



P-ISSN 2349-8528  
E-ISSN 2321-4902  
IJCS 2015; 3(4): 10-13  
© 2015 JEZS

Received: 04-10-2015  
Accepted: 25-11-2015

**Mansi Gupta**  
Department of Chemistry  
Uttaranchal University,  
Dehradun, Uttarakhand, India.

**Ajay Singh**  
Department of Chemistry  
Uttaranchal University,  
Dehradun, Uttarakhand, India.

**Harish Chandra Joshi**  
Department of Chemistry  
Uttaranchal University,  
Dehradun, Uttarakhand, India.

## *Berberis Lycium* multipotential medicinal application: An overview

**Mansi Gupta, Ajay Singh, Harish Chandra Joshi**

### Abstract

*Berberis Lycium* is also known as Indian Barberry. It is a rapidly growing herb mainly distributed in India. In traditional system of medicine, the plant is used for various affliction and diseases. The different parts of the plant like leaves, stem, root, fruits and flowers are used by the people as medicines and food. The plant is known to prevent eye disorders, abdominal disorders, skin diseases etc. Pharmacological investigation has shown that it exhibits antibacterial property, antidiabetic property and cardiac diseases. The present review article overview the ethnomedicinal, phytochemical and pharmacological properties of the plant and in this article attempt has been made to summarize the different properties of the plant.

**Keywords:** Berberidaceae, Barberry, Berberine, Phytochemical, Pharmacological Activity

### Introduction

Medicinal plants are those which have some medicinal properties. According to the World Health Organization (WHO, 1977) <sup>[1]</sup> "a medicinal plant" is any plant, in which one or more of its organ contains substances that can be used for the therapeutic purposes or which are precursors for the synthesis of useful drugs. Medicinal plants are very useful as they are the easily available source for health purpose in rural and tribal areas.

They are used in herbalism. Herbalism is a study of the traditional medicines or folk medicines practice which is based on the use of plants and plant extracts. Herbalism is also known as botanical medicine, herbology or phytotherapy. The use of plants as medicines is as old as the origin of mankind. Since the origin of mankind people have mainly relied on plants for their food as well as their medicines for their nourishment. Through trial and error they discovered that some plants were good for food, some were poisonous and some produced bodily changes such as increased perspiration, relief pain and some were also helpful in healing.

Plant parts such as (leaves, flowers, seeds, roots, barks, stems etc.) are used for preparing medicines and this whole process is termed as herbal drug (Anonymous, 2007a) <sup>[2]</sup>. The plant-based, conventional medicine systems continues to play an essential role in health care, with about 80% of the world's inhabitants relying mainly on traditional medicines for their primary health care (Owolabi J *et al.*, 2007) <sup>[3]</sup>. Further India has several traditional medicinal techniques, such as Ayurveda and Unani, Allopathy etc. is mainly using plant-based drugs. The *materia medica* of these systems contains a rich heritage of indigenous herbal practices that have helped to sustain the health of most rural and urban people of India. The ancient texts like Rig Veda (4500-1600 BC) and Atharva Veda mention the use of several plants as medicine. The different books on ayurvedic medicine such as *Charaka Samhita* and *Susruta Samhita* refer to the use of more than 700 herbs (Jain S.K, 1968) <sup>[4]</sup>. Plants are known to have the ability to synthesize a wide variety of chemical compounds and they are used to perform important biological functions. They also help us to defend against the attack from a wide variety of predators such as insects, fungi & herbivorous mammals. Plants have chemical compounds that mediate their effects on the human body by binding to receptor molecules present in the body; such processes are identical to those which are already well understood for conventional drugs. Herbal medicines do not differ greatly from conventional drugs in terms of how they work but herbal medicines have less side effects as compared to conventional drugs. The family Berberidaceae was first established by (Jussieu A.L de 1789) <sup>[5]</sup> as 'Berberides' and was considered one of the most primitive angiosperms having a high number of disjunct or discontinuous genera (Bruckner C 2000) <sup>[6]</sup>. Berberidaceae is a heterogeneous

