

A Review on Subsistence and Significance of Medical Plants Available in Andhra University, Visakhapatnam

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Abstract- Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources. Many of these isolates were based on the uses of the agents in traditional medicine. India has several traditional medicinal systems, such as Ayurveda and Unani, which has survived through more than 3000 years, mainly using plant-based drugs. The Material medica of these systems contains a rich heritage of indigenous herbal practices that have helped to sustain the health of most rural people of India. World health organization (WHO, 1977) has considered medicinal plant may be 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. Knowledge of the sustainability of the use of such plant resources is urgently needed. Sustainability of the use of such plant resources can be assured with an understanding of the biological/ ecological, economic, socio-cultural and political aspects of resource base understanding of the complex interactions between many of these factors and with careful development of these high value medicinal plants. In this review paper such an effort has been made towards discussing the relevance of medicinal plants which are abundantly available in Andhra university campus.

Index Terms—Medicinal plants, Nature, Therapeutic purposes, Traditional medicinal systems, World health organization.

I. INTRODUCTION

India has standardized their own indigenous medicine and pharmacopoeia yet countries in Africa, despite the pressures of disease and the abundance of plant species, have not followed suit. Most of the existing texts on traditional medicine in Africa deal only with medicinal plants and their uses, ignoring chemical and pharmacological studies [1]. Reflecting the current interest in developing traditional medicine, there is lot of scope of studies to be done in developing the field of medicinal plants [2],[3]. From the earliest times, herbs have been prized for their pain-relieving and healing abilities and today we still rely on the curative properties of plants [4],[5]. According to world health organization, 80 % of the people living in rural areas depend on medicinal herbs as primary health care system. Plant extracted medicines have a vital role in the prevention and treatment of many diseases and medicinal plants are

commonly available and comparatively economical [6],[7]. A great deal of pharmaceutical research done in technologically advanced countries like USA, Germany, France, Japan and china has considerably improved quality of the herbal medicines used in the treatment of many diseases[8]-[10]. There are about 45000 medicinal plant species in India with concentrated spots in the region of Eastern Himalayas, Western Ghats and Andaman & Nicobar Island [11]. The officially documented plants with potential are 3000 but traditional practitioners use more than 6000. India is the largest producer of medicinal herbs and is called the botanical garden of the world[12]-[13]. There are currently about 2,50,000 registered medical practitioners of the ayurvedic system, as compared to about 7,00,000 of the modern medicine system. In rural India, 70 % of the population depends on the traditional type of medicine, the Ayurveda. Ayurveda form of medicine is believed to be existent in India for thousands of years [14]. It employs various techniques and the things to provide healing or relief to the ailing patients. One of the things that ayurveda uses is medications of plant origin [15]. Many herbs and spices are used in Indian cooking, such as onion, garlic, ginger, turmeric, clove, cardamom, cinnamon, Cumin, Coriander, fenugreek, fennel, ajowan, anise, amchur, bay leaf, hing etc [16], [17]. Ayurvedic medicine uses all of these either in diet or as a medicine. Some of these medicinal plants have been features on Indian postage stamps [18], [19]. The first set of stamps showing medicinal plants In recent years, research on medicinal plants has attracted a lot of attentions globally. Large body of evidences has accumulated to demonstrate the promising potential of medicinal plants used in various traditional, complementary and alternate systems of treatment of human diseases [20]. Plants are rich in a wide variety of secondary metabolites such as tannins, terpenoids, alkaloids, flavonoids, etc which have been found in in vitro experiments [20]- [23]. So now in the present work we are likely to present about few medicinal plants which are abundantly available in campus of Andhra University. Table I represents the difference in the usage of these selected medicinal plants in ancient and modern age.

Medicinal plants present in University campus: Many medicinal plants are present in the university

campus, but highly and very commonly known medicinal plants are mentioned here for an ease of understanding as a high number of plants may vex up the complexity in understanding the goodness of medicinal properties of these plants.

