



A review on medicinal properties of endangered medicinal plants

Aditi Panpalia¹, Kriti Sharma², Khushbu Verma^{3*}

¹ Faculty of Agriculture and Veterinary Science, Jayoti Vidhyapeeth Women's University, Jaipur, Rajasthan, India

² Swami Vivekananda Yoga Anusandhana Samsthana, Bengaluru, Karnataka, India

³ Assistant Professor, Faculty of Agriculture and Veterinary Science, Jayoti Vidhyapeeth Women's University, Jaipur, Rajasthan, India

Abstract

Since ancient time, medicinal plants have been known for their uses in medical field to cure diseases. In the current scenario, herbal medicine uses are not only increasing day by day for disease cure, they are used as immunity booster as well. Because of the presence of natural active compounds such as secondary metabolites alkaloids, saponins, flavonoids and many other in the medicinal plants make them major source of medicinal properties. Present study is focused on the medicinal importance of medicinal plants such as Giloy (*Tinosporacordifolia*), Moringa (*Moringaoleifera*), Stevia (*Stevia rebaudiana*), Nagfani (*Opuntiadillenii*), Katkhranj (*Caesalpinia bonduc*) and Datura (*Daturastramonium*). This review is also focused on the comparative study of these medicinal plants uses in Ayurveda, Homeopathy, Unani and Modern medicine preparations. Present study's aim is also to explore these medicinal uses in all type of medicine field and medicinal importance of given medicinal plants to open the future research possibilities.

Keywords: medicinal plants, giloy (*tinoporacordifolia*), moringa (*moringaoleifera*), stevia (*stevia rebaudiana*), nagfani (*opuntiadillenii*), katkhranj (*caesalpinia bonduc*) and datura (*daturastramonium*)

Introduction

Over the last few decades the world has significantly seen an epidemic increase in population rise, inadequate supply of drugs, exorbitant cost of treatments, side effects of several synthetic drugs and the economic forum has always stated that the resources on earth are limited, and superlative use of available technology and new modificants will enhance the productivity to three folds and this has popularised the use of plant materials in sectors of medicines and agriculture for wide variety of human ailments (Chu *et al.*, 2012) [18]. Due to its rare or minimal side effect treating with medicinal plant examine very safe and important certitude arises that herbal treatments is independent of any age groups.

According to WHO, 80% people for primary health care in worldwide confide on herbal medicines (Bharati *et al.*, 2012). For the drug development which can be pharmacopoeial, non-pharmacopoeial and synthetic drugs; medicinal plants have been used due to a rich resources of ingredients (Singh, 2015) [30]. Apart from the medicinal uses, herbs are also used for industrial use such as natural dye, pest control, food, perfume, tea and so on. To prevent ants, flies, mice away from homes and offices many countries used different kinds of medicinal plant. For the pharmaceutical manufacturing medicinal plants considered as important source. The traditional medicine practitioners treat very effectively for the diseases such as diarrhoea, constipation, hypertension, low sperm count, dysentery and weak penile erection, piles, coated tongue, menstrual disorders, bronchial asthma, leucorrhoea and fevers are given by the traditional medicine practitioners very effectively (Boopalan *et al.*, 2012). Medicinal plants such as Giloy (*Tinosporacordifolia*), Moringa (*Moringaoleifera*), Stevia (*Stevia rebaudiana*), Nagfani (*Opuntiadillenii*), Katkhranj (*Caesalpinia bonduc*) and Datura (*Daturastramonium*) cure several common ailments and also considered as home remedies in many parts of the country (Munita and Arias 2016) [26]. It is known fact that lots of consumers are using guggul for making medicines, black tea, in traditional rituals and other activities in their day to day life (Jain and Nadguga 2012). Medicinal plants have been a resource for healing in local communities around the world for thousands of years around the world medicinal plant played a vital role for healing in local communities. The biological properties are responsible for the treatment of infectious diseases, due to the Active compounds produced during secondary metabolism which are alkaloids, glycosides, flavonoids, steroids (Rasool, 2012) [29]. For the treatment of diseases, medicinal plants play a significant role and attribute as synergy medicine, official medicine and preventive medicine. India is one of the country where almost all medicinal plants are cultivated and serve as major exporter of medicinal plant. Due to its important medicinal value we need to conserve the medicinal plants to various strategies such as ex-situ, in-situ and other cultivation practices (Amicet *et al.*, 2003).

