Exploration of some folk medicinal herbs in forest fringe villages of Assam (India): A study amid Nagaon and Golaghat districts

Manish Kumar Singh, Mahima Arya, Kumar Avinash Bharti and Kaushal Singh

Abstract
A two year extensive field survey was carried out in 12 different forest fringe villages of Assam lies especially between Nagaon and Golaghat district and alongside of Kaziranga National Park, to collect information on the uses of wild medicinal herbs by inhabiting tribal populations. The “transect walk” method of participatory rural appraisal (PRA) were adopted during survey and the data were analyzed through Use-value valuation technique. This research documented 34 medicinal herbs which were using by tribal to treat 27 human infirmities like jaundice, diarrhoea, dysentery, coughs, colds and other ailments. The Use-value data indicate that there is a high degree of consensus among informants regarding treatment of various ailments. However, due to the influence of climate change and other anthropological activities, this spoken folklore is at the verge of extinction. Therefore, appropriate measures need to be taken to conserve and enhance these wild medicinal herbs in fringe forest areas and to generate better livelihood options for tribals at their places.

Keywords: nagaon, fringe villages, medicinal herbs, transect walk method, infirmities

Introduction
The North East India has been known for its unique climatic conditions and great plant wealth and because to that it falls under one of the recognized mega biodiversity zones of the world (Singh, et al. 2018) [1]. Its ethnic people and tribes living in remote forest areas are still depend to a great extent on the traditional systems of medicine for their primary health care needs (WHO, 2013). These tribes have acquired the knowledge of medicinal properties of many wild herbs through experiences and thus they became the repository of priceless knowledge of their surrounding plants. This traditional knowledge were cumulated and delivered orally from one generation to the successive generations (Kumar et al, 2013) [2]. However, due to the influence of global climate change, change in land use patter, indiscriminate destruction of forests and other anthropological activities, this spoken customary knowledge is at the verge of extinction (Bharti & Sharma 2010) [10]. Although, some of the tribal medicines have been found pace in the systematized systems of drugs, but a larger number of them have remained endemic to certain tribal pockets of North East India and even not known to the outer world (Dutta & Dutta, 2005) [11]. Therefore, the potentialities of ethnomedicinal studies in remote fringe forest of North East should be given importance as it can provide us a very effective strategy for the discovery of more and potential useful chemicals. Also documentation of their traditional knowledge is the best starting point for effective in situ conservation, which requires accurate and up to date information on the status of medicinal plant populations, the extent and nature of plant use by local communities and the capacity of the resource base to support different economic activities (Kayang et al. 2005) [5]. Further this knowledge can be used in the evaluation and in creation of cognizance of the importance of medicinal plant as it is generally easier for the public to relate to the cultural significance than the results of scientific trials. An understanding of the many aspects of human influences on biodiversity and the underlying driving forces of the influences is of crucial importance for setting priorities and directing efforts towards conservation and sustainable use (Anas 2016; Byg & Balslev 2001) [6, 7]. Keeping this aim, the present studies were undertaken is to highlight the most frequently used medicinal herbs by tribal’s inhabiting forest fringe villages lies between Nagaon and Golaghat districts of Assam especially along the sideline of Kaziranga National Park and the illnesses against which these plants were used and stressing the need for sustainable management of medicinal plant resources.
Materials and Methods
Study area
Intensive field survey was carried out in 12 different forest fringe villages of Assam situated amid of Nagaon and Golaghat district and alongside of Kaziranga National Park i.e. Agerata, Damojan, Haldibari, Harmati, Kuthari, Bandardubi, Hatikut, Sildubi, Mohpara, Kandhulin, Bachagaon, JapariPathar (Figure 1). Study were carried during 2016-2017 and during different seasons, so as to collect maximum information’s on folk medicinal herbs and also to collect plant samples in their full blossom from wild. These were identified through random sampling and while gathering information on herbal folklore, standard approaches and methodologies were followed (Singh, et. al., 2017; Henrich et al. 2009; Gomez-Beloz A, 2002) [3, 8, 9]. Information’s were primarily gathered from old tribal ladies, Ojha, local vaidya and other forest dwelling informant belong to Karbis, the Mishings, the Mikirs, Assamese, Nepali & Santhals tribes and the tea garden community. The herbs so collected were pressed, dried and mounted on herbarium sheet and were identified using available floras and by taking help from Botanical Survey of India, Shillong. The names of the herbs were updated according to the Plant List (www.theplantlist.org) and the specimens were finally deposited in RFRI, Herbarium.