Cassia fistula: *Cassia fistula* Linn. (*Caesalpinaceae*), known as Indian laburnum is a medicinal plant of immense importance the tree is represented in Fig. 1. *Cassia fistula*, known as the golden shower tree and other names, is a flowering plant in the family Fabaceae, native to southern Asia, from southern Pakistan east through India to Myanmar and south to Sri Lanka. It is associated with the Mullai region of Sangam landscape. It is the national tree of Thailand, and its flower is Thailand's national flower [24]. It is also state flower of Kerala in India and of immense importance amongst Malayali population. It is a popular ornamental plant and is an herbal medicine. *Cassia fistula* is widely grown as an ornamental plant in tropical and subtropical areas. It blooms in late spring. Flowering is profuse, with trees being covered with yellow flowers, many times with almost no leaf being seen [25]. It will grow well in dry climates. The golden shower tree is the state flower of Kerala in India. Found frequently in all the forests of Andhra Pradesh, more commonly in dry deciduous forests of Telangana area and also represented (see Table.1).

Physical parameters of plant: Parameters of the golden shower tree are a medium-sized tree, growing to 10–20 m (33–66 ft) tall with fast growth. The leaves are deciduous, 15–60 cm (6–24 in) long, pinnate with 3–8 pairs of leaflets, each leaflet 7–21 cm (3–8 inches) long and 4–9 cm (1.5–3.5 in) broad. The flowers are produced in pendulous racemes 20–40 cm (8–15 in) long, each flower 4–7 cm diameter with five yellow petals of equal size and shape. The fruit is a legume, 30–60 cm (12–23 in) long and 1.5–2.5 cm (0.5–1 in) broad, with a pungent odor and containing several seeds. The seeds are poisonous.

Medicinal Properties: In Ayurvedic medicine, golden shower tree is known as *aragvadha*, meaning "disease killer". The root is considered a very strong purgative, and self-medication or any use without medical supervision is strongly advised against in Ayurvedic texts [26]. Though its use in her balism has been attested to for millennia, there has been rather little research in modern times. The purgative action is probably due to abundant 1, 8-dihydroxyanthraquinone and derivatives thereof. Many Fabaceae are a source of potent entheogens and other psychoactive compounds such as tryptamines, such plants are rarely found among the Caesalpinioideae. It is useful in treatment of boils and pustules, leprosy, ring worm, colic, dyspepsia, constipation, fever, diabetic, and cardiac problems¹. In Cambodia, the bark is used in dysentery². The stem bark is effective in suppressing

blood glucose levels and in prevention and management of coronary artery disease³. It has antioxidant activity, inhibition of per oxidation, O₂- and DPPH radical scavenging ability [27],[28]. Fallen cow and buff hides are tanned by East India tanning process using stem bark. The stem bark commonly known as "Tanner's bark of Cassia", is rich in tannin and produce a bright red dye, 1, 8-Dihydroxy-6-Methoxy-3-Me anthraquinone⁶. Two new flavonol glycosides, viz., 5, 7, 31, 41, - tetrahydroxy-6, 8-dimethoxyflavone-3-0-arabinopyranoside and 5, 7, 41-trihydroxy-6,8, 31- trimethoxyflavone-3-0-L-rhamnosyl (1 _2)-0-D-glucopyranoside were isolated⁷, Lupeol, - sitosterol and hexacosanol⁸; Fistucacidin, a leucoanthocynidin [30].

Azadirachta indica: *Azadirachta indica* (Neem Hindi), is a tree in the mahogany family Meliaceae. It is one of two species in the genus *Azadirachta*, and is native to Pakistan, India and Bangladesh growing in tropical and semi-tropical regions. Neem trees also grow in islands in southern part of Iran. This tree is called "Cherish" in Persian language. Its fruits and seeds are the source of neem oil. The tree is represented in Fig. 2.

