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# Morphogenesis and Biochemical Properties of Soyabean Plant of 30 Days Grown in Plain and Amended Soil

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**Abstract:** ***Soyabean (Glycine max (L) Merr) is a species of legume native to east Asia. The plant, classed as an oil seed rather than a pulse by the UN food and agriculture organization, produces significantly more protein per acre than most other uses of land plain and amended soil of Soyabean indicates some morphogenetic feature. The root length of 30 days old young plants grown in the soil amended with neem cake and urea was more and was less when grown in plain soil. Biochemical properties includes Electrical conductivity, Protein contents, Sugar contents and Chlorophyll determination of extract of root Stem and Leaf with respect of plain and Amended Soil. The root length of 30 days old young plants grown in the soil amended with neem cake and urea was more and was less when grown in plain soil. The shoot lengh of 30 days old young plants grown in the soil amended with neem cake was more and was less when grown in plain soil. The number of leaf in amended soil was more than plain soil but number of node and internode was same on plain and amended soil.***

**Keywords:** Protein, Sugar, Electrical conductivity, Amended soil

## 1. Introduction

Soyabean is one of the important crops of the world. Production of Soyabean in India at the present time is restricted mainly to Madhya Pradesh, Utter Pradesh, Maharashtra and Gujrat. It is also grown on small acreage in Himachal Pradesh, Punjab and Delhi. Soyabean grows well in warm and moist climate. The climate requirement for Soyabean are almost the same as for maize well drained and fertile loam soils with a ph between 6.0 and 7.5 are most suitable for the cultivation of Soyabean. Sodic and saline soils inhibits germination of seeds. In acidic soils, liming has to be done to raise the ph of about seven. The Soyabean crop generally does not require any irrigation during kharif season. Soyabean are considered by many agencies to be a source of complete protein(Henkel, 2000), Derbyshire et al. (1976), Danielsson (1949) and Wolf (2012) suggested that Soya protein is essentially identical to that of legume seeds. Symolon et al. (2004) investigated that consumption of Soya may also reduce the risk of colon cancer, possibly due to presence of Sphingolipids.

Antioxident activity and chemical compounds such as polyphenolics and flavonoids which protect the human tissue from free radicals released from organs, thereby reducing oxidative stress (Steinmetz and Potter 1996, Fritz et al. 2003, Lee et al. 2005, Prakash et al. 2007). Although Soyabean is a legume, It still responds to a small application of starter N. Depending on soil status, application of p at 30 to 50 kg $p_2O_5$/ha was found optimum in several studies (Chauhan 1972, kumar and singh 1990). Response of applied k has not been uniformbut application of NPK at 25-50-25 kg N-$p_2o_5$-$k_2o$/ha was found optimum by Maharudrappa and Sharanappa (1990).

## 2. Material and Method

The seed of Soyabean variety Indira Soya 9 was collected from Saraswati beez bhandar, Ara of Bhojpur district of Bihar. General material and Method related with the germination of seed, determination of electrical conductivity, determination of protein contents, determination of sugar content and determination of chlorophyll contents.

**Use of Glasswares**
All the glasswares used frequently in course of the experimentation were madse of Corning or Borosil brand such as petridish, culture tubes, conical flasks, burettes, funnels and measuring cylinder.

**Use of Water**
For ordinary purposes such as washing, cleansing the glasswares and other apparatus etc. tap water was used. Distilled water was used every time for rinsing and other purposes and as solvent for which water has been mentioned only.

**Sterilization**
Glasswares were oven sterilized at 160 degree Celsius for 4 hrs after wraping in the newspaper or other ordinary paper sheet. Water, filter paper and towel were sterilized in autoclave at 15 psi for 15-20 min.

**Electrical Conductivity (EC)**
The electrical conductivity in the plant extract (root, stem and leaf) was measured with conductivity bridge maintaining the control of conductivity water only. 2 gram of each sample of root, stem and leaf was weighed and

extracted in 20 ml of conductivity water by the help of morter and pestle separately.

