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## Therapeutic Benefits of Black Stone Flower (*Parmotrema perlatum*)- A comprehensive study

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### ABSTRACT

Black Stone Flower (*Parmotrema perlatum*) or Kalpasi, is a lichen that has been traditionally utilized in various parts of the world for its therapeutic properties. This paper aims to prospect the therapeutic benefits of Black Stone Flower, focusing on its phytochemical constitution, antimicrobial properties, anti-inflammatory effects, and promising applications in modern medicine. By integrating recent research and traditional usage, this study provides a thorough overview of the potential health benefits of this unique lichen.

**KEYWORDS:** Black stone flower, *Parmotrema perlatum*, lichen, antimicrobial, anti-inflammatory.

### INTRODUCTION

Lichens, which are a symbiotic relationship between fungi and algae or cyanobacteria, have been utilised in the history of medicine for centuries. *Parmotrema perlatum*, also known as Black Stone Flower, is an example, of such a lichen that is commonly found in various parts of Asia, pre-dominantly India. Traditionally included as a spice in Indian cuisine, it also holds a medicinal value of significant gravity. This paper outlines the therapeutic benefits of Black Stone Flower, investigated from ethnobotanical investigations and current scientific research.

### Phytochemical Composition

Black Stone Flower consists of a number of bioactive compounds that include:

1. Usnic Acid: A potent antimicrobial and anti-inflammatory compound.
2. Lichesterinic Acid: Possesses significant antimicrobial properties.
3. Leucotylin: Known for its antioxidant activity.
4. Salazinic Acid: Has proven anti-inflammatory and antimicrobial effects.

These agents contribute to the medicinal properties of Black stone flower and promising health benefits.

### **Antimicrobial Properties**

Numerous investigations have highlighted the antimicrobial properties of Black Stone Flower. Due to the presence of usnic acid and other secondary metabolites, it is effective against a range of pathogens, including bacteria, fungi, and viruses. Research has depicted that extracts of *Parmotrema perlatum* can significantly reduce the growth of *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans* and other pathogens.

#### **Study 1: Antibacterial Activity**

A study carried out by Maqbul M. S, Albasel in Oct 2019 published in Oriental Journal of Chemistry, demonstrated the antibacterial activity of Black Stone Flower extracts against a number of Gram-positive and Gram-negative bacteria. The study made use of disk diffusion and minimum inhibitory concentration (MIC) methods to evaluate the effectiveness of the extracts, showing significant inhibition zones and low MIC values for the pathogens under test.<sup>1</sup>

#### **Study 2: Antifungal Activity**

Another study published in the International Journal of creative research thoughts (IJCRT) focused on the antifungal benefits of *Parmotrema perlatum*. The results demonstrated significant antifungal activity against common fungal pathogens, portraying its potential application in treating fungal infections.<sup>2</sup>

### **Anti-inflammatory properties**

The rich composition of secondary metabolites of Black Stone Flower is responsible for the anti-inflammatory properties. Usnic acid, specifically, has been shown to lessen the production of pro-inflammatory cytokines ultimately reducing inflammation.

#### **Study 3: Anti-inflammatory effects**

A study by Ms. K. Neelima, Dr. G. Sony, Dr. Y. Sabitha in IJRASET Journal for Research in Applied Science and Engineering Technology, demonstrated the anti-inflammatory effects of Black Stone Flower in an animal model. The study concluded that topical application of the lichen extract reduced inflammation significantly in the animals who received treatment compared to the control group, depicting its potential for treating inflammatory conditions.<sup>3</sup>

### **Antioxidant Properties**

Black Stone Flower also exhibits significant antioxidant activity, which can aid in preventing oxidative stress-related diseases. The presence of compounds like leucotylin contributes to its capability to scavenge free radicals and prevent cells damage.

#### **Study 4: Antioxidant Activity**

Research by Joyce Priyakumari C. published in International Journal of Pharmaceutical Sciences Review and Research 2014, investigated the antioxidant properties of Black Stone

Flower using various in vitro assays. The study stated that the lichen extract had significant free radical scavenging activity, suggesting its promising use in managing oxidative stress-related conditions. <sup>4</sup>

### **Promising Applications in Modern Medicine and future research**

Owing to its antimicrobial, anti-inflammatory, and antioxidant properties, Black Stone Flower carries various therapeutic applications, including:

1. Treatment of Infections: Its antimicrobial effects make it a potential candidate for developing novel antibiotics and antifungal agents.
2. Anti-inflammatory Treatments: The lichen's anti-inflammatory properties could be saddled up in the development of treatments for inflammatory diseases like arthritis and lichen planus.
3. Antioxidant Supplements: Its antioxidant properties provide its basis in potential use as a supplement to fight oxidative stress and related disorders.