Physical parameters of plant : Neem is a fast-growing tree that can reach a height of 15–20 metres (49–66 ft), rarely to 35–40 metres (115–130 ft). It is evergreen, but in severe drought it may shed most or nearly all of its leaves. The branches are wide spread. The fairly dense crown is roundish or ovular and may reach the diameter of 15–20 metres (49–66 ft) in old, free-standing specimens. The opposite, pinnate leaves are 20–40 centimetres (7.9–16 in) long, with 20 to 31 medium to dark green leaflets about 3–8 centimeters (1.2–3.1 in) long. The terminal leaflet is often missing. The petioles are short. The (white and fragrant) flowers are arranged axillary, normally in more-or-less drooping panicles which are up to 25 centimetres (9.8 in) long. The inflorescences, which branch up to the third degree, bear from 150 to 250 flowers. An individual flower is 5–6 millimetres (0.20–0.24 in) long and 8–11 millimetres (0.31–0.43 in) wide. Protandrous, bisexual flowers and male flowers exist on the same individual. Its leaf is approximately 5 to 10 cm long. The fruit is a smooth (glabrous) olive-like drupe which varies in shape from elongate oval to nearly roundish, and when ripe are 1.4–2.8 centimetres (0.55–1.1 in) by 1.0–1.5 centimetres (0.39–0.59 in). The fruit skin (exocarp) is thin and the bitter-sweet pulp (mesocarp) is yellowish-white and very fibrous. The mesocarp is 0.3–0.5 centimeter (0.12–0.20 in) thick. The white, hard inner shell (endocarp) of the fruit encloses one, rarely two or three, elongated seeds (kernels) having a brown seed coat. The neem tree is very similar in appearance to its relative, the Chinaberry (*Melia azedarach*) [29]. The Chinaberry tree is toxic to most animals, especially to fish, but birds are known to

gorge themselves on the Chinaberries, the seeds passing harmlessly through their unique digestive systems.

Traditional medicinal use: In India, the plant is variously known as "Sacred Tree," "Heal All," "Nature's Drugstore," "Village Pharmacy" and "Panacea for all diseases". Products made from neem trees have been used in India for over two millennia for their medicinal properties: neem products are believed to be anthelmintic, antifungal, antidiabetic, antibacterial, antiviral, contraceptive and sedative. It is considered a major component in Ayurvedic and Unani medicine and is particularly prescribed for skin disease.

Other uses of Neem: Neem is a key ingredient in non-pesticidal management (NPM), providing a natural alternative to synthetic pesticides. Neem seeds are ground into a powder that is soaked overnight in water and sprayed onto the crop. To be effective, it is necessary to apply repeatedly, at least every ten days. Neem does not directly kill insects on the crop. It acts as an anti-feedant, repellent, and egg-laying deterrent, protecting the crop from damage. The insects starve and die within a few days. Neem also suppresses the hatching of pest insects from their eggs. Neem cake is often sold as a fertilizer. Neem oil is used for preparing cosmetics (soap, neem shampoo, balms and creams such as Margo soap) [33]. Besides its use in traditional Indian medicine, the neem tree is of great importance for its anti-desertification properties and possibly as a good carbon dioxide sink. Practitioners of traditional Indian medicine recommend that patients with chicken pox sleep on neem leaves. Neem oil is non-drying and it resists degradation better than most vegetable oils. In rural India, it is commonly used to grease cart wheels.

Catharanthus roseus: *Catharanthus roseus* (Madagascar Periwinkle) is a species of *Catharanthus* native and endemic to Madagascar. Synonyms include *Vinca rosea* (the basionym), *Ammocallis rosea*, and *Lochnera rosea*; other English names occasionally used include Cape Periwinkle, Rose Periwinkle, Rosy Periwinkle, and "Old-maid"[34]- [36]. In the wild, it is an endangered plant; the main cause of decline is habitat destruction by slash and burn agriculture. It is also however widely cultivated and is naturalised in subtropical and tropical areas of the world and is represented in Fig. 3.

