Geeta Prajapati and Manish Upadhyay / International Journal of Pharmacy & Therapeutics, 5(5), 2015, 378-380.
e- ISSN 0976-0342
Print ISSN 2229-7456

International Journal of Pharmacy & Therapeutics

Journal homepage: www.ijptjournal.com

IJPT

# SOIL ACIDITY, ITS AMELIORATION BY FLYASH TO RAISE YIELD, GROWTH AND BIOACTIVE COMPOUNDS OF COLEUS FORSKOHLII BRIQ. – FORSKOLIN

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**ABSTRACT**

Soil acidity lowers the yield and even its bioactive compounds like forskolin. Forskolin is an alkaloid and many other diterpenoids are present in the leaves, roots and oils in the inflorescence. It helps to increase an enzyme, adenylate cyclase which increases cyclic adenosine monophosphate cAMP which activates other enzymes. This causes several physiological and biochemical effects, such as: Inhibition of platelet activation, degranulation, raises contraction of heart muscles, relaxation of the arteries and insulin secretion etc. In the light of significance of *C.forskohlii* Briq and its bioactive compound "Forskolin". Acid soil correction by flyash is important, because chromatographic analysis of *C.forskohlii* extracts from Brazil, Africa and India revealed different compounds in different quantity and quality. The unique survival method is shown in the figure 1 and 2 in the next page. Before we proceed for further discussion on *C.forskohlii* Briq, we must have and insight into the soil acidity, its amelioration by flyash for better results.

**Key Words:-** *C.forskohlii*, Forskolin.

## INTRODUCTION

### Soil acidity

Murthy et al (1976) stated that the acid soils developed over varying geological strata like Archean granite and gniess and the mixed Dharwarians in other areas.

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### Inflorescence of *C. forskohlii* Briq. Type – Racemose:-

### Importance of flyash on acid soil

Effect of flyash application on concentration of trace and toxic metals in paddy, wheat, til and other crops and proximate and ultimate analysis in percentage. It was found that no significant variation in the concentration of heavy metals was found. Toxic metals were not detected. The ultimate analysis of C, H, S, and N were not changed in the soil treated by flyash.

According to PK Sarangi and PC Mishra, (1998), the soil metabolic activities and yield in Ground Nut, Ladies Finger and Radish in flyash amended soil. They found amended soil 15% (v/v) coal-fired flyash showed in rise in pH of the acidic soil, soil conductivity, available phosphorus, organic carbon, and organic matter. In the work, they found that protease activity and invertase activity increased. Chlorophyll a, b and carotenoid concentration increased. Plant growth parameters like root

length, shoot length, number of leaf in the plant, leaf area increased. The significance of protease activity is due to its action on soil protein and produce amino acids which are directly available to the plants. This unique property of protease activity is also present in the fruits of *Momordica charantina* Linn. That is why the fruits of *Momordica charantina* have free amino acids like glutamic acid, Alpha alanine, β- alanine, phenyl alanine. This presence of amino acids is due to the presence of proteolytic enzymes. In the figure 1, it has been demonstrated that when soil pH is raised by the use of flyash in the soil, the length of cotton roots rises. In the Figure 2, it has been shown that when organic matter is high, conc. of exchangeable Al is low. Toxicity due to Cd or Pb was negligible, pH was regulated near 7 and electrical conductivity was below 2. When Conc. of exchangeable Al is slow, root length increases as High concentration of exchangeable soil solution of Aluminium is acid soils are toxic to plant roots a toxicity that can be reduced somewhat by adding $CaSO_4$. Cotton root length is increased as soil pH is increased and exchangeable Al is decreased (Adams F and Lund, 1966). When % of O.M. (organic matter) is high conc. of exchangeable Al is low, root length increases as shown in Figure 2.

**Chlorophyll estimation**

It is done by the methods of Sadashivam and Manickam.

**Calculation**

Total chlorophyll in grams = $20.2(A_{645}) \pm 8.02 \times V/1000 \times W$

Where, A= Absorbance at specific ʎ

V= Final volume of chlorophyll extract in 80% acetone.

W = Fresh weight of tissue extracted

Result tabulated below.

**Estimation of phenolic contents**

It is being done by using Folin ciocalteau reagent; Phenols react with phosphomolybdic reagent in alkaline medium and produce blue coloured complex called molybdenum blue. Standard curve is obtained. Estimation is done by spectrophotometrically. Results are tabulated below in Table 2.

**Estimation of free radical**

Scavanging ability by method of Tawaha K et al, (2007). Results are tabulated below in the Table 3.

**RESULTS AND DISCUSSION**

The concentration of chlorophyll (total) shows that leaves have more bioactive compounds synthesized. The phenolic content also rise and deposit in the leaves and roots.

The antioxidant property rises with the concentration of *C.forskohlii*. *C.forskohlii* is a medicinal plant containing a large number of bioactive compounds. It is a key source of forskolin. The analogous of which are of immense value in the treatment of cardiovascular diseases, according to Majeed *et al*. (2003).

Inspite of the multifaceted pharmacological actions of forskolin including positive hypotensive, bronchospasmolytic and antiglaucoma activities, this molecule has not been available as an approved, due to its poor water solubility (0.001%). Thus it can be used as oral or intravenous formulation. The nonspecific nature of forskolin activation of adenyl cyclase raises the concern that it may be too toxic for clinical use.

