

**Phytochemical Screening of Rhizome of *Paris polyphylla* Sm. For
Antibacterial and Antioxidant Investigation**

A Dissertation

**Submitted to Central Department of Botany for the partial
fulfillment of the requirements of M. Sc. Degree in Botany**

Submitted by:

Sirjana Sharma

Plant Bio-chemistry and Bio-technology Unit

Exam Roll No.: 18240

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TRIBHUVAN UNIVERSITY

INSTITUTE OF SCIENCE AND TECHNOLOGY

CENTRAL DEPARTMENT OF BOTANY

OFFICE OF THE HEAD OF DEPARTMENT

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Kirtipur, Kathmandu
NEPAL

CERTIFICATE

This is to certify that the research work entitled "**Phytochemical Screening of Rhizome of Paris polyphylla for Antibacterial and Antioxidant Investigation**" submitted by Mrs. Sirjana Sharma for the partial fulfillment of Master degree in Botany. The research of the investigation was carried out by her under my supervision. The results have not yet been published or submitted for any other degree. I, therefore, recommend this dissertation work to be accepted for the partial fulfillment of Master of Science in Botany, Tribhuvan University, Kirtipur, Kathmandu, Nepal.

Date: November 23, 2015

Supervisor

Bijaya Pant, PhD

Professor

Central Department of Botany
Tribhuvan University
Kirtipur, Kathmandu, Nepal



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LETTER OF APPROVAL

This dissertation paper submitted by Mrs. Sirjana Sharma entitled "**Phytochemical Screening of Rhizome of *Paris polyphylla* for Antibacterial and Antioxidant Investigation**" has been accepted for the partial fulfillment of Master Degree in Botany.

Expert Committee

(Research supervisor)

Bijaya Pant, PhD

Professor

Central Department of Botany

Tribhuvan University

Kirtipur, Kathmandu, Nepal

(External Examiner)

Rabindra Prasad Dhakal (Dr. Eng.)

Senior Technical Officer

Faculty of Technology

Nepal Academy of Science and Technology (NAST)

Dr. Pramod Kumar Jha

Professor & Head

Central Department of Botany

Tribhuvan University

Kirtipur, Kathmandu, Nepal

(Internal Examiner)

Dr. Bharat Babu Shrestha

Associate Professor

Central Department of Botany

Tribhuvan University

Kirtipur, Kathmandu, Nepal

Date of Examination: 7th February, 2016

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Central Department of Botany

ABSTRACT

Paris polyphylla Sm. is a medicinal plant listed as vulnerable (V) under IUCN threat category. The whole plant has medicinal value. The rhizomes have high demands in both national and international markets for its valuable rootstock to treat variety of ailments. Root paste is applied as an antidote to snake bites and poisonous insect bites and also to alleviate narcotic effects. It can be applied to wounds for rapid healing and also for fever, headache, and stomach problems of both man and animals. It is found to be used as a primary herb in the treatment of throat infection, breast cancer in traditional Chinese medicine.

In the present experiment, rhizome sample of *Paris polyphylla* was collected from different localities. Crude methanol extract was prepared from each sample using soxhlet apparatus and used for different experiments. Chemical test method was used for primary phytochemical screening. Primary phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, phenols, terpenoids, glycosides and saponins in all the samples. Total polyphenol content was estimated using the Folin-Ciocalteu phenol reagent and flavonoid content using Aluminium chloride colorimetric method with slight modifications. Highest polyphenol and flavonoid content values of 44.83 ± 0.33 mgGAE/gm and 6.28 ± 0.035 mgQ/gm respectively were observed in wild sample of Dolakha whereas lowest total polyphenol and flavonoid content values of 36.89 ± 0.074 mgGAE/gm and 4.56 ± 0.22 mgQ/gm respectively were observed in wild sample of Parbat district. Similarly antioxidant activity was determined using DPPH assay. It was measured in terms of IC₅₀ value of plant extract. Plant extract having lowest IC₅₀ value was considered as better antioxidant. Maximum IC₅₀ value (47.59 ± 1.2843) was observed in wild sample of Parbat district and minimum IC₅₀ value (42.63 ± 1.4389) was observed in wild sample of Dolakha district. Antibacterial activity was determined using agar well diffusion method. Plant extract exhibited zone of inhibition against *Bacillus subtilis* bacterium with maximum zone of inhibition of 14 mm in the wild sample collected from Dolakha. In this way it has been concluded that *Paris polyphylla* is an important medicinal herb of Nepal. Among the collected samples, sample from Dolakha (wild) was found to have higher antibacterial and antioxidant potential.

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ACRONYMS

| | |
|-------|----------------------------------|
| ATCC | American Type Culture Collection |
| DMSO | Dimethyl sulfoxide |
| DPPH | 1, 1- diphenyl-2 picrylhydrazyl |
| GAE | Gallic Acid Equivalent |
| GC | Gas chromatography |
| IC50 | Inhibitory Concentration 50 |
| mg | Milligram |
| ml | Milliliter |
| mm | Millimeter |
| MHA | Muller Hinton Agar |
| NA | Nutrient Agar |
| NB | Nutrient Broth |
| QE | Quercitin Equivalent |
| T. U. | Tribhuban University |
| U. V. | Ultra Violet |
| WHO | World Health Organization |
| ZOI | Zone of Inhibition |
| µg | Microgram |