Physical features of plant: It is an evergreen subshrub or herbaceous plant growing to 1 m tall. The leaves are oval to oblong, 2.5–9 cm long and 1–3.5 cm broad, glossy green, hairless, with a pale midrib and a short petiole 1–1.8 cm long; they are arranged in opposite pairs. The flowers are white to dark pink with a darker red centre, with a basal tube 2.5–3 cm long and a corolla 2–5 cm diameter with five petal-like lobes. The fruit is a pair of follicles 2–4 cm long and 3 mm broad. As an ornamental plant, it is appreciated for its hardiness in dry and nutritionally deficient conditions,

popular in subtropical gardens where temperatures never fall below 5 °C to 7 °C, and as a warm-season bedding plant in temperate gardens. It is noted for its long flowering period, throughout the year in tropical conditions, and from spring to late autumn in warm temperate climates. Full sun and well-drained soil are preferred. Numerous cultivars have been selected, for variation in flower color (white, mauve, peach, scarlet and reddish-orange), and also for tolerance of cooler growing conditions in temperate regions. Notable cultivars include 'Albus' (white flowers), 'Grape Cooler' (rose-pink; cool-tolerant), the Ocellatus Group (various colors), and 'Peppermint Cooler' (white with a red centre; cool-tolerant).

Traditional medicinal use: The species has long been cultivated for herbal medicine and as an ornamental plant. In Ayurveda (Indian traditional medicine) the extracts of its roots and shoots, though poisonous, is used against several diseases. In traditional Chinese medicine, extracts from it have been used against numerous diseases, including diabetes, malaria, and Hodgkin's disease. The substances vinblastine and vincristine extracted from the plant are used in the treatment of leukemia. This conflict between historical indigenous use, and recent patents on *C. roseus*-derived drugs by western pharmaceutical companies, without compensation, has led to accusations of biopiracy. It can be dangerous if consumed orally. It can be hallucinogenic, and is cited (under its synonym *Vinca rosea*) in Louisiana State Act 159. In the Philippines, decoction of leaves used in diabetes³⁶. Decoction of young leaves used for stomach cramps. Root decoction for intestinal parasitism; as emmenagogue; may produce abortion. Infusion of leaves used for treating menorrhagia. Crude leaf extract has anticancer activity. Recent use of roots for anticancer applications. Roots used for dysentery. In Madagascar, the bitter and astringent leaves used as vomitive; roots used as purgative, vermifuge, depurative, hemostatic and toothache remedy. In Orissa, juice of leaves used as application to wasp stings. In Mauritius, infusion of leaves used for indigestion and dyspepsia. In Ayurveda, used for diabetes. In India, juice of leaves used for bee stings. In India, West Indies, and Nigeria used for diabetes. In Cuba and Jamaica, flower extract used for eyewash in infants. In the Bahamas, flower decoction used for asthma.

Ocimum tenuiflorum: *Ocimum tenuiflorum* is an aromatic plant in the family Lamiaceae which is native throughout the Old World tropics and widespread as a cultivated plant and an escaped weed [37]. The Holy Basil, known as the Tulsi in India, is sometimes termed "The Mother Medicine of Nature," due to its many health benefits which is presented in Fig.4. Basil is used in many recipes around the world, but in India, one variety is much more than a culinary herb. Even today, it is used by practitioners of Ayurveda, the Indian traditional system of

medicine. Moreover, it is worshiped by Hindus as a sacred plant for its miraculous healing properties [38].

Physical features of plant: It is an erect, much branched subshrub, 30–60 cm tall with hairy stems and simple, opposite, green leaves that are strongly scented. Leaves have petioles, and are ovate, up to 5 cm long, usually slightly toothed. The flowers are purplish in elongate racemes in close whorls. The two main morph types cultivated in India and Nepal are green-leaved (Sri or Lakshmi *tulsi*) and purple-leaved (Krishna *tulsi*).