Giloy

Giloy (*Tinospora cordifolia*) belongs to the family *Menispermaceae*. It is a shrub which grows on other trees. It is found in India, China, Australia and Africa. In ayurvedic medicine it is contemplated as an essential herbal plant. Plant stem is used for medicine (Pharmacopoeia 662,663). It contains many bioactive compounds which are used to treat many diseases seen in table 1.1 & 1.2

Table 1.1: Chemical constituents of Giloy

Chemical constituents	Medicinal property	References
Tannins Flavonoids Saponins	Anti-diabetic	(Alam <i>et al.</i> ,2002)
Betq-ecdysone	Anti-osteoprotic effect	(Bharati <i>et al.</i> ,2012)
Flavone	Anti-oxidant activity	(Chen <i>et al.</i> ,2011)
Choline Tinosporin Palmitate	Anti-toxic effects	(Chu <i>et al.</i> ,2012)

Table 1.2: Giloy use in Medicinal system

Parts of plants used	Medicinal system			
	Unani	Ayurvedic	Homeopathy	Modern
Leaves	-	Yes	-	-
Root	yes	-	-	-
Stem	-	-	-	Yes

Moringa

Moringa (*Moringa oleifera*) is a plant that belongs to the family of Moringaceae. It is also considered as a fast growing and drought resistant tree and also called a drumstick tree. It is found in India, Asia, Africa and South America. Due to its medicinal properties (Pharmacopoeia 422) and health benefits shown in table 2.1 & 2.2. It is used since ancient times.

Table 2.1: Chemical constituents of Moringa

Chemical constituents	Medicinal property	References
Quercetin	Anti-diabetic Cardioprotection	(Biswas <i>et al.</i> ,2011)
Chlorogenic acid	Anti-diabetic Anti-obesity	(Dong <i>et al.</i> ,2011)
Alkaloids	Cardioprotection	(Nakayama and Yamada 1995)
Beta-sitosterol	Cardioprotection	(Arora <i>et al.</i> ,2011)
Tannins	Anti-inflammatory	(Bomsere <i>et al.</i> ,1999)
Isothiocyanate	Anti-diabetes Anti-cancer	(Cui <i>et al.</i> ,2010)

Table 2.2

Parts of plants used	Medicinal system			
	Unani	Ayurvedic	Homeopathy	Modern
Leaves	yes	yes	-	-
Root	yes	yes	-	-
Stem	yes	yes	-	-

Stevia

Stevia, also called *Stevia rebaudiana*, is a plant that is a member of the Chrysanthemum family. Stevia is a sugar substitute made from the leaves of the stevia plant (Pharmacopoeia:-475). It is about 100 to 300 times sweeter than table sugar, but it has no carbohydrates, calories, or artificial ingredients. It is used to treat many diseases as shown in table 3.1 & 3.2.

Table 3.1: Chemical constituents of Stevia

Chemical constituents	Medicinal property	References
Phenol	Anti-inflammatory Anti-aging	(Abel and Busia 2005)
Coumarins	Prevent skin diseases	(Bishayee and Dhir 2012)

Saponins	Anti-diabetes Anti-obesity	(Kulhari <i>et al.</i> , 2013)
Flavonoids	Anti-allergic Anti-microbial	(Amicet <i>et al.</i> , 2003)
Steroids	Boost immune system	(Botterweck <i>et al.</i> , 2000)

Table 3.2: Stevia use in Medicinal system

Parts of plant used	Medicinal system			
	Unani	Ayurvedic	Homeopathy	Modern
Leaves	yes	yes	-	-
Stem	-	-	-	Yes
Root	-	yes	-	-

Nagfani

Some medicinal plants can be grown on Barren land and according to this local climate conditions. Nagfani (*Opuntia dillenii*) one of the medicinal and wild species which can be used for Cultivation in Barren Land Nagfani can be grown in Rajasthan (Pharmacopeia 177). It also contain many medicinal property as seen in table 4.1 & 4.2.

