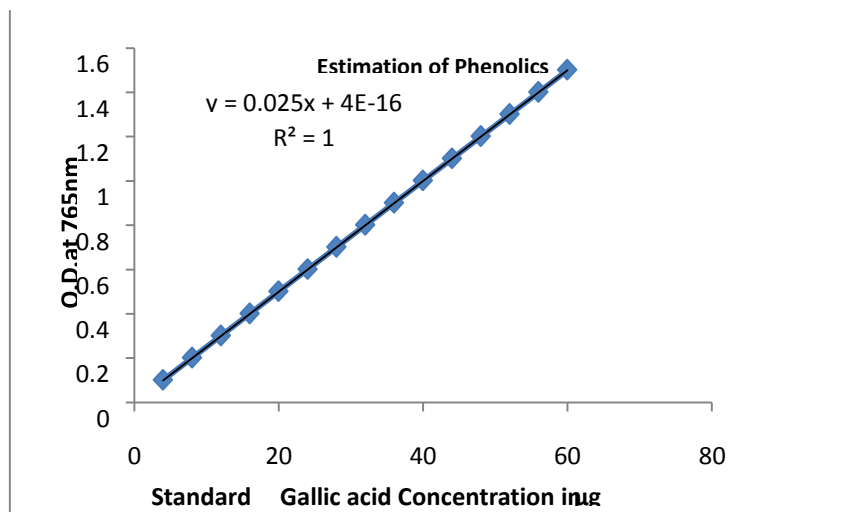
The plant extracts shown antibacterial activity against *E.coli* and antifungal Activity against *Fusarium oxysporum* at preliminary level.



**Antibacterial activity against E.coli**

**Table 5: Detection of metals by atomic absorption spectroscopy**

Metal	Concentration (µg)
Cu	0.084
Ni	0.012
Fe	0.032
Cd	Absent
Mn	0.177
Zn	0.060
Ca	16.59
Mg	2.710



Bioactive phytochemical constituent's present in medicinal plants attribute its therapeutic value (6,8). Aqueous extract, methanol extract and acetone extract of samples were prepared. The obtained results reveals that the *Verbena bipinnatifida* L. extract showed presence of various essential amino acids, it also contain a good amount of vitamin C, reducing sugars as well as proteins. Both the acetone extract as well as methanolic extract showed presence of alkaloids, whereas all the three solvents showed presence of phenolic compounds, hence it may also possess good antioxidant properties (7). Extracts have shown good antimicrobial activity against *E.coli* and *Fusarium oxysporum*. Plant growth promoting rhizobacteria like *Pseudomonas* produces siderophores which sequester the iron and make them soluble for the plants (9). In this study extract also showed presence of various essential metals like Fe, Cu, Ni, Mn, Zn, Ca and Mg whereas heavy metal Cd was absent. Hence, *Verbena bipinnatifida* L. is medicinally important herb with tremendous therapeutic potential. Further detailed investigation of bioactive components will be helpful for its use in development of medicines.

**REFERENCES**

1. Speroni, E., Cervellati, R., Costa, S., Guerra, M. C., Utan, A., Govoni, P. & Stuppner, H. (2007). Effects of differential extraction of *Verbena officinalis* on rat models of inflammation, cicatrization and gastric damage. *Planta medica*, 73(3), 227-235.
2. D. S. Vohra (1 June 2004). *Bach Flower Remedies: A Comprehensive Study*. B. Jain Publishers. p. 3. ISBN 978-81-7021-271-3.
3. Khaled A.A., Adnan A.E. and Salwa, M.N. Research Journal of Agriculture and Biological Sciences, (2009). INSInet Publication, 5(5): 649-659.
4. Calvo, M. I. (2006). Anti-inflammatory and analgesic activity of the topical preparation of *Verbena officinalis* L. *Journal of ethnopharmacology*, 107(3), 380-382.
5. P B Dandge, P J Kasabe and R M Patil. (2011). Evaluation of medicinal and nutritional components from the *Eleagnus conferta* fruit. *Science Research Reporter* 1(2): 56-60.
6. Jhample, S. B., Gajdhane, S. B., Kasabe, P. J., Bhagwat, P. K., & Dandge, P. B. (2015) Phytochemical screening and in vitro antimicrobial activity of *Tridax procumbens* L. *Research Journal of Life sciences, Bioinformatics, Pharmaceutical, and Chemical Sciences*. 1(1), 42-51.
7. Kasabe PJ, Patil PN, Kamble DD, Dandge PB. (2012) Nutritional elemental analysis and antioxidant activity of garden cress. *International journal of pharmacy and pharmaceutical sciences*, 4(3): 392-395.
8. Sambhaji B. Thakar, Kailas D. Sonawane (2013) Mangrove Infoline Database: A Database of Mangrove Plants with Protein Sequence Information *Current Bioinformatics*. 8.524- 529.

9. P. K. Bhagwat, P. J. Kasabe, S. B. Jhample and P. B. Dandge. (2013). Friendly bacteria propping up legumes development in pesticide contaminated soil. *International Journal of Pharma and Bio Sciences* 4(3) (B), 356-364.