Traditional medicinal use: *Tulsi* is cultivated for religious and medicinal purposes, and for its essential oil. It is widely known across South Asia as a medicinal plant and an herbal tea, commonly used in Ayurveda, and has an important role within the Vaishnavite tradition of Hinduism, in which devotees perform worship involving *tulsi* plants or leaves. *Tulsi* has been used for thousands of years in Ayurveda for its diverse healing properties. It is mentioned in the Charaka Samhita, an ancient Ayurvedic text. *Tulsi* is considered to be an adaptogen, balancing different processes in the body, and helpful for adapting to stress. Marked by its strong aroma and astringent taste, it is regarded in Ayurveda as a kind of "elixir of life" and believed to promote longevity. *Tulsi* extracts are used in ayurvedic remedies for common colds, headaches, stomach disorders, inflammation, heart disease, various forms of poisoning, and malaria. Traditionally, *tulsi* is taken in many forms: as herbal tea, dried powder, fresh leaf, or mixed with *ghee*. Essential oil extracted from *Karpoora tulsi* is mostly used for medicinal purposes and in herbal cosmetics, and is widely used in skin preparations due to its antibacterial activity. For centuries, the dried leaves have been mixed with stored grains to repel insects. Regular use of *Tulsi* leads to overall good health and vitality. It boosts the immune system and metabolism of the body, and is effective in treating allergies. *Tulsi* detoxifies the blood, and flushes out toxins from the body [27]. The juice is effective in treating bronchitis, coughs and colds, and other common ailments. Moreover, it enhances the use of oxygen in the body, and is thus useful in respiratory problems, like asthma. *Tulsi* contains antioxidants, which neutralize the harmful effects of free radicals, and thus arrests aging. It is also reputed to control degenerative conditions, like dementia, cancer, diabetes, heart problems and arthritis. *Tulsi* reduces inflammation and fevers, and cures headaches [32]. Due to its antibacterial properties, it is used to treat infectious diseases. *Tulsi* is supposed to be anti-carcinogenic. Traditional practitioners recommend taking a *Tulsi* leaf every day to prevent cancers. *Tulsi* lowers cholesterol and blood pressure, and thus prevents cardiac problems. It helps in digestion and absorption of nutrients by the body, by encouraging the secretion of digestive enzymes. Therefore, it also acts as an appetizer. Moreover, its carminative properties prevent gastric ulcers. It also controls *E.coli* and tuberculosis, and hastens the recovery

of patients with viral hepatitis and encephalitis. *Tulsi* has been proved good for periodontal health; a decoction can be used to cure toothache, and as a general mouth wash. The Ursolic acid has an anti-fertility effect, without any negative effects [39]. Some research points to the *Tulsi* as a protection against the ill effects of radiation. An interesting fact is that it does not contain any caffeine, yet acts as a vitalizer or quick "pick me up" to increase stamina and endurance. Finally, *Tulsi* relaxes the muscles, and acts as a stress buster. The small leaves of the *Tulsi* are packed with health enhancing properties, beneficial for the heart, lungs, immune and digestive systems [40]. *Tulsi* is also effective in preventing and treating a number of common ailments, and contributing to a general feeling of well being. Therefore, it is rightly called the "Queen of Herbs" in India.

II. CONCLUSION

The traditional medicinal systems of India such as Ayurveda and Unani are part of a time- tested culture and honoured by people still today. The plants used for various therapies are readily available, easy to transport and have a relatively long shelf life. The most important advantage of herbal medicine is the minimal side effects and relatively low cost compared to the synthetic medicines. The success of these medicinal plants are mainly depended on the awareness and interest of the farmers and as well as the stakeholders , supportive government policies and NGO. In conclusion, this article provides the knowledge about the general importance of medicinal plant whole over the world and specifically brief study on commonly available plants in Andhra University, so that awareness of the medicinal properties of these plants may help people to use it in the time of need. Also it is significant to exploit novel drugs from these plants.



