

EFFECT OF INSECTICIDE IMIDACLOPRID ON
THE DIVIDING CELLS OF ROOT MERISTEM
OF ALLIUM CEPA L.

A Dissertation Submitted to the
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Tribhuvan University,
Kathmandu, Nepal

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CERTIFICATE

This is to certify that the Master's Degree in Science dissertation work, entitled "**Effect of Insecticide Imidacloprid on the Dividing Cells of Root Meristem of *Allium cepa* L.**" has carried out by Ms. Sita Gurung under my supervision. It is based on the experiment performed by the student and the result has not been published or submitted for any other degrees. I recommend this dissertation to be accepted as a partial fulfillment for M.Sc. Degree in Botany, Tribhuvan University, Kirtipur, Kathmandu, Nepal.

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LETTER OF APPROVAL

This is to certify that the Dissertation work entitled “**Effects of Insecticide Imidacloprid on the Dividing Cells of Root Meristem of *Allium cepa* L.**” submitted by Sita Gurung has been accepted for the partial fulfillment of Master’s Degree in Botany.

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ABSTRACT

Imidacloprid is a systematic, chloro-nicotinyl insecticide with soil, seed and foliar uses for the control of sucking insects including rice hoppers, aphids, whiteflies, termites, turf, soil insects and some beetles. In present work the cytological effects of insecticide Imidacloprid on root meristematic cells of *Allium cepa* L. were studied. The different concentration of insecticide i.e. 25%, 50%, 75% and 100% were treated in different time periods i.e. 3, 6, 12, and 24 hours separately.

The observation data was used to calculate the chi-square value and was recorded as 3.3 indicating less effectiveness of the chemical. The mitotic index value of treated meristem was higher than control at different concentration in all cases except some interruption in some periodic treatment. This increased mitotic index reveals mitostimulative action of the insecticide Imidacloprid. Among the phases, the prophase index is generally higher which increases as the concentration and time period increases. Increase in prophase index shows prophase poisoning i.e. inhibits further division.

Besides such activities this chemical also shows slight mutagenic effect. The percentage of abnormal cells increased with the increasing concentrations and time period. The common types of abnormality were c-metaphase plasmolysed cells, shifting of poles, precocious arm.

Other types of abnormalities found in certain concentrations are bridges, breaks in chromosome, star metaphase, fragmentation of chromosomes etc. Present observation indicates that mutagenic, cytotoxic and mitodpressive inhibition of the spindle mechanism are the accumulative effects of insecticide Imidacloprid.

From the observed result, it is clear that the insecticide Imidacloprid is cytologically effective chemical to the plant in different concentrations and time of treatment causing toxic effect on chromosomal behaviour.

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ABBREVIATIONS

A Ana- Telo -	Percentage of Abnormalities at Anaphase and Telophase among the Abnormal Cells
A Meta -	Percentage of Abnormalities at metaphase among the Abnormal Cells
A Pro -	Percentage of Abnormalities at Prophase among the Abnormal Cells
Ana-Telo I -	Anaphase and Telophase Index
HMG/N -	His Majesty Government of Nepal
Meta I -	Metaphase Index
MI -	Mitotic Index
T Ana- Telo -	Total Percentage of Abnormal cells at Anaphase and Telophase
T Meta -	Total Percentage of Abnormal cells at Metaphase
T Pro -	Total Percentage of Abnormal cells at prophase
TC Abn Meta -	Total number of abnormal cells counted at Metaphase
TC Abn Pro -	Total number of abnormal cells counted at prophase
TC Abn -	Total number of abnormal cells counted
TC Abn –Ana-Telo -	Total number of abnormal cells counted at Anaphase and Telophase
TC Ana-Telo -	Total number of cells counted at Anaphase and Telophase
TC Meta -	Total number of cells counted at metaphase
TC Pro -	Total number of cells counted at prophase
TC -	Total number of cells counted
TDC -	Total Dividing Cells