**Correspondence:**  
**Mansi Gupta**  
Department of Chemistry  
Uttaranchal University,  
Dehradun, Uttarakhand, India.

assemblage of angiosperms comprising 17 genera and 650 species in the world, which are distributed mostly in the northern hemisphere. *Berberis lycium* is found throughout the temperate and subtropical regions of the world (apart from Australia). *Berberis lycium* is native to Nepal, globally distributed in various parts of world. It occurs in sub-tropical and temperate regions from Kashmir to Uttaranchal on the outer northern-western Himalayas (Sharma Dr. Ravindra 2003) [7]. *Berberis lycium* also known as Indian Barberry. It is a large, spiny, evergreen deciduous shrub. It belongs to the family Berberidaceae. It is about 2-4 m high. Leaves of this plant are lanceolate or narrowly obovate-oblong and coriaceous in shape entire or with a few large spinous teeth that are arranged alternately on the stem (Dhar Uppeandra and Kachroo P 1983) [8]. The leaves of the plant are dull green above, pale and glaucous beneath. Secondary nerves are not prominent on the upper surface. Inflorescence is corymbose racemes with 11-16 flowers per cluster and the flowers are hermaphrodite. It means that they have both male and female organs which are pollinated by insects (Sood Purvika *et al.*, 2012) [9]. The plant is self-fertile.

The fruits of *Berberis lycium* are called berries. The flowers of the plant are bright yellow in colour which acquire bright red

or purplish colour on ripening (i.e. fruits). The fruits are ovoid in shape. The fruits are about 7mm long. The flowering season of *Berberis lycium* is from the month of April-May and September-October and fruiting season is from June-July. The fruits can be used raw or cooked and made into preservatives. It is fairly juicy with a nice slightly acid flavour. It is suitable for light (sandy), Medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil both.

### Objectives of the Review

*Berberis lycium* is one of the Berberidaceae family having potential medicinal values. *Berberis lycium* is endangered species. The aim of the present review is to delineate the various plants with their chemical constituents and biological activities. Various traditional uses of some common species have also been summarized. These informations can create a centre of attention for scientists and herbalists for this genus, and consequently this database might play a major role in future research.

### Plant Profile



**Fig 1:** Different Parts of the Plants

**Kingdom-**Plantae

**Phylum-**Tracheophyta

**Class-**Magnoliopsida

**Order-**Ranunculales

**Family-**Berberidaceae

**Genus-**Berberis

**Species-***Berberis lycium*

### Phytochemical Constituents

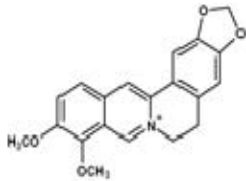
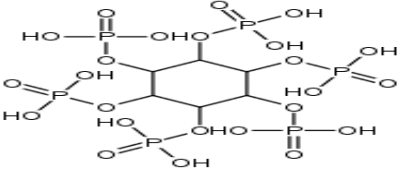
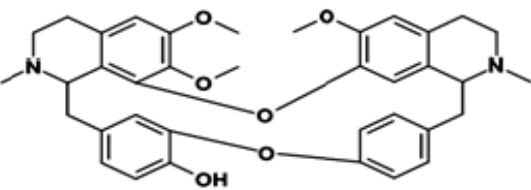
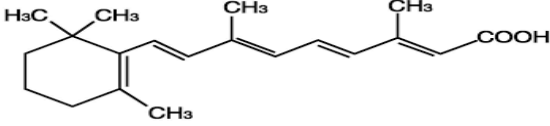
The preliminary phytochemical analysis of *Berberis Lycium* plant parts showed the presence of alkaloids, tannin, flavonoids, phenols, terpenoids, fat and resin are other important constituents of the herb. *Berberis Lycium* has many active alkaloids. Fruit and leaves contains high percentage of various nutritive constituent i.e. protein, fat, fiber, palmitine, calcium, sulphur, berberine and vitamin C.

### Chemical Constituents of the Plants

The plants of *Berberis lycium* contain various types of plant secondary metabolites including terpenoids, flavonoids, diarylheptanoids, phenols, steroids, tannins, and many others.