Fig. 1: Binomial Name- Cassia Fistula



Fig. 2: Binomial Name- Azadirachta Indica



Fig. 3: Binomial name - *Catharanthus roseus*



Fig. 4: Binomial name- *Ocimum tenuiflorum*

REFERENCES

- [1] A. Allameh, M. Razzaghi, M. Shams, MB. Rezaee, and K. Jaimand, "Effects of neem leaf extract on production of aflatoxins and activities of fatty acid synthetase, isocitrate dehydrogenase and glutathione S-transferase *Aspergillus parasiticus*", *Mycopathologia*, vol.154, pp.79, 2002.
- [2] N. P. Biswas, and A. K. Biswas, "Evaluation of some leaf dusts as grain protectant against rice weevil *Sitophilus oryzae* (Linn.)", *Environment and Ecology*, vol.23(3), pp. 485, 2005.
- [3] Chatterjee, and Gautam, *Sacred Hindu Symbols*, Abhinav Publications, pp. 93, 2001.
- [4] J. Claus Peter, Sarah Diamond, and Margaret Ann Mills, *South Asian Folklore: An Encyclopedia*, Taylor & Francis, vol.619, 2003.
- [5] Chung-Jan Chang, "Pathogen city of Aster Yellows Phytoplasma and Spiro plasma citri on Periwinkle", 89th Annual Meeting of the American Phytopathological Society, 1997.
- [6] P. U. Devi, and A. Ganasoundari, "Modulation of glutathione and antioxidant enzymes by *Ocimum sanctum* and its role in protection against radiation injury", *Indian Journal of Experimental Biology*, vol. 37 (3), pp.262, 1999.
- [7] D, Flood Gavin, *The Blackwell companion to Hinduism*, Wiley-Blackwell, vol.331, 2001.
- [8] M. Ghorbanian, M. Razzaghi-Abyaneh, A. Allameh, M. Shams-Ghahfarokhi, and M. Qorbani, "Study on the effect of neem (*Azadirachta indica* A. juss) leaf extract on the growth of *Aspergillus parasiticus* and production of aflatoxin by it at different incubation times", *Mycoses*, vol.51, pp.35, 2007.
- [9] V. Guptha, Agrawal, Amulaya, and H.P. Tiwari, "Isolation and characterization of two flavonols and a xanthone glycoside from the stem bark of *Cassia fistula* Linn", *Indian Journal of Chemistry*, vol.28B(3), pp.282, 1989.
- [10] H. Golshahi, E. Ghasemi, E. Mehranzade, "Antibacterial activity of *Ocimum sanctum* extract against *E. coli*, *S. aureus* and *P. aeruginosa*, *Clinical Biochemistry*, 2011.
- [11] C. Karasov, "Who Reaps the Benefits of Biodiversity", *Environmental Health Perspectives*, vol. 109 (12), pp. 582, 2001.
- [12] K.R. Kirthikar, B.D. Basu, and L.M. Basu, *Indian Medical Plants*. vol.(2), pp.856, 1933.
- [13] S.K.Kothari, and Bhattacharya, "Volatile Constituents in Oil from Different Plant Parts of Methyl Eugenol-Rich *Ocimum tenuiflorum* L.f. (syn. *O. sanctum* L.) Grown in South India", *Journal of Essential Oil Research: JEOR*, 2008.
- [14] Kuhn Merrily, and David Winston, "Winston & Kuhn's Herbal Therapy & Supplements: A Scientific and Traditional Approach", Lippincott Williams & Wilkins, vol.260, 2007.
- [15] Ledwani, Lalitha, Singh, and Mukhtar, "Isolation and characterization of anthraquinones from stem bark of *Cassia* species", *Journal of Indian Chemical society*, vol. 83(4), pp.383, 2006.
- [16] S. Mondal, S. Varma, V. D. Bamola, S. N. Naik, B. R. Mirdha, M. M. Padhi, N. Mehta, and S. C. Mahapatra, "Double-blinded randomized controlled trial for immunomodulatory effects of Tulsi (*Ocimum sanctum* Linn.) leaf extract on healthy volunteers", *Journal of Ethno pharmacology*, vol.136 (3),pp. 452, 2011.
- [17] C.Marcone, A. Ragozzino, and E.Seemuller, "Dodder transmission of alder yellows phytoplasma to the experimental host *Catharanthus roseus* (periwinkle)", *Forest Pathology*, vol.27 (6), pp.347,1997.
- [18] A. Nirmala, A. Eliza, M. Rajalakshmi, Priya Edel, and P. Daisy, "Effect of hexane extract of *Cassia fistula* barks on blood glucose and lipid profile in streptozotocin diabetic rats", *International Journal of Pharmacology*,vol. 4(4),pp. 292, 2008.
- [19] NIIR Board, *Compendium of Medicinal Plants*, "National Institute of Industrial Research", vol. 320, 2004.
- [20] K. Parthasarathy, and D.H. Kamath, "Rural tanning technique. Improved method of EI tanning of hides using Avaram and Konnam barks and manufacture of chrome sole and waxed crome Soles ", *Leather science*, vol.21 (9), pp.309, 1974.
- [21] X. Peng, Y. Zhao, X. Liang, L. Wu, S. Cui, A. Guo, and W. Wang, "Assessing the quality of RCTs on the effect of beta-element, one ingredient of a Chinese herb, against malignant tumors", *Contemporary clinical trials*,vol. 27 (1),pp.70, 2006.
- [22] C. Padalia Rajendra, and S. Verma Ram, "Comparative volatile oil composition of four *Ocimum* species from northern India", *Natural Product Research*, vol.25 (6), pp.569 2011.
- [23] N.D. Prajapathi, S.S. Purohit, A.K. Sharma, and Tarun Kumar, "A Hand Book of Medicinal Plants", *Agrobios India, Jodhpur*, vol. 2, pp. 119, 2003.
- [24] P. Prakash, and N. Gupta, "Therapeutic uses of *Ocimum sanctum* Linn (Tulsi) with a note on eugenol and its pharmacological actions: A short review", *Indian Journal*