Results & Discussion
The information on medicinal herbs, which were found in forest fringe villages and were utilized by different tribal population for curing various ailments, is provided with correct scientific names followed by family name in parenthesis, than Herbarium accession No., Vernicular names (V.N.), Availability (Avl.) of plants or plant part; parts use in remedy preparations & their therapeutic uses (U). Also, the photographs of some of the collected herb’s herbarium specimens are given in figure 2-19.

<table>
<thead>
<tr>
<th></th>
<th>Scientific Name</th>
<th>V.N.</th>
<th>Avl.</th>
<th>Part Use</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Allium sativum (Linn.) (Liliaceae), RFRIH-168</td>
<td>Kumpun talap; Avl.: Year round</td>
<td>Part Use: Tubers</td>
<td>Preparation of garlic is used in pulmonary phthisis, gangrene of the lungs and whooping cough. For cough, ash obtained from dried peels of ripe M. balbisiana fruit is soaked whole night in water, and filtrate is obtained. One cup of filtrate is mixed with a little amount of mustard oil, common salt and 3-4 pieces of crushed A. sativum. Mixture is slightly heated and allowed to take with freshly prepared rice, preferably in the morning for a week.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Artemisia nilagirica (Cl.) pamp. (Asteraceae), RFRIH-182</td>
<td>Nilum; Avl.: Aug.-Oct.</td>
<td>Part Use: Fruits</td>
<td>Leaves and flowering tops used in asthma, also leaves are used to prepare a local hair-care lotion Chinghi</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Basella alba Linn. (Basellaceae), RFRIH-165</td>
<td>Kumpun puroi oying, Puin sag, Poi sag; Avl.: Year round</td>
<td>Part Use: Whole plant</td>
<td>Juice of leaves given to children and pregnant woman to remove constipation and for curing allergy, leaf extract is applied over the affected portion.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Basella ruba Linn. (Basellaceae), RFRIH-127</td>
<td>Leene puroi oying; Avl.: July to frost (fruits); leaves &amp; roots (year round);</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|   | Part Use: Fruits, leaves & roots  
|   | Use: For curing allergy. B. raba leaf extract is applied over the infected portion.  
|   |  
| 5. | *Cissampelos pereira* L. (Menispermaceae), RFRHI-141  
|   | V.N.: tubukilota; Avl.: Year round  
|   | Part Use: Roots  
|   | Use:- Roots diuretic, antiperiodic, purgative, used in dyspepsia, dropy and urinary troubles; contains an alkaloid pelosine.  
| 6. | *Cleome gynandra* L. (Cleomaceae), RFRHI-106  
|   | V.N.: Bhutnulla; Avl.: Year round  
|   | Part Use: leaves  
|   | Use: The leaves also have antioxidantative properties that can help with inflammatory diseases.  
| 7. | *Costus speciosus* (Koen.) Sm. (Zingiberaceae), RFRHI-179  
|   | V.N.: jom lakhu; Avl.: Year round  
|   | Part Use: Rhizome  
|   | Use: Rhizomes are also given in diseases as pneumonia, rheumatism, dropy, urinary diseases, jaundice, and leaves are given in mental disorders and it also has anti-fertility, anabolic properties.  
| 8. | *Cucumis domesticus* Valeton (Zingiberaceae), RFRHI-191  
|   | V.N.: Halodhi ; Avl.: Harvested during winter and foliage dies  
|   | Part Use: Rhizome  