**Protein Content**

Biuet assay method was used for measurement of protein content of root,stem and leaf extract. The following material required for the determination of protein contents were as follows-

a) Protein standard- 5mg albumin/ml. prepare first.
b) Biuret reagent- Dissolve 3 gm of copper sulphate and 9 gm of sodium potassium tartarate in 500 ml of 0.2 mol/litre sodium hydroxide. Add 5 gm of potassium iodide and make up to 1 litre with 0.2 mol/litre sodium hydroxide.
c) Water bath at 37 degree centigrade.

**Method**

Add 3 ml of biuret reagent to 2 ml of plant extract, mix, and warm at 37 degree centigrade for 10 minutes. Cool and read the extinction at 540 nm.

**Sugar Content Determinati**on

At 480 and 490 nm, pentose and hexose sugars in the plant extract (root, stem and leaf) were measured calorimetrically using phenol-sulphuric acid method (Dubois et al. 1951). The material required for the determination of pentose and hexose sugars were as follows-Reagent-5% phenol was dissolved in water and the volume was made to 100ml.

**Chlorophyll Determination**

100 mg of leaf was taken and chlorophyll was extracted in diffused and deam light with 10 ml of 80% acetone using small glass mortar and pestle. The extracts were pooled together and centrifused at 5000rpm for 15 min and the o.D was recorded at 645 and 663 nm in Beckman $DU_2$ Spectrophotometer. The amount of Total chlorophyll was calculated by formula (Witham et al. 1971).

## 3. Result and Discussion

There was no marked changes in the root lengh of the young plants when grown in plain soil and in the soil amended with vermicompost/ neem cake and urea. When shoot length of 30 days old young plants was considerd it was found that maximum length of shoot in the young plants grown in the soil amended with neem cake while minimum shoot length in the young plants grown in plain soil. The number of leaf of 30 days old Soyabean young plants showed maximum number of leaf in the young plants when grown in the soil amended with neem cake and urea. The improvement in plants growth could also be due to differences in the mineral element contents of the soil, vermicompost, neem cake and urea. It has been shown that micro-organisms can produce materials that affect plant growth such as substances acting as plant hormone analogues or growth regulators (Frankenberger and Arshad 1995, Brown 1995). Chamani et al.(2008) have reported increase in the leaf growth of Petunia hybrid when the plant is grown in presence of Vermicompost.

Atiyeh et al. (1999) have reported enhancement in the growth of tomoto plants in horticultural potting media amended with Vermicompost.

**Table 1:** Electrical Conductivity of the Extract of Root, Stem and Leaf of 30 Days Old Young Plants Grown in Plain and Amended Soil

| Parts of Young plant | Plain soil | P.S+ Vermicompost | P.S+ Neem Cake | P.S+ Urea |
|---|---|---|---|---|
| Root | 1.279±0.004 | 0.955±0.002 | 1.234±0.002 | 1.125±0.002 |
| Stem | 0.856±0.003 | 0.925±0.002 | 0.977±0.003 | 0.896±0.003 |
| Leaf | 1.135±0.002 | 1.012±0.001 | 0.012±0.001 | 1.012±0.001 |

**Table 2:** Protein Contents in the Extract Of Root, Stem and Leaf of 30 Days Old Young Plants Grown in Plain and Amended Soil

| Parts of young plant | Plain soil | P.S+ Vermicompost | P.S+ Neem cake | P.S+ Urea |
|---|---|---|---|---|
| Root | 2.4±0.02 | 2.3±0.01 | 2.1±0.05 | 1.9±0.4 |
| Stem | 3.6±0.03 | 2.0±0.01 | 2.6±0.03 | 2.0±0.04 |
| Leaf | 3.0±0.01 | 1.3±0.01 | 1.8±0.04 | 2.0±0.01 |

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