The plants and their chemical constituents have been summarized below, whereas the chemical structures of various compounds isolated from different parts of the plants (mainly stem, bark and leaves).

**Table 1:** Chemical constituents of *Berberis lycium*

Sr. No.	Constituents	Chemical Structure
1	Berberine	
2	Phytic Acid	
3	Berbamine	
4	Vitamin A	
5	Palmitine	$\begin{array}{c} \text{C}_{15} \text{H}_{31} - \text{COO} - \text{CH}_2 \\   \\ \text{C}_{15} \text{H}_{31} - \text{COO} - \text{CH} \\   \\ \text{C}_{15} \text{H}_{31} - \text{COO} - \text{CH}_2 \end{array}$

### Traditional Medicinal Uses

Berberidaceae is a famous family with medicinal and edible values and is included in British and Indian pharmacopeias. The extract of the roots is known as Rasaut (Raizada M.B and Saxena Hari Om 2000) [10]. *Berberis lycium* roots form a reputed drug in the ayurvedic medicines. In Unani system of medicine, it is used for the treatment of leprosy. Plant is extensively used in local practices for the treatment of several human diseases like piles, menorrhagia, jaundice, wounds and broken bones (Singh S.K and Rawat G.S 2000) [11]. It is used in intestinal colic, diarrhoea and in bacterial dysentery (Dickason F.G 8530/1939) [12]. It is used as expectorant, diuretic, acute conjunctivitis, chronic ophthalmic and throat inflammations. The plant is stomachic, aperient, carminative and febrifuge.

### Pharmacological Activity

**Antibacterial activity:** The roots are the most important part of *Berberis* species as they contain a number of alkaloids, the most prominent one is berberine. It was found that inhibitory activity was shown by the components present in the root extracts of *Berberis lycium* and not by the solvents used for extraction (Irshad A.H *et al.* 2013) [13]. It is useful in preparation of drugs for cholera, diarrhoea, dysentery and eye troubles. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various bacterial infections, especially bacterial dysentery. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine.

**Cardiac Diseases:** Many species of *Berberis* have been reported to reduce the level of serum triglyceride (Chand N *et al.*, 2007) [14]. Berberine a major alkaloid of plant, prevented ischemia-induced ventricular tachyarrhythmia, stimulated cardiac contractility, lowered peripheral vascular resistance and blood pressure and left ventricular hypertrophy development.

**Antidiabetic activity:** Many species of *Berberis* have been found to have antidiabetic property. *Berberis lycium* and various root extracts lower the glucose level significantly (Nangyal Hasnain *et al.*, 2014) [15]. Comparison of pure berberine was made with ethanolic root extract of *Berberis lycium* of its antidiabetic activity in normal and alloxanized diabetic rats. Using similar doses (50mg/kg) plant extract and berberine reduced blood glucose level significantly and demonstrated significant effects on glycosylated haemoglobin, glucose tolerance, serum, lipid profiles and body weight. Plant extract was comparable in efficacy with berberine. Oral glucose tolerance test showed that extracts of the plant reduce serum glucose level independent manner.

### Other Uses

Berries of *Berberis lycium* (i.e. fruits) is used raw or in cooked form by the local inhabitants. Juice of the berries is with a nice slightly acid flavour. Leaves are used as a tea substitute. A yellow dye is also obtained from the roots.

### Conclusion

The present paper reveals the multi-potential application of *Berberis Lycium* as medicinal plant. The various parts of the

plant contain a small number of phytoconstituents, which are the key factors in the medicinal value of this plant. The present review summarizes some important studies on pharmacological and some phytochemical investigations. The bioactive components responsible for the activities are not precisely known.