|   | Use: Rhizome-use as stimulant, tonic, stomachic and depurative; for curing allergy, *C. domestica* plant extract are applied on the affected areas thrice daily, till recovery  
|   | V.N.: Doob; Avl.: Year round  
|   | Part Use: whole plant  
|   | Use: Fresh juice of durva is given in a dose of 15-20 ml in conditions of epileptic seizures and psycho- somatic disorders also as eye drops to reduce the redness, burning sensation and treat the condition.  
| 10. | *Dioscorea alata* L. (Dioscoreaceae), RFRHI-188  
|   | Part Use: Kath alu  
|   | Use: Tubers consider anthelmintic; also used in leprosy and piles.  
| 11. | *Dioscorea bulbifera* L. (Dioscoreaceae), RFRHI-167  
|   | V.N.: Kathalu, Mati alu  
|   | Avl.: Winter season; Part Use: Tubers  
|   | Use:- Improves sperm and semen quantity and quality; helpful in throat infection and related disorders; improves strength and immunity.  
| 12. | *Dioscorea pentaphylla* L. (Dioscoreaceae), RFRHI-136  
|   | V.N.: Kanta alu, kada kanda; Avl.: Nov. Dec. (i.e. early winter)  
|   | Part Use: Tubers  
|   | Use: Tubers consider tonic and used for swelling  
| 13. | *Gnetum montanum* MGf. (Gnetaceae), RFRHI-118  
|   | V.N.: Mameilet, thanlping-ruhi; Avl.: Year round  
|   | Part Use: Roots  
|   | Use: The root is used as a general antidote to poisons and also used as a remedy for malaria.  
| 14. | *Hiptage benghalensis* (L.) Kurz. (Malpighiaceae), RFRHI-250  
|   | V.N.: Kerek-lata; Avl.: Year round  
|   | Part Use: Whole Plant; Use:- Leaves used in cutaneous diseases, leaf juice insecticidal used in scrapies; vine used in chronic rheumatism and asthma.  
| 15. | *Hodgsonia macrocarpa* (BL.) Cogn. (Cucurbitaceae), RFRHI-183  
|   | V.N.: Thebou-lata, taponguti; Avl.: Year round  
|   | Part Use: Leaves & fruits  
|   | Use: The ashes from burnt leaves are also used to heal wounds; the fruit bulb is applied to bacterial infections in the feet.  
|   | V.N.: Kanta kachu; Avl.: Year round  
|   | Part Use: whole plant  
|   | Use: Plant use for intestinal diseases and colic rheumatism; root-stock juice used for piles.  
| 17. | *Leucas aspera* Spreng. (Lamiaceae), RFRHI-172  
|   | V.N.: Takom Kori; Avl.: Year round  
|   | Part Use: Whole plant  
|   | Use: For indigestion, young leaf and stem of *L. aspera* are given to eat as vegetable with rice for first two days. From third day 3 to 4 fruits of *E. officinalis* are given to eat. It will continued for a week.  
| 18. | *Musa balbisiana* Colla. (Musaceae), RFRHI-180  
|   | V.N.: Kopak, kola; Avl.: Year round  
|   | Part Use: Fruits, leaf, pseudostem, flowers, root, sap, peel  
|   | Use: For cough, ash obtained from dried peels of ripe *M. balbisiana* fruit is soaked whole night in water, and filtrate is obtained. One cup of filtrate is mixed with a little amount of mustard oil, common salt and 3-4 pieces of crushed *A. sativum*. Mixture is slightly heated and allowed to take with freshly prepared rice, preferably in the morning for a week.  
| 19. | *Nymphaea nouchali* Burm.(Nymphaeaceae), RFRHI-193  
|   | V.N.: Kumud; Avl.: Year round  
|   | Part Use: flower  
|   | Use: Flower mainly used to treat indigestion  
| 20. | *Ocimum sanctum* Linn. (Lamiaceae), RFRHI-119  
|   | V.N.: Tulosi, Tulsi  
|   | Avl.: Year round  

