

## **Review On Traditional Medicinal Plants In Aravalli District**

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### **Abstract**

Aravalli hill ranges are endowed with vast natural resources and abundant medicinal plant resources. Tribes and other communities of people who inhabit these regions depend on natural resources for their food, shelter, and for treating various diseases. The use of medicinal plant resources is practised since Vedic era. The traditional medicine practice plays a predominant role in the evolution of human culture because the medicinal plants have been used in the treatment of numerous diseases including epidemics. A systematic review of literature and web search was done to summarize various medicinal plants in the traditional practice by the natives of Aravalli region. There is a requisite to gather data about these medicinal plants as secondary metabolites derived from the wild plant species have high therapeutic value.

**Key Words:** Aravalli range, Traditional medicine practice, medicinal plants, therapeutic formulations, Northern Gujarat.

### **1. Introduction:**

The Aravalli range passes through the northern parts of Gujarat encompassing the districts of Mehsana, Banaskantha, and Sabarkantha. Aravalli district is in the north-eastern region of Gujarat that lies between the 23° 3' and 24° 37' Northern latitudes and 72° 15' and 73° 39' Eastern longitudes. This region encompasses an undulating terrain of Aravalli Mountains. These region has deciduous type of forests with rich biodiversity of flora and fauna. The common tribes present in this area are Dungari, Garasia Bhil, etc.

Traditional communities are mostly dependent on the collections of wild plant species for their livelihood and basic needs (Campbell et al., 1997) as they are easily accessible to native tribes of that region (Baquar, 1989; Singh and Gautam, 1997; Tripathi, 2000). An enormous amount of patented drugs that are prescribed to patients have the origin of wild medicinal plant species (Hamilton AC, 2004). Asia, Africa, and Latin America are the countries to be naturally enriched with numerous medicinal plant species.

In the 21st century, modern medicines like Allopathy have revolutionized the medical field, however the tribes inhabiting numerous hamlets of Aravalli mountain range mostly depend on traditional medicines of plant origin. It is because those tribes either have little or no access to health care services of the modern world. In India, tribal communities in the forest are the early practitioners of indigenous medicinal practices and was first observed by Kirtikar and Basu (1984), the ethno medicinal uses of plants was first studied by Jain (2015) and the aboriginal plant species in North Gujarat was recorded by Bhatt and Sabnis (1987) and by Punjani (1997, 2006).

Due to deforestation, migration, population load and other developmental projects in the Aravalli range (Rao, 1996) have exploited natural resources and the oral/ written form of knowledge transmitted from their ancestors to the upcoming generation is on the verge of extinction, so there arises a necessity for recording and documentation of their medicinal practices before its disappearance from the practice (Silori and Rana, 2000; Mujtaba and Khan, 2007). Indian government has undertaken a mission to precisely collect and document the traditional knowledge of aboriginals of forest regions (Anonymous, 1998). Several research works to record ethnobotanical aspects have been instigated in Aravalli hills, India (Sebastine and Bhandari, 1984; Singh and Shetty, 1987–1993; Katewa and Guria, 1997; Singh and Pandey, 1998; Katewa et al., 2001a,b; Katewa and Jain, 2003; Katewa et al., 2003). Majority of these studies includes investigational reports obtained from the field survey and there exist a lacunae in the scientific classification; identification of the plant species and in the discovery of plant based drugs. Our review article is proposed to review, reevaluate the ethno medicinal information to document the therapeutic formulations obtained from ethno medicinal plants of Aravalli hills.

## **2. Methodology**

Oral (non-codified) and written form of traditional medicinal practices and the research findings of many Indian research scholars was examined and studied carefully to retrieve data about medicinal plants, formulations obtained from the medicinal plants and the diseases that can be cured with the formulations. We reviewed the published research articles of several researchers in Scopus, NCBI (National Centre for Biotechnology Information), PubMed, Science Direct, Google Scholar, and conference proceedings which has relevant research findings like the therapeutic value of medicinal plants.