Table 4.1: chemical constituents of Nagfani

Chemical constituents	Medicinal property	References
Nictoflorin	Anti-inflammatory Neuroprotect	(Rakotoarivelo <i>et al.</i> , 2015)
Isorhamnetin	Anti-cancer	(Rasool 2012)
Gallic acid	Anti-oxidant	(Cai <i>et al.</i> , 2018)

Table 4.2: Nagfani use in Medicinal system

Parts of plant used	Medicinal system			
	Unani	Ayurvedic	Homeopathy	Modern
Whole plant	-	-	Yes	-

Katkaranj

It is an extensive climber, with finely downy gray branches armed with both hooked and straight hard yellow prickles. *Caesalpinia bonducella* L. (Family: Fabaceae) is an important medicinal plant, which is widely distributed in the tropical and subtropical regions of Asia and the Caribbean (Pharmacopeia 415, 108, 209). In Bangladesh, this plant is abundant in forests and village thickets of Dhaka, Chittagong, Khulna, Tangail, and North Bengal. This plant used to treat many infectious disease as shown in table 5.1 & 5.2

Table 5.1: chemical constituents of Katkaranj

Chemical constituents	Medicinal property	References
Alkaloids	Antidiaphoretic	(Pierro <i>et al.</i> , 2012)
Flavonoids	Anti-cytotoxicity	(Bhagyasree 2019)
Saponins	Anti-fungal	(Abel and Busia 2005)
Tannins	Anti-diaphoretic	(Munita and Arias 2016)
Glycosides	Anti-inflammatory	((Bomser <i>et al.</i> , 1999)

Table 5.2: Katkaranj use in Medicinal system

Parts of plants used	Medicinal system			
	Unani	Ayurvedic	Homeopathy	Modern
Leaves	yes	-	-	-
Seeds	-	-	-	Yes
Root	-	Yes	-	-

Datura

Datura is a genus of nine species of poisonous, vespertine-flowering plants belonging to the nightshade family Solanaceae. *Datura* (*Datura stramonium*) is herbaceous, leafy annuals and short-lived perennials, which can reach up to 2 m in height. The leaves are alternate, 10–20 cm long, and 5–18 cm broad, with a lobed or toothed margin. This plant contain crucial bioactive compound (Pharmacopeia 203) which used to treat diseases as shown in table 6.1 & 6.2.

Table 6.1: Chemical constituents of Datura

Chemical constituents	Medicinal property	References
Atropine	Treat vagal syncope Antidote for organophosphates	(Banning 2019)
Hyoscine	Antispasmodic	(Amicet <i>et al.</i> ,2003)

Table 6.2: Datura use in Medicinal system

Parts of plants used	Medicinal system			
	Unani	Ayurvedic	Homeopathy	Modern
Leaves	Yes	-	-	Yes
Seeds	Yes	-	-	Yes
Root	-	yes	-	-

Conclusion

As we know that our lifestyle is now getting technically competent, we are moving forth from nature. While we cannot get away from nature because we are fragment of nature. As herbs are pure natural products they are unbound from side effects, they are comparatively safe, eco-friendly and locally available. As compared to synthetic drugs herbal products are the hieroglyph of safety. Medicinal plants have various active compounds which have medicinal properties and their mode of action is very accurate to cure the diseases. Due to medicinal, flavouring and aromatic qualities of medicinal plants, they play a vital role for centuries. It's time to promote medicinal plants globally.

Acknowledgement

Authors are thankful to Hon'ble Late JV'n Dr. Panckaj Garg, Jayoti Vidyapeeth Women's University, Jaipur (Rajasthan) for his encouragement and blessings and Authors are also thankful to the University Management for providing the facilities of University Innovation Center and other laboratories.

