



COMPARATIVE ACCOUNT OF TWO MEDICINAL PLANTS C.FORSKOHLII AND COSTUS IGNEUS IN THE SOIL OF BILASPUR (C.G.)

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ABSTRACT

Medicinal plants have competitive properties. All have chlorophyll contents to synthesize bioactive compounds. In some, these compounds are stored in the rhizome. In some these compounds remain in the leaves. It was thought worthwhile to study their chlorophyll content, phenolic contents, Ascorbic acid contents and anti-oxidant property to evaluate their status as a medicinal plant.

Key words: Medicinal plants, Ascorbic acid contents, Anti-oxidant property.

INTRODUCTION

The soils of Bilaspur district (C.G.) are acidic in nature (acidity varying between pH 5 to 6.5). In the pot experiments the two plants were grown and Chlorophyll content, phenolic content, Ascorbic acid contents and anti-oxidant properties were compared. According to Shadangi PK et al., (1998) 15% v/v coal fired flyash were evaluated for the use in agriculture as nutrient supplement. Flyash amended soil showed increase in pH, soil conductivity and soil protease activity. Soil protease enzyme splits the protein contents of the soil into amino acids as in the case of plant *Momordica charantina* plant, the fruit has proteolytic enzyme hence the fruit contains free amino acids. (Rasheeduz Zafar, 1994). Following these authors we have used plant growth hormones.

Some authors have reported that plants grown in Brazil, Africa and India revealed that plants from each country produced different compounds in different quantities. This may be due to different chlorophyll contents, different phenolic contents and antioxidant components. Leaves are the seats of bioactive compounds

so amount of chlorophyll content in the plants of different soils of Brazil, Africa and India will be naturally different (Patil S et al., 2001, Prakash, Krishnan R, 1994, Kavitha C et al., 2007).

MATERIALS AND METHODS

Plants of *C.forskohlii* and *Costus igneus* (Insulin plant) were grown in flyash amended soil (15% v/v). Hormones were (Gibberelic acid and Indole acetic acid) were sprayed on the growing plants in 10^{-5} M dilutions.

Chlorophyll contents

The leaves of *C.forskohlii* and *Costus igneus* were extracted in 80% acetone and absorption were taken in 663nm and 645nm and read in the spectrophotometer. Using the absorption using coefficients, the amount of chlorophyll was calculated. Formulae used for amount of chlorophyll a and b are calculated as described below:-

$$[1] \text{ mg of chlorophyll a/g tissue} = 12.7 (A_{663}) - 2.69 (A_{615}) \times V/1000 \times W$$

$$[2] \text{ mg of chlorophyll b/g tissue} = 22.9 (A_{645}) - 4.68 (A_{663}) \times V/1000 \times W$$

$$[3] \text{ mg of total chlorophyll/g tissue} = 20.2 (A_{645}) + 8.02 (A_{663}) \times V/1000 \times W$$

Where A = absorbance at specific λ .

V = Final volume of chlorophyll extract in 80% acetone

W = Fresh weight of tissue extracted.

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Phenolic contents

Phenols react with phosphomolybdic acid in Folin-Ciocalteu reagent in alkaline medium and blue complex (Molybdenum blue) is obtained. From the standard curve, the concentration of phenols in the test sample is obtained as mg phenols/100 gm material.

Ascorbic acid content

Ascorbic acid (vitamin 'C') present in the plants of *C.forskohlii* and *C.igneus*.

Volumetric method of estimation of Ascorbic acid

Principle

Ascorbic acid reduces the 2,6- dichlorophenol indophenol dye to a colorless leuco base. Ascorbic acid gets oxidised to dehydroascorbic acid. The dye is blue colored compound, the end point is the appearance of pink color. The dye is pink colored in acid medium. Oxalic acid (4%) is used as the titrating medium.

Calculation

Amount of ascorbic acid mg/100 gm.

Sample= $0.5\text{mg}/V_1 \text{ mL} \times V_2 / 5 \text{ mL} \times 100 \text{ mL} / \text{wt of the sample} \times 100$. (Sadasivam S and Manickam A, 1996) is for chlorophyll estimation, phenolic estimation and ascorbic acid estimation.

Anti-oxidant property

The phenolic contents properties are responsible for anti-oxidant activity and hence, measurement of total phenolic content properties (Jang HD *et al.*, 2007, Katalinic M *et al.*, 2006).