The most potent water soluble forskolin derivative so far produced is 6- (3- dimethyl amino propionyl) forskolin hydrochloride or (NKH 477), according to Khandeleval *et al*. (1988).

**Figure 1. Soil pH Vs Length of cotton roots in cm**

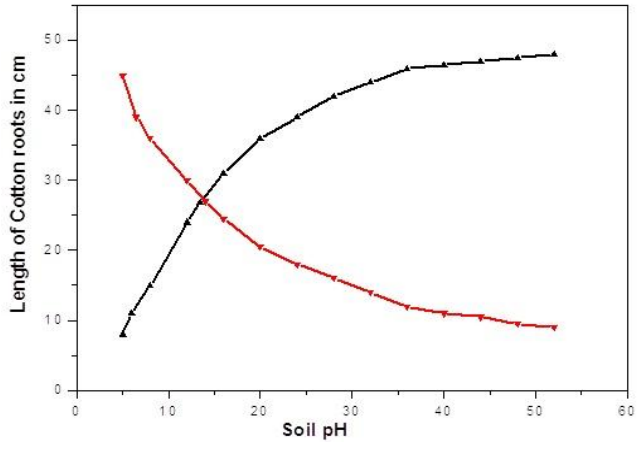


**Figure 2. Soil pH Vs Concentration of exchangble Al / moles / kg**

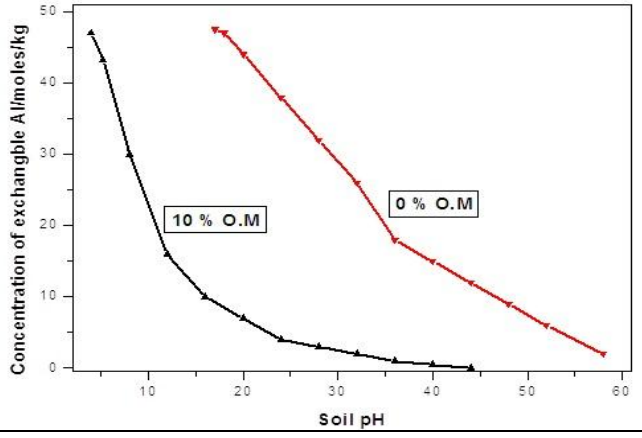

**Table 1. Estimation of Chlorophyll**

| | | |
|---|---|---|
| 1 | In plain soil | 2.28 mg/g |
| 2 | In flyash treated soil.<br>In 10% flyash + 90% soil and hormone IAA spray in the young plant | 4.00mg/g |

**Table 2. Estimation of phenolic contents**

| | | |
|---|---|---|
| 1 | When plant was grown in plain soil | 20 mg/g of dried and tuber powder 71mg/GAE/gm. |
| 2 | When grown in 10% flyash treated soil | 29 mg/g of dried powder tuber |

**Table 3. % Inhibition**

| S.no | Sample conc. in 100ppm | Free radical scavanging activity by % inhibition |
|---|---|---|
| 1 | In plain soil | 12.27 % |
| 2 | In flyash treated soil | 11.25 % |

## CONCLUSION

(1) % Inhibition = Ac – As / Ac* × 100

(2) With the decrease in conc. of absorbance, in absorbance % inhibition rises.

(3) *C.forskohlii* is a fairly good antioxidant.

(4) When conc. of *C.forskohlii* rise, absorbance decrease and % inhibition rises.

## REFERENCES

Adams F et al. Effect of chemical activity of soil solution on cotton root penetration of acid sub soils. *Soil Science*, 1966, 101, 193-198.

Chlorophyll estimation, phenolic estimation and antioxidant property measured spectrophotometrically by the method described in the book by S Sadashivam and Manickam Biochemical methods. New Age International Limited. New Delhi, 1996.

Gulab Singh. Utilization of flyash in Agriculture. Report No. TR/CFRI/1/07/97. Dhanbad. Bihar,1997.

Khandelwal et al. Cardiovascular effects of water soluble derivatives of forskolin. *J Med Chem*, 1988, 31, 1872-1879.

Majeed M et al. Composition of essential oils which antimicrobial. *Coleus forskohlii*. U.S.Patent. No. 2003, 6607, 712.

Mandal SC et al. Acid soils of India and liming. *ICAR Tech Bull*, 1975, 51, 1-126.

Murthy RS et al. Distribution, genesis and classification of acid soils. *Bull Ind Soc Soil Science*, 1976, 11, 1-17.

Prashanta K Mishra and Pramod C Mishra. Soil metabolic activities and yield in Ground nut, Ladies finger and Radish in flyash amended soil. *Res J of Chemistry and Environment*, 1998, 2(2).

Prof.Rashecduz Zafar. Medicinal plants of India. C.B.S Publication, Delhi, 1994, 106-107.

Sarangi PK and Pramod C Mishra. Soil metabolic activities in flyash amended soil. *Res J Chem and Env*, 1998, 2(2).

Tawaha K et al. Antioxidant activity and total phenolic content of selected Jordanian plant species. *Food Chem*, 2007, 104, 1372-1378.