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EFFECT OF LEAF EXTRACT ON GROWTH OF HORDEUM VULGARE

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ABSTRACT
The *Costus igneus* is commonly called as insulin plant that promotes hormones in human body. The leaf extract of the plant is used to see the effect on growth of *Hordeum vulgare* which is a food grain crop. The percent seed germination and various growth parameters of Barley were determined. The laboratory experiments were carried out to assay growth and survival of seedlings. The different concentrations of leaf extract were prepared by keeping control. The growth parameters of plant were tested with a chemical Sodium azide. This chemical is used in the preparation of various other chemicals combinations which are used in Agriculture sector. The actively emerging radical is considered to determine percent seed germination. The minimum % seed germination (13.89%) was noted at 0.0% control leaf extract. The maximum seed germination percentage was recorded at leaf extract having concentration of 0.3%. It is found that as there is increase in concentration of leaf extract enhanced rate of seed germination. The maximum shoot length, root length and survival of seedling was found in highest concentration (0.4%) of leaf extract. In terms of Sodium azide there found reduction in percent seed germination (10.01%) at 0.3% concentration. It is observed that as the concentration of Sodium azide increased then reduction in growth parameters were observed in shoot length, root length and % seedling survival. The maximum reduction in growth parameters were observed at 0.4% concentration.

KEYWORDS: C*ostus igneus, Leaf extract, Sodium azide, Hordeum vulgare, Growth parameters.*

INTRODUCTION
The plant produces primary and secondary metabolites that are important in preparation of medicinally important drugs. The amount of metabolites varies plat to plant species. They are present in different plant parts like root, sap wood, heart wood, bark, leaves, flowers, fruits and seeds. The extract obtained from plant parts are used in the preparation of various crude drugs which are applied to cure ailments and different kinds of diseases caused by pathogens to man and animals. The utilization of herbal medicines by tribal people are practiced since ancient time. The herbal preparations have been flourished worldwide and millions of people rely on it for herbal cosmetics and medicines. The increase of sugar level in human body affects on many vital organs that result into deterioration of body and ultimately death. The *Costus igneus* is commonly called as insulin plant[1] which decrease sugar level and enhances insulin in the body. It is ornamental plant and found in wild state.[2] The leaves of this plant are used as a dietary supplement to treat diabetic person[3],[4] and are used in the preparation of medicines that are used to lower blood glucose cure diabetes patient.

The Barley plant is identified with a scientific name *Hordeum vulgare*. It yields maximum fibre contents and β glucan which decreases cholesterol level in the body. It aids in weight loss and improves digestion. The significance of both the plants encouraged to investigate the effect of insulin plant extract on growth of parameters of Barley.

MATERIALS AND METHODS
Study site
The study site is located at Achalpur city in Amravati district of Vidarbha region of Maharashtra state in India. It shows geographical location at 21º 15′ 26 ″ N and 77º 30′ 31″ E.

Costus igneus N.
It is a perennial herb belongs to the family Costaceae. It grows upright and spreading on the ground. The plant body consisted of root, stem, leaves, flowers and fruits. The leaves are green, simple, alternate, entire and oblong. The large smooth and dark green leaves show light purple undersides. The leaves are spirally arranged around the stems and forming elegant arching. The flowers are appearing as a cone-like head at the tip of

branches. The fruits are generally indistinct. The leaves are used decrease blood glucose level in the body.

***Hordeum vulgare* L.**

It is annual grass belongs to the family Poaceae. The English name of the plant is Barley. The plant body consisted of adventitious root system. The stem consisted of nodes and internodes. The leaves are elongated showing parallel venation. They are simple and bear leaf sheath, ligule, auricle and blade. The inflorescence is spike type produced on solid, flat, zigzag rachis with several spikelet's. The ripe grains are oval and elongated in shape.

Collection of sample

The seeds of *Costus igneus* N. and *Hordeum vulgare L.* were procured from the Sadhana Vidnyan Kendra Durgapur at Amravati. The seeds were brought to the laboratory. The in-vitro and pot culture experiments were carried in laboratory.

Preparation of Leaf extract

The healthy and fresh leaves of *Costus igneus* were cut from mature plant. They were brought to the laboratory and thoroughly washed with distilled water. The leaves were then blotted to dry with the help of blotting paper. 50 gram leaves were weighed on sensitive balance and crushed in mortar with pestle in presence of Acetone. The extract was filtered through muslin cloth and used for bioassay.

