EFFECT OF FUNGICIDE COPPER OXYCHLORIDE ON DIVIDING CELLS OF *Allium cepa* L.

A Dissertation

Submitted to the Central Department of Botany, Tribhuvan University for the Partial Fulfillment of M. Sc. in Botany

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LETTER OF APPROVAL

This dissertation entitled "Effect of fungicide Copper oxychloride on dividing cells of *Allium cepa* L." submitted by Ms. Sangita K.C. has been accepted as a partial fulfillment of the requirement for M. Sc. in Botany.

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This is to certify that the dissertation work entitled "Effect of fungicide Copper oxychloride on dividing cells of *Allium cepa* L. " has been carried out by Ms. Sangita K.C. 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 degree. I recommend this dissertaton to be accepted as a partial fulfillment for M.Sc. degree in Botany,Tribhuvan University, Kathmandu, Nepal.

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Date.....

ABSTRACTS

The present study describes a cytological experiment to determine the effect of fungicide Copper oxychloride on the root meristematic cells of *Allium cepa*. The root meristems were treated with different concentrations of Copper oxychloride i.e., 0.025%, 0.05%, 0.075% and 0.1% for different duration of time i.e., 3, 6, 12 and 24 hours for each concentration.

In the study, mitotic index, phase indices and abnormality indices were calculated and abnormal phases were studied. Mitotic index decreased with increasing concentration and period of treatment. Mitotic index was least in 0.1% concentration at 24 hours treatment. It shows that treatment with higher concentrations and longer period of treatment is toxic. Prophase index increased with increase in concentration and period of treatment. Metaphase and Ana-telophase indices showed decreasing tendency with increase in concentration and period of treatment.

Copper oxychloride induced various types of cellular abnormalities. The abnormalities were diluted cells, unequal condensation of chromatin threads in prophase, equatorial plate shifting, C-metaphase, stickiness, disturbed metaphase, diagonal anaphase, precocious chromosomes, precocious arms, laggards, bridges, fragmentation, sticky anaphase, pole shift in anaphase and telophase, unequal cytokinesis, delay in cell plate formation, binucleated cells, unequal movement of chromosomes, diagonal telophase and unequal condensation of daughter chromosomes. The abnormalities may be attributed to the disturbance in the spindle mechanism and metabolic disturbances caused by the chemical.

The results obtained from the study shows that fungicide Copper oxychloride is cytologically effective, mito-depressive, clastogenic and is lethal at higher concentrations.

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ABBREVIATIONS AND ACRONYMS

$A_{Ana\text{-}Telo}$	=	Percentage of abnormalities at Anaphase and telophase among the abnormal cells.
A_{Meta}	=	Percentage of abnormalities at Metaphase among the abnormal cells.
Ana-Telo I	=	Anaphase and Telophase Index
A_{Pro}	=	Percentage of abnormalities at Prophase among the abnormal cells.
DNA	=	Deoxyribo Nucleic Acid
Fig	=	Figure
Meta I	=	Metaphase Index
MI	=	Mitotic Index
PPD	=	Plant protection Directorate
Pro I	=	Prophase Index
T_{Abn}	=	Total percentage of abnomal cells
$T_{Ana\text{-}Telo}$	=	Total percentage of abnormal cells at Anaphase and Telophase
T_{Meta}	=	Total percentage of abnormal cels at metaphase
T_{Pro}	=	Total percentage of abnormal cells at prophase
$TC_{Abn\ Ana\text{-}Telo}$	=	Total number of abnormal cells counted at Anaphase and Telophase
$TC_{Abn\text{-}Meta}$	=	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
$TC_{Ana\text{-}Telo}$	=	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