## **3. Observation and Discussion**

Several plant derived active compounds have been discovered with the help of ethno medical and ethno botanical information obtained from the region with rich floral biodiversity (Camey et al., 1999; Ajibesin et al., 2008 and Fabricant & Farnsworth, 2001). Ever since the period of ancient days, the Cairn's company is known for crude oil extraction from this region. After ban on the mining activities by our Supreme Court, there is a reduction in the deforestation. Prohibition of all the mining activities must be done in the Aravalli range to preserve biodiversity (Maffi, 2001; Jain et al., 2005). Endangered plant species and critically endangered species require special care and observation in order to conserve them before getting extinct. Due to the poor educational and financial background of these tribes, even traditional medical practitioners believe that disease is a form of God's punishment. Tribes above the age of 50 inhabiting the Aravalli hill range have had expressed about the decline of ethno medicinal plants in the recent decade (Parveen et al., 2007). Current generation of tribe depends more on allopathic medicine than the locally found medicinal plants.

### **3.1. Tribal communities in Aravalli**

Bhardwaj, M et al, 2011- Numerous tribal communities are present in the Aravalli hillock regions such as Meena, Garasiya, Kathodia Banjara, Rawat, Bheel, Gurjar, Patodia, Raigar, Berva, Vishnoi, Kumawat, Saharia, Mogya, Bawaria, Raot, Parmar, Ahari, Dindor, Kahar, Khati, Mali, Garia-Luhar and Meghwal. Tribal population interconnects with the wild species of plants

in all the socio-cultural and socio-religious events. In particular Vishnoi tribes are known for Biodiversity conservation and protested against deforestation during Chipko movement (*Gazella bennettii* and *Prosopis* sp.). Bheel, Garia-Luhar and Banjaras are the nomadic tribes whereas Vishnoi are found only in a particular area as they are poverty stricken, and have problems with ecological adaptation and linguistic issues. Garia-Luhar tribal population is enriched with ethno medicinal information about wild medicinal plants and wild edible plants. Banjara and Gujar tribes depend on animal husbandry for their livelihood and they carry much information regarding the fodder species. Mali tribe is acquainted with knowledge on floral biodiversity. These tribes religiously conserve the species like *Ficus* sp. pl, *Calotropis gigantea* (L.) R.Br., *Mitragyna parvifolia* (Roxb.) Korth. and *Ocimum* sp. pl.

### **3.2. Poisonous plants:**

In a study by Katewa SS et al., 2006, about 28 poisonous species of plants of 14 families present in the southern Aravalli hills of Rajasthan were studied and its toxicological and therapeutic significances were reported. The seeds, barks of root, latex were found to be the most poisonous part of the studied plants. Some plants are poisonous to both livestock and human population and some other plants are poisonous to humans. The compounds when consumed in regulated smaller doses its therapeutic value is achieved, while in greater quantity, it exhibits poisonous effects. For example, the bark extracts of *Alangium salvifolium* is used by the tribals to treat hypertension when used in larger doses it cools the body and causes irregular respiration.

### **3.3. Wetland and aquatic plants in Aravalli district of Gujarat:**

Mukesh M Patel (2018), studied and reported about the aquatic plant species belonging to the wetlands in the aravalli district of Gujarat. The tribal people residing in the Aravalli area used wetland and aquatic species for treating several human ailments. 18 such plant species were reported belonging to 13 Angiosperm families which is used in treating ailments such as cough, cold, diarrhoea, dysentery, Belly enlargement, bone fractures, insanity, Cracks, wounds and dermatological disorders, etc. The reported plants belong to the following families: Asteraceae (3 plants), Commelinaceae (2 plants), Convolvulaceae (1 plant) and Scrophulariaceae (1 plant). The tribal people of Aravalli district are enriched with knowledge about the medicinal flora, which

are the significant sources of medicinal compounds. The ethno medical details of aquatic plants with its scientific name, family, vernacular name, and parts used in medicinal formulations and medicinal uses are tabulated below in Table 1.