References

1. Abel C, Busia K. An exploratory ethnobotanical study of the practice of herbal medicine by the Akan Peoples of Ghana. *Altern. Med. Rev.*,2005;10(2):111-122.
2. Akinpelu BA, Dare CA, Adebisin FI, Iwalewa EO, Oyedapo OO. Effect of stem - bark of *Erythrophleum suaveolens* (Guill. & Perri.) saponin on fresh water snail (*Lanistes lybicus*) tissues. *African Journal of Environmental Science and Technology*,2012;6(11):446-451.
3. Alam A, Khan N, Sharma S, Saleem M, Sultana S. Chemopreventive effect of *Vitis vinifera* extract on 12-*O*-tetradecanoyl-13-phorbol acetate-induced cutaneous oxidative stress and tumor promotion in murine skin. *Pharmacol. Res.*,2002;46(6):557-564.
4. Amic D, Davidovic-Amic D, Beslo D, Trinajstic N. Structure-Radical scavenging activity relationship of flavonoids. *Croatia Chem Acta*,2003;76:75-61.
5. Antony ML, Singh SV. Molecular mechanisms and targets of cancer chemoprevention by garlic-derived bioactive compound diallyltrisulfide. *Indian J. Exp. Biol.*,2011;49(11):805-816.
6. Arora N, Bansal MP, Koul A. *Azadirachta indica* exerts chemopreventive action against murine skin cancer: studies on histopathological, ultrastructural changes and modulation of NF-kappaB, AP-1, and STAT1. *Oncol. Res.*,2011;19(5):179-191.
7. Bharati S, Rishi P, Koul A. *Azadirachta indica* exhibits chemopreventive action against hepatic cancer: Studies on associated histopathological and ultrastructural changes. *Microsc. Res. Tech.*,2012;75(5):586-595.
8. Bhagyasree B, Mruthunjaya K, Paramakrishnan N, Suresh J. Guggul- A Treasure of Chemical Constituents. *Int. J. Pharmacogn. Phytochem.*,2019;11(2):49-52
9. Banning M. The carcinogenic and protective effects of food. *Br J Nurs*,2019;14(20):1070-1074.
10. Bishayee A, Dhir N. Resveratrol-mediated chemoprevention of diethylnitrosamine-initiated hepatocarcinogenesis: inhibition of cell proliferation and induction of apoptosis. *Chem. Biol. Interact.*,2012;179(2-3):131-144.
11. Biswas KR, Ishika T, Rahman M, Khan T, Swarna A, Monalisa MN *et al.* *Am. -Eurasian J. Sustain. Agric.*,2011;5(2):247-251.
12. Bomser JA, Singletary KW, Wallig MA, Smith MAL. Inhibition of TPA induced tumor promotion in CD-1 mouse epidermis by a polyphenolic fraction from grape seeds. *Cancer Lett*,1999;135(2):151-157.
13. Boopalan T, Arumugam A, Damodaran C, Rajkumar L. The anticancer effect of 2'-3'-dehydroalannol on triple-negative breast cancer cells. *Anticancer Res*,2012;32(7):2801-2806.
14. Botterweck AAM, Verhagen H, Goldbohm RA, Kleinjans J, Van den Brandt PA. Intake of butylatedhydroxyanisole and butylatedhydroxytoluene and stomach cancer risk: results from analyses in the Netherlands cohort study. *Food Chem. Toxicol*,2000;38:599-605.
15. British Pharmacopoeia. Vol. 4. UK: Council of Europe; 2014. British Pharmacopoeia Commission,2014;4:43-399.