## References

1. WHO. Resolution-Promotion and development of Training and Research in Traditional Medicine; WHO document 1977, 30-49.
2. Anonymous Medicinal, Culinary and Aromatic Plants in the near East-Medic...<http://www.fao.org/dorep/x5402e16.htm> (cited 4 August), 2007a.
3. Owolabi J EKI, Omogbai Obasuyio. Antifungal and antibacterial activities of the ethanolic and aqueous extract of *Kigelia Africana* (Bignoniaceae) stem bark. *Afr. J Biotechnol.* 2007; 6(14):882-85.
4. Jain SK, Medicinal plant India, Land and Land People, National Book Trust of India, 1968, 1-3.
5. Jussieu A.L.de. BERBERIDACEAE, nom. cons. *Genera Plantarum*, 1789, 286.
6. Bruckner C. Clarification of the Carpel Number in Papaverales, Capparales, and Berberidaceae. *Botanical Review*, 2000; 66(2):155-307.
7. Dr. Ravindra Sharma. *Medicinal Plants of India; An Encyclopaedia*, 2003, 33.
8. Dhar Uppeandra, Kachroo P. *Alpine flora of Kashmir Himalaya*, 1983, 180.
9. Sood Purvika. *Indian journal of pharmaceutical and biological research*, 2012, 1(1).
10. Raizada MB. Saxena Hari Om, *Flora of Mussoorie*, 2000; 1:22.
11. Singh SK, Rawat GS. *Flora of Great Himalayan National Park-Himachal Pradesh*, 2000, 60-61.
12. Dickason FG, *Berberis* indet. Burma, Bark used medicinally for stomach trouble; 8530/1939.
13. Irshad AH. *Trakia journal of science*, 2013; 11(1):88-90.
14. Chand N. *Asian-Aust.J.Anim.Sci*, 2007; 20(4):563-568.
15. Nangyal Hasnain. *Advances in Biomedicine and Pharmacy (An International journal of Biomedicine, Natural products and Pharmacy)* 2014; 1(1):11-14.
16. Shabbir Arham. *African journal of pharmacy and pharmacology*. 2012; 6(31):2346-2353, 22.
17. Khare CP. *Indian Herbal Remedies. In: Rational Western Therapy, Ayurvedic and Other Traditional Usage, Botany.* (Springer) Kuo C, Chi C, Liu T, 2004, 98.
18. Bukhari Intisham. *African journal of microbiology research*. 2011; 5(6):725-728.
19. Ali MN, Khan AA. Pharmacognostic studies of *Berberis lycium* Royle and its importance as a source of raw material for the manufacture of berberine in Pakistan. *Pak. J For.* 1978, 26.
20. Anke M, Groppe B. Significance of newer essential trace elements (like Si, Ni, As, Li, V,) for the nutrition of man and animals. In: Bratter, P. and Schramel, P. (eds), *Trace element-analytical chemistry in medicine and biology* (Berlin), 1984, 421.
21. Ahmed Alamgee M. Effect of *Berberis lycium* Royle on Lipid Profile in Alloxan Induced Diabetic Rabbits. *Ethnobot. Leaflets* Ali M, Shuja MN, Zahoor M, Qadri I; 2009/2010; 13:702-708.
22. Gulfranz M, Arshad M. Investigation for bioactive compounds of *Berberis lycium* Royle and *Justicia adhatoda* L. *Ethnobot. Leaflets* 2004; 1:51-62.
23. Chandra P, Purohit AN. Berberine contents and alkaloid profile of *Berberis* species from different altitudes. *Biochem. Sys. Eco. Dalziel JM*; 1980/1936; 8(4):379-380.
24. Sood P, Modgil R. Physico-chemical and nutritional evaluation of indigenous wild fruit Kasmal, *Berberis lycium* Royle. *Indian. J Nat Prod Res.* 2010; 1(3):362-366.
25. Manske RHF. *The alkaloids: Chemistry and Pharmacology*, (San Diego, California: Academic press, INC) McLaughlin MMJ, Parker DR, Clarke JM; 1998/1999, 287.
26. Sabir Shaista. *Pakistan journal of pharmaceutical and science*. 2013; 26(6):1165-1172.
27. Reis Altschul Siri Von, *Drugs and Foods from little known Plants*, Harvard University Press Cambridge, Massachusetts, 1973.
28. Baquar SR. *Medicinal and Poisonous plants of Pakistan*, (Karachi, Pakistan: Printas) 1989, 55.
29. Srivastava S, Vartika R. Estimation of heavy metals in different *Berberis* species and its market samples. *Env. Monit. Assess.* 2006; 116:315-320.