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ALLELOPATHIC EFFECT OF AQUEOUS EXTRACT OF FRESH LEAVES OF *TINOSPORA CORDIFOLIA* ON SEED GERMINATION AND SEEDLING GROWTH OF *ALLIUM CEPA* L.

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ABSTRACT:
Tinospora cordifolia, also known as heart-leaved moonseed, belongs to the family Menispermaceae. The underground vegetation under its canopy suggests that it has some allelopathic potential, which may have been caused by fallen leaves (through the decomposition of leaves) or plant leaching, or exudates. The release of allelochemicals (organic substances) into the soil inhibits seed germination and the establishment of crops and vegetation. The present project work is designed to study the same using *Allium cepa* L. as an experimental plant. Leaf aqueous extract of *T. cordifolia* with 01%, 05%, 10% (prepared in MilliQ water) concentration was applied to determine their effect on *Allium cepa* L. seed germination, seedling growth. Increasing concentrations of aqueous extract of fresh leaves exhibited inhibitory effect on seed germination and seedling growth.

KEYWORDS:- *Tinospora cordifolia,* fresh leaf aqueous extract, allelochemicals, *Alium cepa*, preliminary growth.

INTRODUCTION:

Allelopathy is a phenomenon in which chemicals of plants or microbial origin affect the growth, development and distribution of other plants and micro-organisms in bacterial communities or in an agricultural system (Rizvi et al., 1990) Allelopathy is define as the inhibitory or stimulatory reciprocal biochemical interaction among plants (Rice, 1984). Allelochemicals are present in all plant tissue, including leves, stem, roots, rhizome, flowers, seeds and pollen they can be release into environment through volatilization leacging, root exudation and composition of plant residues (Putnam and Tang 1986)

*Tinospora cordifolia (*Willd*)* is an herbaceous climbing shrub native to India, extract of leaves, root and bark of which have been used by traditional Indian (Ayurveda) medicine for various diseases including diabetes, arthritis, liver diseases, malaria, urinary tract infection, and recently it used for prevention of covid -19 infection(PubMed). large deciduous, extensively spreading climbing shrub with a number of coiling branches. The underground vegetation under its canopy indicates that it has some allelopathic potential which might have been caused either by fallen leaves (through the decomposition of leaves) or plant leachates or root exudates. Consequently, the release of allelochemicals (organic substances) into the soil inhibits seeds germination and the establishment of agricultural crops and vegetation

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Present project work is designed to study the sane using Allium cepa L. as experimental plant. Leaf aqueous extract of *T. cordifolia* with 01%, 05%, 10% (prepared in milli Q water) concentration were applied to determine their effect on *Allium cepa* L. seed germination, seedling growth, cell division and bulb growth at morphological and biochemical levels.

MATERIALS AND METHODS:

Preparation of extract:

100 mg fresh leaves of *Tinospora cordifolia* (Willd) were chopped into small pieces and dissolved in 2000 ml of distilled water overnight and then boiled using autoclave for two time. Extract was then filtrated through four layers of muslin cloth and concentrated to half volume i. e. 1000 ml by heating in microwave. This extract is considered as stock 100% and used for studying allelopathic effect.

For studying the allelopathic effect of fresh leaf extract of *T. cordifolia* (Willd), Three different concentrations such as 1%, 5%, and 10% were prepared in Milli-Q water as follows.

Volume of 100% Concentrated fresh leaf extract	**Volume of Milli-Q Water**	**Concentration of diluted extract used**
5ml	500ml	1%
25ml	500ml	5%
50ml	500ml	10%

Study the effect on seed germination percentage: uniform size primes seeds were soaked in different conc. of aqueous fresh leaf extract of *T. cordifolia (*Willd*)* for two hours then sown in sterilized filter paper

Study seedling growth: For studying the allelopathic effect on plantlets growth, primed seeds were sown in root trainer trays and irrigated with respective concentration

Statistical analysis of the collected data

Observation recorded from experiment for each parameter studied during investigation were pooled using Microsoft Excel. The mean for each treatment were compared with water control and significance different at 5% level (p=0.05) was determined by One way ANOVA (Analysis of variance) using the method given by Gomez and Gomez (1976) and Microsoft Excel**.**

Effect on seed germination

Parameters	**Control**	**Concentration of aqueous extract of T. cordifolia**		
		01%	**05%**	**10%**
Seed germination %	68.11±29.18	61.41±18.07	67.4±9.75	65.45±10.63
CD = 12.36493	Mean are not statistically different			

Table No. 01: Effect of aqueous extracts of fresh leaves of *Tinospora cordifolia (Willd) on seed germination percentage of Alium cepa*

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Seed germination percentage of *T. cordifolia* (Willd) was recorded less in treatments with 01%, 05% and 10% concentration of aqueous fresh leaves extract of *T. cordifolia* (Willd) as compared to untreated control. No particular trend was observed in inhibition of seed germination percentage with respect to concentration of aqueous fresh leaf extract used (table No. 01)

Effect on seedling growth:

Parameters	**Control**	**Concentration of aqueous extract of *T. cordifolia***		
		01%	**05%**	**10%**
Seedling growth	2.53±0.87	2.29±1.05	*1.7±0.89	*2.01±1.00
CD = 0.426073	Mean are statistically different			

Table No. 02: Effect of aqueous extracts of fresh leaves of *Tinospora cordifolia (Willd) shoot growth of Alium cepa*

Shoot growth of *A.cepa* seedlings was found to be inhibited significantly in higher concentration of aqueous extracts of *T. cordifolia* (Willd) 05% concentration was recorded to be exerting most inhibitory effect on shoot growth. (table No. 02)

CONCLUSION:

Aqueous extract of fresh leaves of *T. cordifolia* (willd) is observed to have inhibitory effect on growth parameters of *A.cepa* seedling in terms of reduced seed germination percentage and stunted shoot length.

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