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Out of the total medicinal herbs documented (i.e. 34), majority of them were belongs to families Dioscoreaceae, Poaceae & Zingiberaceae with three genus each and total genera documented were 32, which were utilized by dwellers since time immemorial in their folklore medicine preparations. However, in term of species richness, the value came out to be 26 which indicate that, fringe forest is full of various medicinal herbs, which were utilized in one or other form by tribals in their health care management and still there are lot many unknown herbs whose medicinal properties are yet to be explored (Table. 1).

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### Table: Medicinal Herbs Documented

<table>
<thead>
<tr>
<th>No.</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Part Use</th>
<th>V.N.</th>
<th>Avl.</th>
<th>Use</th>
<th>Table 1</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td><em>Oxalis corniculata</em> Linn. (Oxalidaceae), RFRIH-107</td>
<td>Botene tengeshi</td>
<td>Whole plant</td>
<td>-</td>
<td>-</td>
<td>For curing allergy, O. sanctum and <em>C. domestica</em> plant extract are applied on the affected areas thrice daily, till recovery.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td><em>Polygala chinensis</em> L. (Polygalaceae), RFRIH-108</td>
<td>Meradu</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>Fine powder of seeds of <em>P. chinensis</em> is applied on affected part thrice daily, till recovery.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td><em>Portulaca oleracea</em> L (Portulacaceae), RFRIH-101</td>
<td>Mahbhog xaak</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>Herb use in disease of liver, spleen, kidney and bladder, also in cardio-vascular disease, dysuria, haematuria, sore nipples and mouth ulcer.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td><em>Rauwolfia serpentina</em> Benth. Ex Kurz. (Apocynaceae), RFRIH-87</td>
<td>Arachoritita</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>Extraction of <em>R. serpentina</em> root bark is applied on affected part thrice daily, till recovery.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td><em>Saccharum officinarum</em> Linn. (Poaceae), RFRIH-169</td>
<td>Kuhiyar</td>
<td>Stem</td>
<td>December - May</td>
<td>For constipation, finely crushed <em>S. officinarum</em> seeds are mixed with equal amount of <em>S. officinarum</em> molasses are given thrice daily for two days.</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td><em>Sesamum indicum</em> Linn. (Pedaliaceae), RFRIH-99</td>
<td>Til</td>
<td>August - October</td>
<td>-</td>
<td>-</td>
<td>For constipation, powdered <em>S. indicum</em> ripe and dry seeds mixed with equal amount of <em>S. indicinarum</em> molasses is given thrice daily for two days.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td><em>Stellaria media</em> L. (Caryophyllaceae), RFRIH-85</td>
<td>Morolia</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>For curing allergy, finely crushed <em>S. officinarum</em> mixed with old molasses obtained from <em>S. officinarum</em> is applied over the affected part, three times daily, until cure.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td><em>Stephania hernandifolia</em> (Wild.) Walp. (Menispermaceae), RFRIH-79</td>
<td>Tubuki lota</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>Leaves of this plant are used as a purgative and emetic, whereas the roots are employed in the treatment of roundworm, menorrhagia and boils.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td><em>Stereospermum personatum</em> (Hassk) Chatt. (Bignoniaceae), RFRIH-206</td>
<td>Parul, Paroli, Pareya-auwal</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>For treating stomach and liver problems</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td><em>Trichosanthes anguina</em> Linn. (Cucurbitaceae), RFRIH-157</td>
<td>Tumpat</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>For curing allergy, finely crushed <em>T. anguina</em> fruit is crushed and pills made out of it are taken three times daily.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td><em>Urena lobata</em> L. (Malvaceae), RFRIH-192</td>
<td>Sampakpi</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>Flower expectorant; their infusion used in aphthae and sore throat; decoction of stem and roots used for flatulent colic.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td><em>Vetiveria zizanioides</em> L. (Poaceae), RFRIH-185</td>
<td>Birina</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>For backache, powdered seeds of <em>V. zizanioides</em> are applied on affected part, for an hour.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td><em>Vigna mungo</em> (Linn.) Hepper (Fabaceae), RFRIH-163</td>
<td>Paret</td>
<td>October-March</td>
<td>-</td>
<td>-</td>
<td>For backache, powdered seeds of <em>V. mungo</em> mixed with small amount of warm mustard oil are applied on affected part, for an hour.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td><em>Zingiber officinale</em> Rosc. (Zingiberaceae), RFRIH-93</td>
<td>Take</td>
<td>Year round</td>
<td>-</td>
<td>-</td>
<td>For curing allergy, finely crushed <em>Z. officinale</em> mixed with old molasses obtained from <em>S. officinarum</em> is applied over the affected part, three times daily, until cure.</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
In term of Use value (UV), out of total recorded herbs, the maximum value were obtained for Rauwolfia serpentina (0.11) followed by Gnetum montanum, Dioscorea alata, Vigna mungo (0.09) whereas, least UV value were attained by Hibiscus bigphasenl, Allium sativum, Dioscorea pentaphylla, Oxalis corniculata, Stereospermum personatum, Urena lobata (0.01) and these Use Value in turn indicate relatively important of the herbs to the forest dwellers (Table 2).

