

**EVALUATION OF ANTIFUNGAL ACTIVITY OF PLANT  
EXTRACTS ON FUNGAL PATHOGENS OF  
POTATO PLANT**

**A DISSERTATION**

**SUBMITTED TO THE CENTRAL DEPARTMENT OF MICROBIOLOGY  
IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE MASTER  
DEGREE OF SCIENCE IN MICROBIOLOGY  
(ENVIRONMENT AND PUBLIC HEALTH)**

**BY**

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This is to certify that **Ms. Bijaya Laxmi Maharjan** has completed this dissertation work entitled “**EVALUATION OF ANTIFUNGAL ACTIVITY OF PLANT EXTRACTS ON FUNGAL PATHOGENS OF POTATO PLANT**” as a partial fulfillment of M.Sc. Degree in Microbiology under our supervision. To our knowledge, this thesis work has not been submitted to any other degree.

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## ABSTRACT

*Solanum tuberosum* (Potato) is one of the most important tuber crops with the production of 325 million tons worldwide and about 20 million tons in Nepal per year. It is a cool season crop and is considered as a staple food. It is prone to many diseases including late blight (*Phytophthora infestans*), early blight (*Alternaria solani*) and fusarial wilt (*Fusarium oxysporum*) as major ones with a yield loss of 50-90%, 20-50% and 10-40% respectively. Although a large number of synthetic chemicals have been recommended to control these losses, most of these have proved to be pollutive, carcinogenic and the emergence of resistant pathogens towards these chemicals has been a great concern. Biological control is the only safe substitute to be explored to control these phytopathogens. The microbial ones being difficult to produce, maintain and use, the plant materials can be used as an alternative. In the present study an attempt has been made to screen and evaluate the antifungal activity of plant extracts against the fungal pathogens of potato plant.

Crude ethanolic extracts of five different fungicidal plant materials viz. *Brassica nigra* (cake), *Cinnamomum camphora* (fruits), *Eupatorium adenophorum* (twigs), *Lantana camara* (twigs) and *Melia azedarach* (fruits) were screened and tested against the three fungal pathogens isolated from the leaf samples of infected potato plant collected from the 7 sites of Kathmandu valley. The identification of the isolated fungal organisms was done by the study of colony characteristics and microscopic observation. The antifungal activity of the crude extracts obtained was evaluated by agar well diffusion method and two fold broth dilution method.

The moisture content was highest in the twigs of *L. camara* and lowest in the cake of *B. nigra*. The yield of crude extracts was obtained highest from *C. camphora* (70%) and lowest from *M. azedarach* (9.75%). *B. nigra* was found most effective against *P. infestans* with both MIC and MFC values 6.25mg/ml. Similarly, *M. azedarach* showed the higher antifungal activity against *A. solani* with both MIC and MFC values 3.125mg/ml. *C. camphora* was found least effective against *P. infestans* and *A. solani* while it was most effective against *F. oxysporum* with both MIC and MFC values 3.125 mg/ml. Different types of plant extracts with different concentration significantly ( $P < 0.05$ ) inhibited the growth of all the fungal pathogens. The extracts used in this experiment were found to be suitable for the control of these fungal pathogens and those also help to maintain sustainable agriculture and environment.

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## LIST OF ABBREVIATIONS

°C	Degree Celsius
µl	Microliter
µm	Micrometer
DMSO	Dimethyl Sulphoxide
gm	Gram
ha	Hectare
Masl	Meter above sea level
MFC	Minimum Fungicidal Concentration
mg	Milligram
MIC	Minimum Inhibitory Concentration
ml	Millilitre
mm	Millimetre
Mt	Metric ton
PDA	Potato Dextrose Agar
PDB	Potato Dextrose Broth

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