**Table 1. Ethno medicinal values of Aquatic and Wetland plants from Aravalli**

| S.No. | Scientific name /Family<br>/ Local name                                     | Ethno medicinal uses                                                                                                               | References                                  |
|-------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| 1.    | <i>Acmella calva</i> (DC.)<br>R.K.Jansen Asteraceae /<br>Akkalgaro          | Tender leaves are used in treating flu and cough                                                                                   | Panda T and Padhy RN, 2008; Punjani BL 2006 |
| 2.    | <i>Acmella paniculata</i> (Wall. ex DC.) R.K.Jansen, Asteraceae / Akkalgaro | Leaves decoction is used as cough syrup and in treating fever                                                                      | Patel RS, 2003                              |
| 3.    | <i>Alternanthera sessilis</i> (L.) DC. Amaranthaceae                        | Tender shoot and leaf is boiled and roasted and given to treat dysentery problems. It is also used to treat gastric related issues | Jeeva S et al., 2006                        |
| 4.    | <i>Centella asiatica</i> (L.) Urb. Apiaceae / Brahmi                        | One teaspoon of whole plant juice is consumed twice a day for up to a month to cure mental illnesses                               | Ramachandra RP et al, 2003                  |

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|-----|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 5.  | <b><i>Colocasia esculenta</i></b> (L.)<br>Schott Araceae / Alavi.          | Rhizome and tender leaves are cooked and eaten as nutritious vegetables                                                                       | Jeeva S et al., 2006                  |
| 6.  | <b><i>Commelina benghalensis</i></b><br>L. Commelinaceae /<br>Shishmuliyu  | Aerial Shoot and tender leaves and shoots are cooked and eaten as a vegetable. Paste obtained from shoot and leaves is used in bone fracture. | Kirtikar KR, Basu BD 1984             |
| 7.  | <b><i>Commelina diffusa</i></b> Burm.<br>f. Commelinaceae /<br>Shishmuliyu | Paste is made from stem and leaves and used in the treatment of bone fractures.                                                               | Ramachandra RP et al., 2003           |
| 8.  | <b><i>Cynodon dactylon</i></b> (L.)<br>Pers. Poaceae / Darbh               | Plant juice is used in the treatment of piles and to treat cuts and wounds.                                                                   | Jeeva S et al., 2006                  |
| 9.  | <b><i>Eclipta prostrata</i></b> (L.)<br>Mart. Asteraceae /<br>Bhangaro     | Shoot juice with few drops of mustard oil is given in diarrhea                                                                                | Prashant kumar P, Vidyasagar GM, 2008 |
| 10. | <b><i>Hydrilla verticillata</i></b> (L. f.)<br>Royle Hydrocharitaceae      | Whole plant Tender leaves and rhizome are cooked and eaten as                                                                                 | Ramachandra RP et al., 2003           |

|     |                                                                                     |                                                                                                                                        |                                             |
|-----|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
|     |                                                                                     | vegetable                                                                                                                              |                                             |
| 11. | <b><i>Ipomea aquatica</i></b> Forsk.<br>Convolvulaceae /<br>Nanibhaji               | Tender leafy shoots are eaten fried or cooked. About 30 to 50 ml of leaf extract is orally taken to control bleeding during childbirth | Kirtikar KR, Basu BD 1984                   |
| 12. | <b><i>Ipomoea fistulosa</i></b> Mart. ex<br>Choisy Convolvulaceae /<br>Naffat       | Tender leafy shoots are eaten fried or cooked. About 30 to 50 ml of leaf extract is orally taken to control bleeding during childbirth | Jeeva S et al., 2006                        |
| 13. | <b><i>Lindernia crustacea</i></b> (L.)<br>F. Muell. Scrophulariaceae                | Whole plant Whole plant is used to cure Skin diseases                                                                                  | Prashant kumar P,<br>Vidyasagar GM,<br>2008 |
| 14. | <b><i>Nelumbo nucifera</i></b> Gaertn.<br><i>Nelumbonaceae</i> / Kamal<br>Seeds and | Flowers Seeds are used as raw, flowers and leaves are used in religious aspect and in rituals                                          | Jain SK, 1991                               |

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|-----|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 15. | <i>Ricinus communis</i> L.<br>Euphorbiaceae / Aeranda                       | Boiled leaves in lukewarm condition are spread over painful abdomen and then bandaged twice a day for two days to get relief from abdominal pain | Ramachandra RP et al., 2003 |
| 16. | <i>Trapa natans</i> L. Trapaceae<br>/ Shingoda                              | Fruit and Seed Seeds are eaten raw. Raw fruits are used raw in the treatment of diarrhea                                                         | Panda T and Padhy RN, 2008  |
| 17. | <i>Typha domingensis</i> Pers.<br>Typhaceae / Gha bajariyu<br>Inflorescence | The fresh powdered inflorescence of this plant is spread over the fresh cut to stop bleeding and fast healing of the cut                         | Panda T and Padhy RN, 2008  |

