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THE ROLE OF MEDICINAL PLANTS IN TREATING INFERTILITY: CURRENT TRENDS AND CONSERVATION NEEDS

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ABSTRACT

As an alternative to costly and intrusive contemporary therapies, more and more couples are turning to herbal and traditional remedies to address the growing global issue of infertility. Because of their high phytochemical content and few side effects, medicinal plants have considerable therapeutic potential in the treatment of infertility in both males and females. However, the existence of many medicinal species is under jeopardy due to uncontrolled harvesting and rising demand. In addition to highlighting important medicinal plants with demonstrated fertility-boosting benefits, this review examines in situ and ex situ conservation tactics that are essential to protecting these natural resources. The topic of biotechnology's involvement in plant conservation is also covered. For the sustainable use and preservation of medicinal plants, an integrated strategy integrating traditional knowledge, scientific confirmation, and conservation techniques is required.

KEYWORDS: Infertility, Medicinal plants, Conservation, Herbal therapy, Cryopreservation, In situ conservation, Ex situ conservation.

INTRODUCTION

The inability to conceive after a year of unprotected sexual activity is the hallmark of infertility, a serious worldwide health concern that affects 10–15% of couples of reproductive age.[1] Male, female, or unexplained factors are among the multifactorial causes. Intrauterine insemination (IUI), hormonal therapy, and in vitro fertilization (IVF) are examples of conventional treatments that frequently have negative side effects and high costs. Because of their accessibility, affordability, and low risk of adverse effects, complementary and alternative therapies, especially herbal medicine are becoming more and more popular.[2] By boosting spermatogenesis, controlling hormone balance, and

reducing oxidative stress, a variety of medicinal plants have been shown to increase fertility.[3,4] Simultaneously, the unsustainable exploitation of medicinal flora necessitates robust conservation strategies to preserve biodiversity and traditional knowledge.[5] This review highlights the role of key medicinal plants in infertility management, and evaluates in situ and ex situ conservation strategies vital for sustaining their availability.

MEDICINAL PLANTS IN THE TREATMENT OF INFERTILITY

Herbal medicine plays a pivotal role in the management of infertility, supported by centuries of traditional use and increasing scientific evidence. Plants such as *Withania somnifera* (Ashwagandha), *Nigella sativa*, *Moringa oleifera*, and *Tribulus terrestris* have demonstrated efficacy in enhancing reproductive function through antioxidant, hormone-modulating, and gonadotropin-stimulating properties.[6–9] For instance, *Nigella sativa* has shown improvements in sperm count and motility in male infertility.[7] *Withania somnifera* acts as an adaptogen that helps in stress reduction and improves sperm quality.[8] Clinical and preclinical studies have also validated the estrogenic and progestogenic activities of various herbs used in female infertility treatment.[10,11]

IN SITU CONSERVATION OF MEDICINAL PLANTS

In situ conservation involves protecting plant species within their natural habitats, ensuring the continuity of evolutionary processes and ecosystem interactions.[12] Biosphere reserves, national parks, and sacred groves serve as effective in situ conservation zones.[13] This strategy is particularly beneficial for endemic and rare species that are highly susceptible to environmental changes. Community-based conservation programs also play a crucial role by involving indigenous communities in sustainable harvesting and habitat restoration.[14] Traditional knowledge systems are preserved alongside plant species, providing a dual benefit in conserving biodiversity and cultural heritage.[15]

EX SITU CONSERVATION OF MEDICINAL PLANTS

The preservation of plant genetic material outside of their natural settings is known as ex situ conservation. This covers cryopreservation methods, tissue culture, seed banks, and botanical gardens.[16] The most popular method is seed banking, but not all seeds are conventional (resistant to desiccation). Elite genotypes can be stored and multiplied quickly through tissue culture.[17] Germplasm can be stored for an extended period of time via cryopreservation, which requires little room and upkeep.[18] Post-thaw viability and genetic stability have increased thanks to advancements in slow-freezing and vitrification methods.[19] For medicinal plants that are endangered by overharvesting, habitat loss, or climate change, ex situ conservation techniques are essential.[20]

ROLE OF BIOTECHNOLOGY IN CONSERVATION

Through tissue culture techniques, DNA barcoding, and molecular characterization, biotechnology improves both in situ and ex situ conservation. Ensuring the proper use and conservation of medicinal plants depends on accurate species identification made possible by DNA barcoding.[21] Elite genotypes can be mass-propagated with the use of somatic embryogenesis and synthetic seed synthesis.[22] To improve resistance to illnesses and environmental stress, genetic transformation approaches can be used.[23] Furthermore, by reducing the strain on wild populations, biotechnology promotes the sustainable use of plant resources.[24]

CHALLENGES AND FUTURE PROSPECTS

Even with improvements in conservation techniques and the shown effectiveness of herbal therapy, a number of problems still exist. These include overuse of medicinal plants, habitat degradation, a lack of established procedures for

herbal formulations, and a lack of community knowledge.[25, 26] Integrative frameworks that blend conventional wisdom with cutting-edge scientific instruments are desperately needed. To support the protection and use of medicinal plants, policies that support sustainable cultivation, equitable benefit sharing, and intellectual property rights are crucial.[27] Furthermore, more pharmacological research and clinical trials are needed to support the therapeutic claims of a variety of herbal therapies.[28]

CONCLUSION

Medicinal herbs offer natural therapeutic benefits with fewer side effects, making them excellent choices for controlling infertility due to their effectiveness, affordability, and cultural acceptance. Effective conservation measures are desperately needed, since the increasing demand for these plants threatens their survival. Plant biodiversity must be preserved using both in situ and ex situ techniques, which are aided by biotechnological instruments such as tissue culture and cryopreservation. The comprehension and responsible use of these resources can be improved by combining traditional knowledge with contemporary science. Policy changes must encourage moral harvesting, community engagement, and agricultural methods in order to guarantee sustainable use. To preserve these therapeutic herbs for present and future generations, a comprehensive strategy integrating research, custom, and conservation is essential.