The Preparation of these medicinal plants are either applied Externally (E) or taken Internally (I). Internal application of plants is more frequent (70%) in the present study area than external 10 applications (35%). Out of 27 ailments of human beings i.e. herbal medicines are applied externally in 12 ailments namely body pain, boil, bone fracture, cut and wounds, headache, joint pain, toothache, snake bite etc. and taken orally in 26 ailments viz. cough, cold, diarrhoea, dysentery, fever, indigestion, jaundice, malaria, stomach pain, uterine disorders, stress, piles etc.

Table 2: Use Value (UV) of medicinal herbs in forest fringe villages

<table>
<thead>
<tr>
<th>No.</th>
<th>Medicinal Herbs</th>
<th>Use Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rauwolfia serpentina</td>
<td>0.11</td>
</tr>
<tr>
<td>2.</td>
<td>Gnetum montanum, Dioscorea alata, Vigna mungo</td>
<td>0.09</td>
</tr>
<tr>
<td>3.</td>
<td>Dioscorea bulbifera, Vetiveria zizanioides</td>
<td>0.08</td>
</tr>
<tr>
<td>4.</td>
<td>Ocimum sanctum, Nymphaea nouchali</td>
<td>0.07</td>
</tr>
<tr>
<td>5.</td>
<td>Masa balbisiana, Polygala chinensis</td>
<td>0.06</td>
</tr>
<tr>
<td>6.</td>
<td>Cynodon dactylon, Sesamum indicum, Stellaria media, Zingiber officinale, Trichosanthes anguina</td>
<td>0.05</td>
</tr>
<tr>
<td>7.</td>
<td>Curcuma domestica, Basella ruba</td>
<td>0.04</td>
</tr>
<tr>
<td>8.</td>
<td>Costus speciosus, Lasi spinos, a Lecus aspera, Saccharum officinarum, Stephania herampidifolia</td>
<td>0.03</td>
</tr>
<tr>
<td>9.</td>
<td>Basella alba, Cissampelos Pereira, Artemisia nilagirica, Cleome gynandria, Portulaca oleracea, Hodgsonia macrocarpa</td>
<td>0.02</td>
</tr>
<tr>
<td>10.</td>
<td>Hibiscus bigphasenl, Allium sativum, Dioscorea pentaphylla, Oxalis corniculata, Stereospermum personatum, Urena lobata</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Table 3: Informants consensus factor (FIC) for various ailment categories