### 3.4. Wormicidal and Insecticidal plants from Aravalli district

Bhardwaj M (2011) carried out an ethnobotanical survey amongst the tribes of Aravalli and reported information about the plants that possessed insecticidal and wormicidal activities (Table 2). The research findings included identification and taxonomic classification of 67 remedies with 49 plants species from 29 families. *Mitragyna parvifolia* (Roxb.) Korth. was first reported to have ethnomedicinal values against worms and insects. Active pharmaceutical ingredients derived from these species of plants may serve as novel drugs in therapy. This survey (Table 2) also emphasized on the information source of medical practitioners of tribal community and traditional medicinal plant researchers that would be helpful in the strategic development for conservation of these plants and as well as the traditional knowledge.

**Table 2: Medicinal uses of Wormicidal / Insecticidal plants from Aravalli district**

| S.No. | Scientific Name,<br>Family name/ Local Name                         | Plant Parts used in formulations and its wormicidal/<br>insecticidal uses                                                                                                                                                                                                                 |
|-------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.    | <i>Mitragyna parvifolia</i> (Roxb.)<br>Korth.<br>(Lamiaceae) Kadamb | 100 ml of warm water is added to 20 g of root and the root juice is extracted and applied onto scalp to get rid of lice                                                                                                                                                                   |
| 2     | <i>Ocimum basilicum</i> L.<br>(Lamiaceae) Ban Tulsi                 | 10 g of whole plant (shoot part) is mixed with 100 ml of lukewarm water and is orally consumed as anthelmintic drug.                                                                                                                                                                      |
| 3.    | <i>Aegle marmelos</i> L. Wild-<br>(Rutaceae) Bel                    | Fruit juice is extracted by adding 50 g of fruit pulp in 100 ml milk and is orally taken with goat/cow milk as anthelmintic agent                                                                                                                                                         |
| 4.    | <i>Withania somnifera</i> L. wild<br>(Solanaceae) Ashwagandha       | <ul style="list-style-type: none"> <li>Any plant part (shoot, root, flowers, bark) is crushed and applied topically to protect from fly and mosquito bite.</li> <li>Mixture of 2.5 g fruit and leaves in 500 ml warm water functions as insect repellent while applied on skin</li> </ul> |

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|----|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5. | <i>Curcuma aromatica</i><br>(Zingiberaceae) Haldi                   | Tubers (5 g of powdered tuber mixed with 100 ml of milk) is orally taken to get rid of intestinal worms                                                                                                                                        |
| 6. | <i>Tribulus terrestris</i> L.<br>(Zygophyllaceae) Gokhru            | 50 g of shoot part is macerated with 100 ml of water and sieved to extract its juice which is used topically on skin to repel away the mosquitoes                                                                                              |
| 7. | <i>Ocimum americanum</i> L.<br>(Lamiaceae) Ram Tulsi                | Leave juice is applied over skin as mosquito repellent                                                                                                                                                                                         |
| 8. | <i>Punica granatum</i> L.<br>(Punicaceae)                           | Root juice (20 g of root macerated in 100 ml water, crushed and sieved) is orally consumed as an anthelmintic agent<br><br>Bark juice (20 g of bark macerated in 100 ml water, crushed and sieved) is orally consumed as an anthelmintic agent |
| 9. | <i>Picrorhiza kurroa</i> Royle ex Benth<br>(Scrophulariaceae) Kutki | 5 g of rhizome which is in powder form is applied directly on anus to get rid of pinworms                                                                                                                                                      |

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| 10. | <i>Cymbopogon jwarancusa</i> (Jones) Schult. (Poaceae)<br>Buraro | Leave juice is mixed with water to take bath; functions as mosquito repellent                      |
| 11. | <i>Ficus cordifolia</i> Roxb. Wild (Moraceae) Paras Pipal        | Fresh Fruit juice (25 g fruit pulp mashed in 100 ml milk) is consumed to ward off intestinal worms |
| 12. | <i>Dodonaea viscosa</i> (L.) Wild (Sapindaceae) Kherata          | Inflorescence paste is prepared in water and consumed orally to kill intestinal worms              |