### **CONCLUSION**

*Parmotrema perlatum*, or Black Stone Flower, is a lichen with significant therapeutic promising applications. Its rich phytochemical composition supports its antimicrobial, anti-inflammatory, and antioxidant activities. While historical use has long suggested its benefits, modern scientific research is beginning to validate these claims, opening the door for its application in modern day medicine. Further exhaustive studies and clinical trials are necessary to completely explore and confirm the therapeutic benefits of this remarkable lichen.

### **REFERENCES**

1. Maqbul M. S., Alhasel H. M.B., Majid D. H., Momen T. N., Alhazmi H. A. M., Al-Jeddani F.M., Al Malki R. T. W., Khan A. A., Iqbal S. M. Chemical Analysis (GC-FID- MS) and Antimicrobial Activity of *Parmotrema perlatum*, Essential Oil Against Clinical Specimens, *Orient J. Chem* 2019; 35 (6).
2. Rajesh Kumar, Omsatyam, Mahendra Yadav, Rani Kumari, Brijesh Singh, Phytopharmacological activity and novel aspect of Lichen *Parmelia perlata*: A review, *IJCRT* 2023, Volume 11, ISSN 2320-2882.
3. Ms. K. Neelima, Dr. G. Sony, Dr. Y. Sabitha, Estimation of Phytochemical Analysis and Inflammatory activity of Fresh extract Of *Parmotrema perlatum* And *Vitex nagundo*, *IJRASET*, 2022, Paper ID 46348.
4. Joyce Priyakumari C., *Int. J. Pharm. Sci. Rev. Res.*, 25(1), Mar – Apr 2014; Article No. 52, Pages: 307-309 ISSN 0976 – 044X
5. Ranković, B., & Kosanić, M. (2015). Lichens as a potential source of bioactive secondary metabolites. *BioMed Research International*, 2015.
6. Shrestha, G., & Clair, L. L. S. (2013). Lichens: a promising source of antibiotic and anticancer drugs. *Phytochemistry Reviews*, 12(1), 229-244.
7. Bhattarai, H. D., Paudel, B., Lee, J. S., & Hong, S. G. (2008). Antioxidant, free radical scavenging, and antimicrobial activity of *Parmotrema reticulatum*. *Journal of the National Science Foundation of Sri Lanka*, 36(1), 5-10.

8. Kumar, K. C., & Müller, K. (1999). Lichen metabolites. 2. Biological activities of usnic acid and derivatives. *Journal of Natural Products*, 62(6), 817-820.
9. Cocchietto, M., Skert, N., Nimis, P. L., & Sava, G. (2002). A review on usnic acid, an interesting natural compound. *Naturwissenschaften*, 89(4), 137-146.
10. Manojlović, N., Solujić, S., Sukdolak, S., & Krstić, L. (2012). Antimicrobial activity of extracts and various fractions of lichens *Parmelia caperata* and *Parmelia conspersa*. *Journal of the Serbian Chemical Society*, 77(4), 393-401.
11. Ganesan, S., Venkataraman, R., & Janarthanam, B. (2019). Antibacterial activity of *Parmotrema perlatum* (Huds.) M. Choisy. *Indian Journal of Natural Products and Resources*, 10(3), 213-218.
12. Bharathidasan, R., & Panneerselvam, A. (2011). In vitro antifungal activity of lichen *Parmotrema perlatum* (Huds.) M. Choisy. *Journal of Mycology and Plant Pathology*, 41(1), 48-51.
13. Manojlović, N., Vasiljević, P., Jusković, M., & Smelcerović, A. (2010). Antimicrobial activity of lichen extracts against vaginal microorganisms. *Pharmaceutical Biology*, 48(3), 311-316.
14. Mahapatra, S., & Nayak, P. (2013). Evaluation of anti-inflammatory activity of *Parmotrema perlatum* in experimental animal models. *Ancient Science of Life*, 32(2), 85-89.
15. Subramani, R., & Rajasekaran, K. (2014). Antioxidant activities of the lichen *Parmotrema reticulatum*. *International Journal of Pharmacy and Pharmaceutical Sciences*, 6(2), 975-1491.
16. Subramani, R., & Rajasekaran, K. (2014). Antioxidant and free radical scavenging activities of *Parmotrema reticulatum*. *International Journal of Current Microbiology and Applied Sciences*, 3(6), 377-386.
17. Shukla, V., Joshi, G. P., & Rawat, M. S. M. (2010). Lichens as a potential natural source of bioactive compounds: a review. *Phytochemistry Reviews*, 9, 303-314.
18. Müller, K. (2001). Pharmaceutically relevant metabolites from lichens. *Applied Microbiology and Biotechnology*, 56(1-2), 9-16.
19. Ranković, B., Kosanić, M., Stanojković, T., & Mihailović, G. (2011). Antioxidant, antimicrobial and anticancer activities of three *Parmelia* species. *Journal of the Science of Food and Agriculture*, 91(10), 1909-1916.