- of Physiology and Pharmacology, vol. 49 (2), pp. 125, 2005.
- [25] Puri Harbans Singh. Rasayana: "Ayurvedic Herbs for Longevity and Rejuvenation", CRC Press., vol.272, 2002.
- [26] Qingdi Q. Li, Gangduo Wang, Manchao Zhang, Christopher F. Cuff, Lan Huang, and Eddie Reed, "β- Elemene, a novel plant-derived antineoplastic agent, increases cisplatin chemo sensitivity of lung tumor cells by triggering apoptosis", *Oncology Reports*, vol. 22, pp.161, 2009.
- [27] V. Rai, U.V. Mani, and U.M. Iyer, "Effect of *Ocimum sanctum* Leaf Powder on Blood Lipoproteins, Glycated Proteins and Total Amino Acids in Patients with Non-insulin-dependent Diabetes Mellitus", *Journal of Nutritional and Environmental Medicine*, vol.7 (2), pp.113, 1997.
- [28] T.V. Rao, Padmanabha, and V. Venkateswarlu, "Fistucacidin from the bark and heartwood of *Cassia fistula*", *Bulletin of the National Institute of Sciences of India*, vol. 31, pp. 28, 1965.
- [29] M. Razzaghi-Abyaneh, A. Allameh, T. Tiraihi, M. Shams-Ghahfarokhi, and M. Ghorbanian, "Morphological alterations in toxigenic *Aspergillus* parasitic us exposed to neem (*Azadirachta indica*) leaf and seed aqueous extracts", *Mycopathologia*, vol. 159, pp. 565, 2005.
- [30] A.B. Sen, and Y.N. Shukla, "Chemical examination of *Cassia fistula*", *Journal of the Indian Chemical Society*, vol. 45(8), pp.744, 1968.
- [31] Sethi, Jyoti, Sood, Sushma, Seth, Shashi, Talwar, and Anjana, "Evaluation of hypoglycemic and antioxidant effect of *Ocimum sanctum*", *Indian Journal of Clinical Biochemistry*, vol.19(2), pp. 152, 2004.
- [32] P. Sharma, S. Kulshreshtha, and A.L. Sharma, "Anti-cataract activity of *Ocimum sanctum* on experimental cataract", *Indian Journal of Pharmacology*, vol. 30 (1), pp. 16–20, 1998.
- [33] P. Siddhuraju, P. Mohan, and K. Becker, "Studies on the antioxidant activity of Indian laburnam (*Cassia fistula* L.): a preliminary assessment of crude extracts from stem bark, leaves, flowers and fruit pulp", *Food chemistry*, vol. 79(1), pp.61, 2002.
- [34] J. Simoons Frederick, "Plants of life, plants of death", Univ of Wisconsin Press, vol. 7, 1998.
- [35] Staples, George, and Michael S. Kristiansen, "Ethnic Culinary Herbs", University of Hawaii Press, vol.73, 1999.
- [36] T. Suanarunsawat, T. Boonnak, W. D. Na Ayutthaya, and S. Thirawarapan, "Anti-hyperlipidemic and cardio protective effects of *Ocimum sanctum* L. fixed oil in rats fed a high fat diet", *Journal of Basic and Clinical Physiology and Pharmacology*, vol. 21 (4), pp. 387, 2010.
- [37] N. Toki K Saito, Y. Irie, F. Tatsuzawa, A. Shigihara, T. Honda, "7-O-Methylated anthocyanidin glycosides from *Catharanthus roseus*", *Phytochemistry*, vol. 69 (5), pp. 1215, 2008.
- [38] P K. Warriar, "Indian Medicinal Plants", Orient Longman, vol.168, 1995.
- [39] William Saunders, "U. S. Department of Agriculture, Catalogue of Economic Plants in the Collection of the U. S. Department of Agriculture", Washington D. C. June 5, 1891.
- [40] S. Zillur Rahman, and M. Shamim Jairajpuri, "Neem in Unani Medicine. Neem Research and Development Society of Pesticide Science", India, New Delhi. vol. 208, 1996.