### 3.5. Ethnomedicinal uses of plant species in Aravalli district of Gujarat

In a study by Punjani B et al. (2015), ethnomedicinal field trips were carried out in the tribal villages of Banaskantha district, Gujarat for the documentation of traditional and herbal medicinal plants used by the native residents for the medicinal purpose. The study indicated that the native residents predominantly depend on the medicinal flora for curing several diseases. This study documented about 24 plant species which belong to 22 genera of 20 Angiosperm families. These medicinal plants are used by the tribals of this area for treating various human diseases like cough, cold, inflammation, eye diseases, skin related diseases, gastric complaints, joint diseases, mumps, kidney disorders, blood disorders, asthma and tuberculosis. In this study, it was also observed that out of a total of 20 families, only 4 families such as Asteraceae, Moringaceae, Combretaceae, and Papilionaceae contributed the highest number of species, the remaining 16 families contributed only one species each, used in the medicinal treatment. Out of 22 genera reported in this study, only Anogeissus and Moringa constitute 2 species each, while the remaining 20 genera comprised only single species. In most of the observations, the

medicines are given from a distinct single plant rather than the formulations prepared from the multiple plants.

**Table 3: Ethnomedicinal uses of plantspecies in Aravalli district of Gujarat**

| <b>Medicinal Plant name,<br/>Family name/local<br/>name</b>               | <b>Medicinal uses and formulations</b>                                                                                                                                                                                                                                                                                                                                           | <b>References</b>       |
|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b><i>Abrus precatorius (L.)</i></b><br><br>Papilionaceae /<br>Chanothi   | Cough and Cold: 10 g of dried root powder mixed in water is consumed two times per day for 2 to 3 days<br><br>Mouth Ulcer: Fresh leaves are manducated and eaten as the juice is known for treating mouth ulcers                                                                                                                                                                 | Tirkey Amia, 2006       |
| <b><i>Acacia nilotica (L.) Del.</i></b><br><br>Mimosaceae /<br>Deshibaval | Toothache: The tender stem twig is used for 2 to 3 days as a toothbrush<br><br>Piles: One teaspoonful root juice is given orally 3-4 days to once a day to cure piles.<br><br>Eye diseases: A cut is made in the root to collect the fluid that oozes out from the root. The fluid is used as eye drops to treat redness of eye and to reduce the feeling of burning in the eye. | Venkata RK et al., 2008 |

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| <i>Aegle marmelo</i> es (L.) /<br>Rutaceae / Bili         | <b>Sunstroke-</b> Fruit is crushed to obtain juice and mixed with a litre of water and is consumed once a day to reduce body heat<br><b>Diabetes-</b> Extracted leaf juice mixed with a cup of water, is given thrice a day for a couple of weeks to treat hyperglycemia | Khan M et al., 2010                      |
| <i>Ageratum conyzoides</i> L.<br><br>Asteraceae / Galjibh | <b>Boils-</b> Such fresh lukewarm leaves are applied topically around the affected area, and then bandaged once a day for two-three days to cure tumour in any parts of the body or in the neck                                                                          | Chhetri DR, 2005                         |
| <i>Alangium salvifolium</i> (L.f.)                        | <b>Fever-</b> The decoction of the root is consumed<br><b>Boils-</b> Leaves in lukewarm condition is applied on the boils                                                                                                                                                | Panda & Padhy, 2008                      |
| <i>Aloe barbadense</i> L.<br>Liliaceae / Kuvarpathu       | <b>Piles-</b> Leaves are crushed and the juice is consumed in the morning for 8-10 days<br><b>Hair-care-</b> The leaf pulp extract is applied on the scalp every night to treat premature falling of hair. A spoonful of leaf juice is orally taken to treat the same.   | Chaudhary M et al., 2008; Shah NC, 2012. |