Bioassay of Barley

The growth parameters like percent seed germination shoot length, root length and percent survival of seedlings of Barley was determined. Bioassay of Barley was carried by preparing different concentrations of leaf extract and a chemical Sodium azide separately. The concentration grades were made like 0.0%, 0.1%, 0.2%, 0.3%, 0.4% and 0.5%. The 0.0% concentration is treated as control and remaining as test concentrations. The control was prepared with distilled water solution. The similar healthy seeds of Barley were used for experimental purpose. The moist seeds were rotated on Orbital Shaking incubator at 100 rpm for 18 Hours. The seeds were rinsed thrice with distilled water to remove any kind of trace elements on the seed surface. The seeds were soaked in distilled water for 30 minutes. The seed germination percentage was determined with the help of moist blotting paper in a tray. There taken 20 seeds for each treatment. The growth parameters were determined with the help of pot culture experiments. The growth effect were observed at 30 DAS.

RESULTS AND DISCUSSION

The effect of leaf extract of *Costus igneus* and Sodium azide was assayed on *Hordeum vulgare*. Different concentrations of leaf extract and a chemical Sodium azide were prepared. (Table 1). In the control treatment less % seed germination (13.89 and 14.12) was recorded in both the cases. At the concentration of 0.3% the rate of seed germination was increased. It is observed that as concentration increased percent seed germination reduced (15.18%). In terms of Sodium azide there was decrease in percent seed germination (10.01%).

Table 1: Effect of leaf extract and Sodium azide on seed germination of *Hordeum vulgare L.*

S.N.	Leaf extract	Seed germination (%)	Sodium azide	Seed germination (%)
1	0.0 %	13.89	0.0 %	14.12
2	0.1%	16.25	0.1%	16.07
3	0.2%	14.65	0.2%	18.32
4	0.3%	16.13	0.3%	21.04
5	0.4 %	15.18	0.4 %	10.01

It is found that as concentration of Sodium azide increases the percent seed germination also reduces. It is assumed that the Sodium azide affect chemically on cytoplasmic content of seeds. A chemical treatment might have changed physiological and metabolic activities of germinating seed due to reactive oxygen derived radicals.[5]

Table 2: Effect of leaf extract of *Costus igneus* on growth parameters of *Hordeum vulgare* L.

S.N.	Leaf extract	Shoot length (cm)	Root length (cm)	Seedling survival (%)
1	0.0 %	08.84	06.45	73.06
2	0.1%	09.25	07.32	86.07
3	0.2%	11.65	09.39	88.01
4	0.3%	13.01	10.69	90.03
5	0.4 %	13.05	10.89	91.02

The growth parameters including shoot length, Root length and % survival of seedling was determined (Table 2). At the 0.0% concentration minimum shoot length (08.84 cm) was noted. The root length was 06.45 cm and Seedling survival was 73.06%. The maximum shoot length (13.05 cm) and Root length (10.89cm) was recorded at 0.4% concentration. The seedling survival (91.02 %) was found at 0.4% concentration which was

maximum and at the 0.0% concentration it was reduced). The increase in concentration of leaf extract has shown increases in growth parameters and seedling survival. The enhancement can be attributed positive effect on seed contents.

Table 3: Effect of Sodium azide on growth parameters of *Hordeum vulgare* L.

S.N.	Sodium azide	Shoot length (cm)	Root Length (cm)	Seedling survival (%)
1	0.0 %	09.89	07.45	75.06
2	0.1%	10.25	08.37	72.07
3	0.2%	08.65	06.39	65.01
4	0.3%	07.11	05.69	55.03
5	0.4 %	06.05	05.12	46.02

The effect of Sodium azide was tested on growth parameters of *Hordeum vulgare* (Table 3). At the concentration of 0.0% shoot length (09.89 cm) and Root length (07.45 cm) was noted. At the concentration of 0.4% shoot length (06.05 cm) and root length (05.12 cm) was recorded. The seedling survival (75.06%) was noted at 0.0% concentration. The reduction in seedling survival (46.02%) was noted at 0.4%. The decrease in shoot length was may be due to negative effect of Sodium azide. The Sodium azide is a respiratory inhibitor which may disrupt the formation of enzymes which is necessary for overall growth of seedlings. The reduction in growth may be due to effect on physiological activities of seed.[6] The increase in growth promoters or metabolic status of seeds at certain levels of dose or increase in growth inhibitors or induced chromosomal aberrations affect on growth of plant. The increase or decrease in seedling height over the control might be due to stimulatory or inhibitory effect of Sodium azide. The similar effect of different chemicals were reported in rice plant.[7] [8]

CONCLUSION

The growth parameters and cytological study are the effective measures to evaluate beneficial or toxic effect of leaf extract and chemicals .The leaf extract shows significant and positive effect on growth parameters and overall growth of plants. The leaf extract shows stimulatory and regulatory effect on proteins at the time of growth of plant. The effect of Sodium azide had shown inhibitory effect on seed germination, root and shoot length as well as survival of seedlings. The chemical might affect and become obstacle in physiological and metabolic processes in the seed during germination and growth.

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