<table>
<thead>
<tr>
<th>Disease category</th>
<th>Number of Use Reports (Nur)</th>
<th>Number of Taxa (Nt)</th>
<th>Informants consensus index facto (FiC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive system disorders</td>
<td>79</td>
<td>20</td>
<td>0.78</td>
</tr>
<tr>
<td>Infections/infestations</td>
<td>104</td>
<td>27</td>
<td>0.77</td>
</tr>
<tr>
<td>Skin/subcutaneous cellular tissue disorders</td>
<td>67</td>
<td>11</td>
<td>0.76</td>
</tr>
<tr>
<td>Respiratory system disorders</td>
<td>42</td>
<td>7</td>
<td>0.76</td>
</tr>
<tr>
<td>Injuries</td>
<td>56</td>
<td>17</td>
<td>0.76</td>
</tr>
<tr>
<td>Muscular-skeletal system disorders</td>
<td>35</td>
<td>9</td>
<td>0.76</td>
</tr>
<tr>
<td>Pain</td>
<td>56</td>
<td>14</td>
<td>0.75</td>
</tr>
<tr>
<td>Genitourinary system disorders</td>
<td>54</td>
<td>11</td>
<td>0.75</td>
</tr>
<tr>
<td>Inflammation</td>
<td>7</td>
<td>5</td>
<td>0.75</td>
</tr>
<tr>
<td>Mental disorders</td>
<td>3</td>
<td>2</td>
<td>0.75</td>
</tr>
<tr>
<td>Nervous system disorders</td>
<td>27</td>
<td>8</td>
<td>0.74</td>
</tr>
<tr>
<td>Pregnancy/birth disorders</td>
<td>25</td>
<td>10</td>
<td>0.74</td>
</tr>
</tbody>
</table>

Also, as per the disease treated in the study area, these were categorized under 12 disease categories (Table 3). The highest FIC value have been shown by Digestive system disorders (0.78) and Infections/infestations (0.77) followed by Skin/subcutaneous cellular tissue disorders, Respiratory system disorders, Injuries, Muscular-skeletal system disorders with FIC value 0.76.

Conclusion
The present exploration work revealed that the forest fringe villages of Assam are full of wild herbs which are having high ethno-medical importance. It can be clearly seen from the observations that there are a wide variety of herbs for every day common ailments and diseases. The medicinal herbs play a very vital role in the tribal society of the forest fringe villages under review. Documentation of such treasures of herbal medicinal plants in forest fringe villages is highly valued and needs to be scaled-up before it disappears. Further, it is recommended to undertake detailed ethnobotanical studies of the whole of North East region involving as many tribes as possible. Also policies need to be framed and projects need to be formulated in the direction of conservation of these valuable herbs and also propagation and management trainings should be imparted to the local villages, so that they can succor in conservation and generate better livelihood option themselves within stone’s throw distance.

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Fig 2: Vigna mungo

Fig 3: Gnetum montanum

Fig 4: Leucas aspera

Fig 5: Sesamum indicum

Fig 6: Polygala chinensis

Fig 7: Ocimum sanctum

Fig 8: Urena lobata

Fig 9: Hodgsonia macrocarpa

Fig 10: Hiptage benghalensis

Fig 11: Cynodon dactylon

Fig 12: Costus speciosus

Fig 13: Artemisia nilagirica
Fig 14: *Dioscorea alata*  
Fig 15: *Dioscorea pentaphylla*  
Fig 16: *Dioscorea bulbifera*

Fig 17: *Curcuma domestica*  
Fig 18: *Artemisia nilagirica*  
Fig 19: *Cissampelos pereira*

Fig 2-19: Herbarium specimen of some Medicinal herbs.

References