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| <b><i>Annona squamosa</i> L.</b><br>Annonaceae / Sitaphal                | <b>Injuries-</b> About 5-7 drops of fresh extracts of leaf is applied on the wound area twice a day to induce healing by controlling bleeding, and disinfecting the wounded area.                                                                                                                                    | Anonymous, 1998                                 |
| <b><i>Anogeissus sericea</i></b><br>Brandis / Combretaceae / 'Aendrokh'. | Belly enlargement: Leaf Boiled leaves in lukewarm condition (100 g approx.) are spread over affected area which was previously applied with ghee/ oil and bandaged with cotton cloth once a day up to two days to get relieve from                                                                                   | Anonymous, 1998                                 |
| <b><i>Argemone mexicana</i> L.</b><br>/ Papaveraceae / Darudi            | Skin diseases: The root paste is applied and tied on the affected skin areas to treat ringworm infection and its decoction is used in treating roundworm infections.                                                                                                                                                 | Anonymous, 1998                                 |
| <b><i>Azadirachta indica</i> A. Juss.</b>                                | Gynecological problems: 200 g of flowers is crushed and added with fresh leaf paste of 10 leaves and is consumed with water in the morning and night for 2-3 days to regulate excessive bleeding during menstruation.<br>Tuberculosis: A spoonful of seed oil is given twice/ day for a month to treat tuberculosis. | Jadhav Dinesh. 2006; Gupta Mradu, Shaw BP, 2009 |

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| <b><i>Bombax ceiba</i> L.</b>                                                 | Diarrhoea: A spoonful of stem bark juice is taken orally twice a day for upto three days                                                                                                                                                                                                | Anonymous, 1998                            |
| <b><i>Boswellia serrata</i> Roxb</b>                                          | Antidote: 25 g fresh boiled leaves in lukewarm condition spread over affected area and then bandaged once a day for three days to reduce swelling and poisonous effect caused due to insect bite.                                                                                       | (Goel & Mudgal, 1988)                      |
| <b><i>Butea monosperma</i></b>                                                | Antidote: The seed is crushed and made into a paste and spread on the surface of skin twice for a couple of days to ward off the toxicity effect at the site of bite.<br><br>Dental problem: 1 g of the powdered gum is applied in the achy tooth to ameliorate pain in teeth and gums. | Jain et al., 2008; Mishra and Shakun, 2008 |
| <b><i>Capparis sepiaria</i> L. / Capparaceae / 'Kanthar'. Part used: Root</b> | Mumps: Paste of 50 g root of 'Kanthar' [ <i>Capparis sepiaria</i> L. (Capparaceae)] and 20 g seed of 'Kalijiri' [ <i>Vernonia anthelmintica</i> (L.) Willd. (Asteraceae)] is applied topically on cheeks for once a day up to two days to reduce swelling due to mumps.                 | Jadhav Dinesh, 2006                        |

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| <p><b><i>Calotropis procera</i></b><br/><b>(Ait) R.Br</b></p> <p>Asclepiadaceae /<br/>Nanaakado</p>                               | <p>2-4 drops of latex is applied thrice a day in the affected areas for at least two days to remove the stuck thorn from the human body.</p>                                                                                                                  | <p>Kumar S and Chauhan AKS, 2006; Upadhyay et al., 2005</p> |
| <p><b><i>Cassia fistula</i> L.</b></p> <p><b>Caesalpiaceae /</b><br/><b>Garmalo</b></p>                                           | <p>Headache: Fresh Paste of leaves is topically applied over forehead to get rid of headache</p>                                                                                                                                                              | <p>Nadanakunjidam S &amp; Abirami S, 2005</p>               |
| <p><b><i>Citrullus colocynthis</i></b><br/><b>(L.)</b></p> <p>(Kanwar et al., 2006)</p>                                           | <p><b>Skin diseases</b><br/>The paste prepared from fresh root is topically applied on the affected part of skin to ward off fungal diseases (itching ringworm)</p>                                                                                           | <p>Panda T &amp; Padhy RN, 2008</p>                         |
| <p><b><i>Dichrostrachys cinerea</i></b><br/><b>(L.) W. &amp; A. /</b><br/><b>Mimosaceae / 'Medol'.</b></p> <p>(Punjani, 2006)</p> | <p>Stem bark Paste is applied topically over affected part on the skin for rupturing and fast healing of the boil.</p> <p>Diarrhoea: Leaf extract mixed with a teaspoonful of fine sugar is consumed orally once a day for to cure diarrhoeal infections.</p> | <p>Punjani BL, 2006</p>                                     |
| <p><b><i>Emblica officinalis</i></b><br/><b>Gaertn. / Euphorbiaceae</b></p>                                                       | <p>Physical weakness: A teaspoonful of dried fruit powder mixed with equal quantity of honey, is given twice orally for a week to treat</p>                                                                                                                   | <p>Anonymous, 1998</p>                                      |