16. Cai YZ, Luo Q, Sun M, Corke H. Antioxidant activity and phenolic compounds of 112 traditional Chinese medicinal plants associated with anticancer. *Life Sci*,2018;74:2157-2184.
17. Chen CY, Yang WL, Kuo SY. Cytotoxic activity and cell cycle analysis of hexahydrocurcumin on SW 480 human colorectal cancer cells. *Nat. Prod. Commun*,2011;6(11):1671-1672.
18. Chu YL, Ho CT, Chung JG, Rajasekaran R, Sheen LY. Allicin Induces p53-Mediated Autophagy in Hep G2 Human Liver Cancer Cells. *J Agric Food Chem*,2012;60(34):8363-8371.
19. Cui X, Jin Y, Poudyal D, Chumanevich AA, Davis T, Winds A *et al.* Mechanistic insight into the ability of American ginseng to suppress colon cancer associated with colitis. *Carcinogenesis*,2010;31(10):1734-1741.
20. Di Pierro F, Rapacioli G, Ferrara T, Togni S. Use of a standardized extract from *Echinacea angustifolia* (Polinaceae) for the prevention of respiratory tract infections. *Altern. Med. Rev*,2012;17(1):36-41.
21. Dong H, Bai LP, Wong VK, Zhou H, Wang JR, Liu Y *et al.* The in vitro structure-related anti-cancer activity of ginsenosides and their derivatives. *Molecules*,2011;16(12):10619-10630.
22. IPC. The Indian Pharmacopoeia Commission. Ghaziabad. Indian Pharmacopoeia,2014;3:165-284.
23. Jain N, Nadgauda RS. *Commiphora wightii* (arnott) bhandari—a natural source of guggulsterone: facing a high risk of extinction in its natural habitat. *Am. J. Plant Sci*,2013;04(06):57.
24. Kulhari A, Sheorayan A, Saxena N, Chander Mohan, Mangal M, Choudhary A *et al.* HPTLC analysis of guggulsteroneiso-mers in *Commiphorawightii* (Arn.) Bhandari: an endangered ole-gum species heading towards extinction. *Genet. Resour. Crop. Evol*,2013;60:1173-1180.
25. Mesrob B, Nesbitt C, Misra R, Pandey RC. High -performance liquid chromatographic method for fingerprinting and quantitative determination of E- and Z- guggulsterones in *Commiphoramukul* resin and its products. *J. Chromatogr. B Biomed. Appl*,1998;720:189-196
26. Munita JM, Arias CA. Mechanisms of antibiotic resistance. *Microbiol Spectr*,2016;4(2):doi:10.1128/microbiolspec.VMBF-0016-2015.
27. Nakayoma J, Yamada M. Suppression of active oxygen-indeed cyto- toxicity by flavonoids. *Biochem. Pharmacol*,1995;45:265-267.
28. Rakotoarivelo NH, Rakotoarivony F, Ramarosandratana AV, Jeannoda VH, Kuhlman AR, Randrianasolo A *et al.* Medicinal plants used to treat the most frequent diseases encountered in Ambalabe rural community, Eastern Madagascar. *J. Ethnobiol. Ethnomedicine*,2015;11(1):68.
29. Rasool Hassan B. Medicinal plants (importance and uses). *Pharmaceut. Anal. Acta*,2012;3:e139.
30. Singh R. Medicinal plants: A review. *J. Plant Sci*,2015;3(1):50-5.
31. Yuan H, Ma Q, Ye L, Piao G. The traditional medicine and modern medicine from natural products. *Molecules*,2016;21(5):559.
32. Antonisamy P, Agastian P, Kang CW, Kim NS, Kim JH. Anti-inflammatory activity of rhein isolated from the flowers of *Cassia fistula* L. and possible underlying mechanisms. *Saudi J. Biol. Sci*,2019;26(1):96-104.
33. Li W, Zhang X, Chen R, Li Y, Miao J, Liu G *et al.* HPLC fingerprint analysis of *Phyllanthusemblica* ethanol extract and their antioxidant and anti-inflammatory properties. *J. Ethnopharmacol*,2020;254:112740.
34. Shang A, Gan R-Y, Xu X-Y, Mao Q-Q, Zhang P-Z, Li H-B. Effects and mechanisms of edible and medicinal plants on obesity: An updated review. *Crit. Rev. Food Sci. Nutr*,2021;61:2061-2077.