

A Research Based Review

M.V.N.L.Chaitanya¹

¹ GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

Received: 15 December 2017 Accepted: 5 January 2018 Published: 15 January 2018

Abstract

Telangana is a part of Deccan Plateau, located in the central part of the Indian Peninsula. The Hyderabad is now a state capital of Telangana after separation from Andhra Pradesh. It is situated in central Telangana and is spread over an area of 260 km² and a heart of Eastern Ghats and is rich in different varieties of medicinal flora and many floras yet to be explore and there is less scientific literature focusing on these flora. The Guru Nanak School of Pharmacy is a part of GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS) located in Ibrahimpatnam, R.R.District, Nagarjuna Sagar Road, Hyderabad-501506, Telangana. The Ibrahimpatnam is a heart core of Eastern part of Hyderabad where most of the educational institutions are present and also it is rich in medicinal flora. However, awareness on these medicinal plants to the public in this area is not up to the mark. As a part of the Pharmacognosy curriculum and also to create awareness, the Guru Nanak School of Pharmacy is maintaining a medicinal plant garden in an approximate area of 1000 sqft with around 50 varieties of medicinal plants. The current review is discussing on important 21 medicinal plants (For example *Erythrina variegata* (Fabaceae), *Euraca sativa* (Brassicaceae), *Psidium guajava* (Myrtaceae), *Tylophora Indica* (Asclepiadaceae), (etc.) that are maintaining at our garden focusing on the botanical description, Vernacular names, habitat, chemistry, folklore uses, medicinal values and Nutritional values to create an awareness to public through the literature.

Index terms— medicinal flora, guru nanak school of pharmacy, eastern ghats, euraca sativa, folklore uses.

1 Introduction a) Geographical Distribution of Hyderabad

Hyderabad is located in central Telangana and is situated over an area of 260 km². It lies in the Deccan Plateau with an average height of 536 m above the sea level. The latitude is 17.3660 N and longitude is 78.4760 E [1]. The Average temperature is 130c to 390 c, June to September is the south-west monsoon season, and Humidity is with an average of 25 to 30% [2].

2 b) Medicinal Plant flora of Hyderabad district

As per the recent surveys there, are more than 583 reported genus and 1335 species belonging to 160 different families and predominant to 120 families [3].

Author ? : School of Pharmacy, Guru Nanak Institution Technical Campus, Khanapur, Ibrahimpatnam, Ranga Reddy Dist, Hyderabad, Telangana State, India. e-mail: chaitanya.pharma@gniindia.org c) Medicinal Flora in Guru Nanak School of Pharmacy

The Guru Nanak School of Pharmacy is a part of GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS), situated in the eastern core of Hyderabad called Ibrahimpatnam. The school is maintaining a medicinal plant garden with around 50 varieties in an area of around 1000 sqft as a part of its curriculum and

41 also to create awareness on how these plants are being use by common man as a medicine or as a nutritional
42 supplement. The current review is focusing on the importance of 20 important flora of Hyderabad.

43 i. *Erythrina variegata* a) Botanical description: Scientific Name: *Erythrina variegata* L. Family: Fabaceae
44 (legume family) b) Habitat: A deciduous tree with 15-18 m tall and leaves are 6 inches long having spiny
45 branches [??4]. c) Vernacular Names: English: Indian Coral Tree, Lenten tree, Tiger claw, Hindi: Pangara
46 Manipuri: Kurao, Tamil: Kalyana murungai, Telugu: mulla moduga, tella-varjam., Tangkhul: Thikchowon
47 kahunga [??5]. d) Phytochemical Constituents: Alkaloids, flavonoids, pterocarpan, triterpenes, steroids, alkyl
48 transferulates, proteins, and lecithin [6]. e) Isolated Phytochemicals: Erythratidine [??7], N, Ndimethyl tryptophan
49 [8], erythragallin A [9]. f) Nutritional Values: The amino acid composition of seed protein is as follows: alanine
50 (7.2), arginine (3.4), aspartic acid (12.9), glutamic acid (13.4), glycine (7.6), histidine (3.9), isoleucine (3.6),
51 leucine (7.1), lysine (5.1), methionine (0.5), phenylalanine (3.3), proline (4.7), serine (7.1), threonine (5.7),
52 tyrosine (2.2), and valine (4.8) g/100g [??10]. g) Pharmacological uses: Antioxidant [??11], Analgesic and anti-
53 inflammatory [12], Antisclerotic effect [??13]. h) Traditional claims: used especially for menstrual disorders and
54 fissures at penis tip [14]. i) Folklore uses: The tribes of Hingoli, Maharashtra, India use this bark powder as
55 Antirheumatic and internally as a decoction to treat tetanus [15]. ii. *Eruca sativa* a) Botanical description:
56 Scientific Name: *Eruca sativa*, Family name: Brassicaceae. [56], Pinitol, Quercetin [57], Bougainvinones A-H
57 [58]. f) Nutritional Values: Unknown g) Pharmacological uses: Antioxidant, Antimicrobial [59], Anticancer
58 [58]. h) Traditional claims: diarrhea, excess acidity, cough and sore throat, in treatment of low blood pressure
59 Leucorrhea, Hepatitis [60]. i) Folklore uses: The leaf decoction is used in treatment of cough and sore throat by
60 Mexican folks/tribes [61].