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| / Amla                                                                                  | physical weakness.                                                                                                       |                          |
| <b><i>Euphorbia tirucalli</i> L.</b><br>Euphorbiaceae /<br>Kharsani                     | Dental problem: Fresh latex soaked Cotton is kept on painful molars or achy tooth to ameliorate gum pain and toothache   | Prasad, 2011             |
| <b><i>Ficus benghalensis</i> L.</b><br>Moraceae / Vad[                                  | <b>Asthma-</b> A teaspoon of fresh leaf extract is taken along with honey once a day for upto a week to cure asthma.     | Anonymous, 1998          |
| <b><i>Grewia flavescens</i> Juss</b><br>Tiliaceae / Trambath                            | <b>Bone fracture-</b> Every morning, 200-300 ml decoction of fresh branches/stem is given orally until bone gets normal. | Venkata Ratnam, 2008     |
| <b><i>Holoptelea integrifolia</i> (Roxb.)</b>                                           | Skin diseases: The fresh paste of leaves is applied twice on the skin everyday to cure ringworm.                         | Jain et al, 2008         |
| <b><i>Holostemma annularium</i> (Roxb.) K. Schum. /</b><br>Asclepiadaceae /<br>'Bhatto' | cough and cold: About 5 cm piece of root is chewed and the juice is swallowed slowly thrice a day for two days to cure   | (Sudhakar & Rolla, 1985) |

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| <b><i>Helicteres isora</i> L. /<br/><i>Sterculiaceae</i> /<br/>'Maradsing'</b>                    | Filtered fruit mixture is given orally twice a day for 2-3 day to cure diarrhea.                                                                       | Katewa & Galav, 2006; Udayan et. al, 2008) |
| <b><i>Kirganelia reticulata</i> (Poir.) Baill</b><br><br>/ <i>Euphorbiaceae</i> /<br>Kamboi       | Diarrhoea- Fresh leaf extract is taken orally once for two to three days<br><br>Dental problems The tender stem twig is used as a toothbrush.          | Shruthi SD, 2010                           |
| <b><i>Leptadenia pyrotechnica</i> (Forsk.) Decne. /</b><br><br><i>Asclepiadaceae</i> /<br>'Khip'. | Tuberculosis (TB): 500 g of tender stem is boiled with a liter of water. Two teaspoon of cooled filtrate is taken orally twice a day for upto a month. | (Nagendra & Abraham, 1983)                 |

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| <b><i>Madhuca indica</i> J.F. Gmel</b><br>Sapotaceae / Mahudo | Bone fracture: The flower petals in lukewarm condition is tied over the affected part for a month to treat bone fracture and to decrease inflammation at the site of dislocation. | Venkata Ratnam, 2008                |
| <b><i>Moringa concanensis</i> Nimmo</b>                       | About 15 g powdered gum in heated and spread over wounds for inducing healing and preventing pus formation.                                                                       | Khawaja et al., 2010, Kumar A, 2012 |
| <b><i>Mucuna purita</i> Hk.f.</b><br>Papilionaceae / Kuvech   | <b>Spermatorrhoea-</b> A teaspoon of seed powder is taken along with lukewarm milk every morning for two weeks to treat sexual debility.                                          | Lampariello LR et al., 2012         |
| <b><i>Pergularia daemia</i> (Forsk.) Choiv</b>                | <b>Skin diseases-</b> The fresh latex of the plant is applied topically over affected part on the skin to cure itching and ringworm infections.                                   | B Mahadev et al., 2015              |
| <b><i>Phyllanthus fraternus</i> G.L. Webster</b>              | <b>Diabetes-</b> 5 gm of leaf is taken and crushed along with a cup of water. The filtrate obtained is given orally once a day for at least two week to cure diabetes.            | Hukeri VI, et al., 1988             |