REFERENCES

1. Agarwal A, Mulgund A, Hamada A, Chyatte MR. A unique view on male infertility around the globe. *Reprod Biol Endocrinol*, 2015; 13(1): 37.
2. Tiwari P, Nayak D, Mishra SK. Herbal remedies for infertility: A review. *J Pharm Sci Innov*, 2016; 5(5): 164–167.
3. Sinha S, Bhattacharya S, Dutta S. Natural antioxidants and their role in male infertility. *J Hum Reprod Sci*, 2013; 6(3): 177–185.
4. Ajayi GO, Akhigbe RE, Ajayi AF. Testiculoprotective and antioxidant effects of Moringa oleifera seed extract in rats. *Int J Appl Biol Pharm Technol*, 2012; 3(3): 194–199.
5. Canter PH, Thomas H, Ernst E. Bringing medicinal plants into cultivation: Opportunities and challenges for biotechnology. *Trends Biotechnol*, 2005; 23(4): 180–185.
6. Ahmad MK, Mahdi AA, Shukla KK, Islam N, Rajender S. Withania somnifera improves semen quality by regulating reproductive hormone levels and oxidative stress. *Fertil Steril*, 2010; 94(3): 989–996.
7. Kamel M. Effects of Nigella sativa on reproductive system: Review. *J Reprod Infertil*, 2013; 14(3): 166–170.
8. Ambiye VR, Langade D, Dongre S, Aptikar P, Kulkarni M, Dongre A. Clinical evaluation of the spermatogenic activity of the root extract of Ashwagandha. *Evid Based Complement Alternat Med*, 2013; 2013: 571420.
9. Ghosh S, Ghosh P. Evaluation of the aphrodisiac potential of Tribulus terrestris in albino rats. *J Pharm Res*, 2012; 5(3): 1441–1443.
10. Nair R, Kalariya T, Sumitra C. Antibacterial activity of some selected Indian medicinal flora. *Turk J Biol*, 2005; 29(1): 41–47.
11. D'Cruz SC, Vaithinathan S, Jubendradass R, Mathur PP. Effects of plants and plant products on the testis. *Asian J Androl*, 2010; 12(4): 468–479.
12. Hamilton AC. Medicinal plants, conservation and livelihoods. *Biodivers Conserv*, 2004; 13(8): 1477–1517.
13. Kala CP. Indigenous uses and structure of conservation value of sacred groves in Uttaranchal Himalaya, India. *Biodivers Conserv*, 2005; 14(5): 1271–1292.

14. Shrestha PM, Dhillion SS. Medicinal plant diversity and use in the highlands of Dolakha district, Nepal. *J Ethnopharmacol*, 2003; 86(1): 81–96.
15. Pei SJ. Ethnobotanical approaches of traditional medicine studies: Some experiences from Asia. *Pharm Biol*, 2001; 39(Suppl 1): 74–79.
16. Pence VC. In vitro collecting (IVC) and conservation of plant genetic resources. *In Vitro Cell Dev Biol Plant*, 2011; 47(1): 1–4.
17. Chawla HS. *Introduction to Plant Biotechnology*. New Delhi: Oxford and IBH Publishing; 2002.
18. Engelmann F. Use of biotechnologies for the conservation of plant biodiversity. *In Vitro Cell Dev Biol Plant*, 2011; 47(1): 5–16.
19. Reed BM. Plant cryopreservation: A practical guide. *Springer-Verlag*, 2008.
20. Havkin-Frenkel D, Belanger FC. Biotechnology in medicinal plants: Toward sustainable production of active ingredients. *Med Aromat Plant Sci Biotechnol*, 2008; 2(1): 1–12.
21. Techen N, Parveen I, Pan Z, Khan IA. DNA barcoding of medicinal plant material for identification. *Curr Opin Biotechnol*, 2014; 25: 103–110.
22. Rai MK, Asthana P, Jaiswal VS, Jaiswal U. Biotechnological advances in guava (*Psidium guajava* L.): Recent developments and prospects for future research. *Trees*, 2010; 24(1): 1–12.
23. Efferth T. Biotechnology applications of natural products. *Curr Opin Biotechnol*, 2019; 56: 172–178.
24. Ramaiah M, Pattanaik S, Kar B. Role of plant biotechnology in conservation of endangered medicinal plants. *J Pharmacogn Phytochem*, 2014; 3(4): 204–213.
25. Schippmann U, Leaman DJ, Cunningham AB. Impact of cultivation and gathering of medicinal plants on biodiversity: Global trends and issues. *Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries*, FAO; 2002.
26. Nirmal SA, Panichayupakaranant P. Challenges and strategies in quality control and standardization of herbal medicines: A review. *Pharmacogn Rev*, 2020; 14(27): 1–10.
27. WHO. *WHO Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants*. Geneva: World Health Organization; 2003.
28. Dorostghoal M, Seyyednejad SM, Jabari A. Antioxidant effects of *Fumaria officinalis* on spermatogenesis. *Andrologia*, 2013; 45(1): 52–58.