Table I: Comparison in Usage of Medicinal Plants Both in Traditional and Modern Age

S.No	Comparison between use of medicinal plants both in traditional and modern age			
	Botanical Name	Family	Traditionally use	Modern uses
1	Azadirachta indica	Meliaceae	Anti-desertification properties.	Used as anthelmintic, antifungal, ant diabetic, antibacterial, antiviral, contraceptive and sedative
2	Cassia fistula	Fabaceae	In Ayurvedic medicine, golden shower tree is known as aragvadha, meaning "disease killer".	Derivatives of 1,8-dihydroxyanthraquinone is found .Fabaceae are a source of potent entheogens and other psychoactive compounds
3	Catharanthus roseus	Apocynaceae	Decoction of young leaves used for stomach cramps.	Used for deriving anti-cancer drugs, vincristine and vinblastine.
4	Aloe barbadensis	Xanthorrhoeaceae	It also improves human immune system and digestive system.	Aloe vera works as Anti-septic, Antibacterial, and Anti inflammatory. It cures Eczema, Diabetes, Arthritis and Prevent infections.
5	Ocimum tenuiflorum	Lamiaceae	The leaves are a nerve tonic and also sharpen memory. Chewing tulsi leaves relieves cold and flu. Basil juice is beneficial in the treatment of ringworm and other skin diseases.	Tulasi promotes optimum respiratory support. It has anti-microbial, anti-inflammatory, expectorant properties and is useful in respiratory tract infections. It also helps during respiratory stress.