PRELIMINARYPHYTOCHEMICALSCREENINGAN D ANTIBACTERIALACTIVITIESOFMETHANOLIC EXTRACTSOFSELECTEDMISTLETOESFROM KATHMANDU VALLEY

A Dissertation Submitted for Partial Fulfillment of the Requirement for the Master's Degree in Science, Central Department of Botany, Tribhuvan University

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RECOMMENDATION

This is to certify that the dissertation work entitled "**Preliminary phytochemical screening andantibacterial activities of methanolic extracts of selected mistletoes from Kathmandu, Valley**" was conducted by **Ms. KrantiKumal** for the partial fulfillment of Master Degree in Botany with special paper 'Plant Biochemistry and Biotechonology' from Tribhuvan University under our supervision. The work is primarily based on the data collected by the student herself and the result of this work have not yet been submitted for any other academic degree. We therefore recommend this dissertation for the final evaluation and acceptance.

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LETTEROF APPROVAL

The M.Sc. Dissertation entitled **"Preliminary phytochemical screening and antibacterial activities of methanolic extracts of selected mistletoes from Kathmandu valley"** submitted at the Central Department of Botany, Tribhuvan University by **Ms. KrantiKumal** for the partial fulfillment of her Master Degree in Botany, has been accepted.

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Kranti Kumal

ABSTRACT

Mistletoes are hemi-parasitic plant belongs to Sandalwood family (Santalaes), that exploit and (or) parasitize a wide range of host plants. Nepal harbors about 19 species of mistletoes ranges from tropical to temperate with different host plants. However, only 15 specimens were found at National Herbarium and Plant Laboratories (KATH). On the basis of deposited specimens distribution range of mistletoes has been identified. The minimum elevation recorded was 125 m a.s.l and maximum at 3500 m a.s.l. In this study, methnolic extract of seven mistletoes were subjected to phytochemical analysis and determination of antioxidant activity and antibacterial activity. Sonication method was used for extraction process. The highest yield % was obtained for *Viscum album* (24.26 %) and lowest for *Scurrula parasitica* (11.86 %). Phytochemical analysis showed the presence almost all major phytochemicals such as saponin, flavonoid, steroid, terpenoid, glycosides, alkaloids and phenol. The total flavonoid and phenol content were determined by Aluminium chloride colorimetric method and Folin-Ciocalteu reagent respectively. *Viscum album* (31.45 ± 2.32 mg QE/g) showed highest flavonoid content whereas *Macrosolen cochinchinensis* (24.90 ± 2.26 mg QE/g) showed lowest. Similarly, highest phenolic content was found in *Scurrula parasitica* (32.90 ± 2.46 mg GAE/g) and lowest in *Viscum album* (20.60 ± 2.06 mg GAE/g). The antioxidant activity was measured by DPPH (2, 2- Diphenyl-1-picryhydrazyl) radical scavenging assay (RSA) and ascorbic acid was taken as standard. *Scurrulaparasitica* showed best antioxidant activity with lowest IC_{50} (26.04 ± 0.71 µg/ml). *Viscumalbum* showed low antioxidant activity with highest IC_{50} value (199.0 ± 1.25 µg/ml). The IC_{50} value for DPPH radical scavenging activity of methanolic extract of selected mistletoes was statistically negatively correlated with the total phenolic content and positively correlated with the total flavonoid content in this study. For antibacterial screening, four different ATCC culture gram positive bacteria *Staphylococcus aureus* and *Staphylococcus epidermidis* and gram negative bacteria *Escherichia coli, Pseudomonas aeroginosa* were used. Gentamycin was used as positive control. Agar well diffusion technique was used for antibacterial screening and zone of inhibition was observed. Antibacterial screening showed that *Helixanthera ligustrina* and *Viscum articulatum* were effective against all bacterial strains. *Scurrula parasitica* was only effective for gram positive bacteria *Staphylococcus aureus* and *Staphylococcus epidermidis. Macrosolen cochinchinensis* showed antibacterial activity against all bacterial strain except *Staphylococcus aureus.* Similarly, *Macrosolen cochinchinensis* was highly effective against *Pseudomonas aeroginosa*. *Scurrula elata Viscumalbum* and *Viscum articulatum* var.*liquidambaricolum* did not show any result against all tested bacteria. On the basis of above result, the selected mistletoe plant can be used for making drugs against different human diseases after detailed investigation. Additionally, the above study showed that there may be probability of finding similar phytochemicals in other remaining mistletoes species, which must be encouraging for further research.

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ACRONYMS

µg	Microgram
µl	Microliter
a.s.l	Above sea level
ATTC	American Type Culture Collection
DMSO	Dimethylsulphoxide
DPPH	2,2 – diphenyl -1-picrylhydrazyl
DNA	Deoxyribonucleic acid
GAE	Gallic Acid Equivalent
IC_{50}	Inhibitory concentration 50
KATH	National Herbarium and Plant Labotatories, Godavari, Lalitpur
LB	Luria Bertani
Mcg	Microgram
MHA	Muller Hinton Agar
mg/ml	milligram per milliliter
mM	milimolar
nm	Nanometer
NB	Nutrient Broth
QE	Quercetin Equivalent
ROS	Reactive Oxygen Species
RSA	Radical Scavenging Activity
rpm	Revolution per minute
SD	Standard Deviation
TFC	Total Flavonoid Content
TPC	Total Polyphenol Content