Procedure for estimation of anti-oxidant property

The dried rhizome (of *C.forskohlii*) and leaves of *C.igneus* were taken 1 gm. each separately, were dissolved in methanol, mixed with 5 ml of phosphate buffer (0.2 m., pH 6.6) and 5 ml potassium ferric cyanide (1%) and incubated at 50°C for 20 minutes. Then 5 ml of 10% TCA was added to the reaction mixture and centrifuged at 3000 rpm for 10 minutes. The upper layer of 5 ml solution was mixed with 5 ml of distilled water and 1 ml of 1% ferric chloride and the absorbance was read at 700nm.

The reducing power of rhizome of *C.forskohlii* and separately taken leaves of *C.igneus* were estimated by the increased absorbance. The degree of the scavenging was calculated as:

$$\text{Scavenging \%} = A - A_1/A \times 100$$

Table of total chlorophyll, phenols, ascorbic acid and free radical scavenging % of *C.forskohlii* and *Costus igneus* are reported in the table no. 1 in the next page.

Table 1. Comparative account of properties of *C.forskohlii* and *C.igneus*

S.No	Properties	<i>C.forskohlii</i>	<i>C.igneus</i>
1	Chlorophyll content	1.72 ± 2.6	1.9 ± 2.5
2	Total phenols gm/100gm	2.5 ± 2.7	4.5 ± 1.10
3	Ascorbic acid content	50.58 ± 1.8	80 ± 2.08
4	Free radical scavenging capacity	25% ± 1.7	38.7% ± 2.5

Values are expressed on 100 gm dry basis.

RESULTS AND DISCUSSION

The two plant species i.e. *C.forskohlii* and *Costus igneus* Nak were taken to a comparative account of their medicinal properties. The leaves are the seats for bioactive compounds. Bioactive compound of *C.forskohlii* is "Forskolin", it is mainly stored in the rhizome of the plant and in *C.igneus*, the bioactive compounds are present in the leaves. In the treatment with flyash of the soil and spray of plant growth hormones gives the exuberant growth and hence both the plant species have higher chlorophyll contents as reported in the Table no. 1. Ascorbic acid is higher in *C.igneus* as compared to *C.forskohlii*. Total phenolic content is higher in *C.igneus*. Accordingly it has higher free radical

scavenging power. In the light of rising global warming and pollution, free radicals of oxygen, H₂O₂, ROS, chloroforms, NO are more (Tiwari AK, 2004).

CONCLUSION

Antioxidant, anticlastogenic and radioprotective effect have been observed in *C.forskohlii*. Its bioactive component, Forskolin has 3 phenolic groups in the molecular structure. Dose dependent increase in free radical scavenging ability has been observed by Rao BS *et al.*, (2006). Similarly nutrient profile and antioxidant components of *C.igneus* have been studied by Vishalaksmi Devi *et al.* (2010).

REFERENCES

- Jang HD *et al.* Principal phenolic phytochemicals and antioxidant activities of three Chinese medicinal plants. *Food Chem*, 103, 2007, 749-756.
Katalinic M *et al.* Estimation of antioxidant property. *Food Chem*, 94, 2006, 550-557.

- Kavitha C et al. Analysis of variability for qualitative and quantitative traits in *Coleus forskohlii* Briq. *J Horti Sci*, 2, 2007, 44-46.
- Patil S et al. Performance of genotypes of *Coleus forskohlii* Briq. *Indian Perfumer*. 45, 2001, 17-21.
- Prakash, Krishnan R. Comparative performance of accessions and intervarietal hybrids in *Coleus forskohlii* Briq. *J Root Crops*, 20, 1994, 70-73.
- Rao BS et al. Antioxidant, anticlastogenic and radioprotective effect of *Coleus aromaticus* on Chinese hamster fibroblast cells (V79) exposed to gamma radiation. *Mutagenesis*, 21, 237-42.
- Rasheeduz Zafar. Medicinal plants of India. CRC.Press.Inc.Boca Raton, Florida. 1994, 105-120.
- Sadasivam S and Manickam A. Biochemical methods Second Edi. New Age International (P). Ltd. Publishers. New Delhi, 1996.
- Shadangi PK et al. Soil metabolic activities and yield in certain crop plants in fly ash amended soil. *Res J Chem Env*, 2(2), 1998.
- Tiwari AK. Anti-oxidants, new generation therapeutic base for treatment of polygenic disorders. *Curr Sci*, 86(8), 2004, 1092.
- Vishalakshi Devi et al. Nutrient profile and antioxidant components of *C.speciosus* and *C.igneus*. *Ind J of Natural products and Resources*, 1, 2010, 116-118.