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|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b><i>Plumbago zeylanica</i> L.</b>                                                        | Ringworm: The paste of fresh crushed root is topically applied on the infected area once a day.                                  | (Punjani, 2006)              |
| <i>Pterocarpus marsupium</i><br>Roxb.var. <i>Acuminatus</i> .<br>Papilionaceae / 'Biyo'.   | A teaspoon of powdered bark is consumed with water every day morning for up to five days to treat menorrhoea                     | Punjani, 2006                |
| <b><i>Prosopis chilensis</i></b><br><b>(Molina) Stunze</b> /<br>Mimosaceae /<br>Gandobaval | <b>Boils-</b> The paste of fresh leaves is applied topically daily twice to cure over affected part to cure abscess or boils.    | Jain Rajendra , 2015         |
| <b><i>Solanum indicum</i> L.</b><br>Solanaceae /<br>jan gir in gani                        | <b>Dental problem-</b> The tender stem twig chewed and the juice is swallowed slowly thrice a day until cured to cure toothache. | Suresh patel et al.,<br>2014 |
| <b><i>Syzygium heyneanum</i></b><br>Wall. ex W. & A. /<br>Myrtaceae / 'Makan<br>jambu'.    | Bark Paste is applied topically over affected part on the skin to cure wounds.                                                   | Warrier et al., 1995         |

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| <b><i>Tephrosia villosa</i> (L.) Pers</b>                                   | Boils: The leaf paste is applied topically around the affected area, and then bandaged once a day for two days to cure boils.                                      | (Panda & Padhy, 2008)         |
| <b><i>Tinospora cordifolia</i> (Wild.) Miers. / Menispermaceae / Galo</b>   | Diabetes: One teaspoonful of powdered stem along with water given orally once daily morning for two weeks to cure and control diabetes.                            | Sharma R et al., 2015         |
| <b><i>Tridax procumbens</i> L. / Asteraceae / ‘Pardeshi bhangro’</b>        | Cut and wounds: Juice of the plant is filled in the fresh wound to prevent pus formation and for fast healing                                                      | (Ramachandran and Nair, 1981) |
| <b><i>Tribulus terrestris</i> L. Zygophyllaceae / Gokhru</b>                | Pain: About 10 g powdered fruit mixed with 100 ml of water. The mixture is given orally once daily morning for five days to cure backache.                         | Nagrkar et al., 2013          |
| <b><i>Typha angustata</i> Bory &amp; Chaub. / Typhaceae / ‘Ghabajariu’.</b> | Antiseptic: Fruit fibers filled in/sprayed over fresh cuts/wounds for fast healing and to prevent septic. Due to this practice flowing of blood stops immediately. | Shah & Amin, 2005             |

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|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b><i>Vernonia anthelmintica</i></b> (L.) Willd. / Asteraceae / 'Kalijiri' | One teaspoonful seed powder is administered internally with water once to cure intestinal pain                                                                                                                                        | Rajendran et al., 2008                       |
| <b><i>Vitex negundo</i> L.</b> / Verbenaceae / Nagod                       | <b>Joint diseases-</b> 10-20 g decoction of flowers (Inflorescence) bud is given orally once daily in empty stomach in early morning for one week to cure swelling and to get relief from pain in the joints caused due to arthritis. | Ahuja et al., 2015                           |
| <b><i>Withania somnifera</i></b> (L.) Dunal / Solanaceae / 'Ashvagandha'.  | Pain: One cup of filtrate root decoction is given orally twice a day up to two weeks to cure backache                                                                                                                                 | Chauhan & Pillai, 2003; Ganesan et al., 2006 |
| <b><i>Zizyphus nummularia</i> (Bum f.) W. &amp; A.</b> / Rhamnaceae        | Digestive disorders- The extract of fresh root given orally twice a day till cured to stop vomiting                                                                                                                                   | Shankar et al., 2008                         |

#### 4. Conclusion

In India, the demand in pharma market for Herbal medicines is estimated to increase by 20% every year (Kumar, 2000). Growth factors that contributes towards the market growth for

traditional medicine are: increasing human population and inadequate supply of modern (allopathic) medicine in the developing nations (Sharma et al, 2005). Nearly 1400 identified plants species were utilised as raw sources in the Ayurvedic drug formulations (Dev, 1999; Shiva, 1996). In our review article, we compiled information on traditional medicine practice and ethnomedicinal values of various plant species used in treating several minor and major chronic illnesses. The information in this review article would provide a scope for future researchers and pharmacologists to discover plant based novel drugs with minimal side effects and maximal therapeutic values. These ethnomedicinal plants also need a proper evaluation on chemical, pharmacological properties through elaborate studies and clinical trials for the validation of its therapeutic efficacy.

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