

Determination of Chlorophyll Content and Carotenoids in Different Types of Soil in *Boerhaavia diffusa* Linn.

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ABSTRACT

Chlorophyll is a green pigment found in almost every green plants. Chlorophyll pigments are main sources of plants to producing energy for their growth and development and other physiological activities. Chlorophyll has antioxidant properties so that it is used in many medicinal drug industries. Stem cuttings of plants are grown in three types of soil kanhar, matasi and bhata and the chlorophyll was extracted from the leaves and characterized by UV-Visible spectroscopy. Concentration of chlorophyll a and b and carotenoids was calculated using Amon method. So kanhar soil gave better response as compared to bhata and matasi soil.

Keywords: Chlorophyll a, Chlorophyll b, UV- Visible spectroscopy, *Boerhaavia diffusa*

INTRODUCTION:

Boerhaavia diffusa commonly known as punarnava belonging to the family Nyctaginaceae. In Ayurveda it is a very important herb. It is a diffusely branched and creeping herb from a fusiform root. Only few plants establish in to perineal from and most of new plants die during the dry season. Stem prostrate, branches cylindrical, thickhead nodes. Leaves are simple, thick, fleshy, and hairy, arranged in unequal pairs, green and glabrous above and usually white underneath. It is a very important medicinal herd used in treatment for liver, hepatitis, jaundice and urinary disorders. The leaves of *B. diffusa* are often used as a green vegetable in many parts of India, the root juice is used to cure asthma, urinary disorders, leukorrhea, rheumatism, and it is also medicinally used in the traditional, Ayurvedic system. Plant was established before the extracts were prepared. Of the large number of plants screened, *B. diffusa* root extracts were found to have a broad spectrum and very high antiviral activity (Verma and Awasthi, 1979) Besides, the *B. diffusa* plant is reported to possess many pharmacological, clinical, and antimicrobial properties.

MATERIAL AND METHODS

Three types of the soil are used for the suitability of soil for determination of chlorophyll content and carotenoids

in leaves of *Boerhaavia diffusa*. These soil are Bhata soil, Matasi soil Kanhar soil.

Planting Material:

30 pots were taken for the species, *Boerhaavia diffusa*. 4 kg of soil were used to fill each of the pots thus prepared for each of the species were 10 pots with Kanhar soil, 10 pots with Matasi soil and 10 pots with Bhata soil.

Pot Preparation:

Shoots were collected from the plants of *Boerhaavia diffusa* in the month of July from campus of Pt. Ravishankar Shukla University, Raipur. Leaves and apical soft portion of the plants were excised and then cut in to 15 -20cm long pieces. One or two cuttings were planted in each pot.

Estimation of Chlorophyll Content:

Quantitative estimation of chlorophyll content was made following Aron (1949) while carotenoids were estimated following Duxdury and Yentsh (1956). 1 gm fresh leaf material was homogenized with excess of 80% acetone and centrifuged at 3000rpm. Supernatant volume was adjusted to 100ml. The optical density of this extract was measured at 480, 510, 645 and 663nm.

$$\text{Chl.a mg/g} = \frac{12.7 \times A_{663} - 2.69 \times A_{645} \times V}{a \times 1000 \times w}$$

$$\text{Chl.b mg/g} = \frac{22.9 \times 645 - 4.68 \times A_{663} \times V}{a \times 1000 \times w}$$

$$\text{Total Chl. mg/g} = \frac{20.2 \times A_{645} + 8.02 \times A_{663} \times V}{a \times 1000 \times w}$$

$$\text{Carotenoides mg/g} = \frac{7.6 \times A_{480} - 1.49 \times A_{510} \times V}{a \times 1000 \times w}$$

Where,

a = Length of light path in the cell (1 cm)

V = Volume of extract in ml

W = Fresh weight of sample in gm

RESULT

The maximum amount of chlorophyll a, chlorophyll b, total chlorophyll and carotenoids was 0.416 ± 0.009 mg/g, 0.136 ± 0.006 mg/g, 0.546 ± 0.008 mg/g and 0.312 ± 0.111 mg/g found respectively with cutting grown in Kanhar soil followed by cutting grown in Matasi soil 0.247 ± 0.008 mg/g, 0.076 ± 0.004 mg/g, 0.327 ± 0.036 mg/g, 0.217 ± 0.007 mg/g and Bhata soil 0.248 ± 0.036 mg/g, 0.058 ± 0.022 mg/g, 0.304 ± 0.04 mg/g and 0.190 ± 0.014 mg/g respectively.

Soil type	Chlorophyll a (mg/gm)	Chlorophyll b(mg/gm)	Total Chlorophyll (mg/gm)	Carotenoids (mg/gm)
Kanhar Soil	0.416 ± 0.009	0.136 ± 0.006	0.546 ± 0.008	0.312 ± 0.111
Matasi Soil	0.247 ± 0.008	0.076 ± 0.004	0.327 ± 0.036	0.217 ± 0.007
Bhata Soil	0.248 ± 0.036	0.058 ± 0.022	0.304 ± 0.04	0.190 ± 0.014

CONCLUSION:

We find in our study that the kanhar soil gave better response in maximum amount of chlorophyll a Chlorophyll b total chlorophyll and carotenoids as compared to bhata and matasi soil. Chlorophyll is a food supplement because they optimize the immune system and metabolic activity and a lot of medicinal properties. Boerhaavia leaves are also eaten by local people as a leafy vegetable so that experiment can be beneficial for research work to increase chlorophyll content in suitable soil.

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