61 viii. *Psidium guajava* a) Botanical description: Scientific Name: *Psidium guajava*, Family: Myrtaceae b)
62 Habitat: *Psidium guajava* is a large dicotyledonous shrub, or small evergreen tree, generally 3-10 m high, many
63 branches; stems crooked, bark light to reddish brown, thin, smooth, continuously flaking; root system generally
64 superficial and very extensive, frequently extending well beyond the canopy, there are some deep roots but no
65 distinct taproot [62]. c) Vernacular Names: English: common guava, Hindi: Amrud, Malayalam: Pela, Marathi:
66 Jamba, Sanskrit: amrutha phalam, Tamil: Koyya phalam, Telugu: , antimutagenic [82], antidiarrhoeal [83],
67 antimalarial [84]. h) Traditional claims: In Ayurveda, this ancient herb is useful to treat weak digestion, poor
68 concentration, poor circulation, varicose veins, fever, intestinal infections, and certain skin conditions [85]. i)
69 Folklore uses: Lemongrass is a folk remedy for coughs, elephantiasis, flu, gingivitis, headache, leprosy, malaria,
70 ophthalmic, pneumonia and vascular disorders. Studies have shown that the lemon grass has antibacterial and
71 antifungal properties. Mixed with pepper, it's a home therapy for menstrual troubles and nausea [78].

72 xi. *Emblca officinalis* a) Botanical description: Scientific Name: *Phyllanthus emblica* , Family: Phyllanthaceae
73 b) Habitat: The tree is small to medium in size, reaching 1-8 m (3 ft 3 in-26 ft 3 in) in height. The branchlets are
74 not glabrous or finely pubescent, 10-20 cm (3.9-7.9 in) long, usually deciduous; the leaves are simple, subsessile
75 and closely set along branchlets, light green, resembling pinnate leaves [86]. c) Vernacular Names: English name:
76 Amla, Indian gooseberry, Hindi: Aonla, Manipuri: Amla In India, it is a belief that this tree is a holy, uses in
77 many prayers and homams in belief that its medicinal air will heal [95], Snake venom neutralizer [96]. As an
78 ayurvedic immunobooster and digestive aid [95]. i) Folklore uses: In Unani folklore, The plant can use both as a
79 medicine and as a tonic to build up lost vitality and vigor [96] The above described medicinal flora of school of
80 pharmacy, GNITC, Hyderabad also represented in table 1 below for easy understanding to the researchers, the
81 pictures of the various medicinal flora were given below in the figure ?? and the mol format of Phytochemicals
82 isolated from various medicinal flora were represented in the below pages as figure 2.

83 3 II.

84 4 Current Challenges

85 The maintenance of medicinal park / garden is not an easy task, however the school of pharmacy, GNITC,
86 Hyderabad, India is striving hard to maintain these flora, the main challenges we are facing are a) Weed

87 Occurrence of unnecessary flora in desired environment are called weeds, this is one of the major challenges we
88 are facing. Removal of these weeds is again a big challenging task as it requires a separate manpower to maintain
89 the flora and protect from these weeds. As our motto is to maintain healthy organic fields, we are not using any
90 chemicals and use of natural herbicides is again a challenging task so that many of these natural herbicides are
91 failure in eradicating the weeds.

92 5 b) Water

93 Now days, as water is one of the sacred element in the nature especially in summer season and most of these
94 flora need more water at their development stages, this became a ultimate challenge to get quality water and the
95 underground water in this area is absent. However, the Management, School of Pharmacy, GNITC, Hyderabad,
96 outsourcing quality water to safe guard and maintain this medicinal flora.

97 **6 c) Sudden climatic changes**

98 Even sudden changes in the climatic conditions also became a challenge to get uniformity in the growth and
99 quality of the medicinal flora.

100 **7 d) Genetic information**

101 Getting a genetic barcode of this flora became a challenging task even though we maintaining a authentic flora
102 in the garden, still there genetic identification is missing.

103 **8 e) Variation in the phytochemical uniformity**

104 Getting an uniform phytochemical fingerprint from these medicinal flora is a big challenge now a days we are
105 facing due to variation in exogenous and endogenous factors.

106 **9 f) Loss of fertility**

107 The cultivation fields are losing their fertility due to various environment factors.

108 **10 III. Future Directions to Develop this Medicinal Flora in** 109 **Campus**

110 The School of pharmacy, GNITC, Hyderabad, India is striving hard to get funds from various organizations to
111 develop a medicinal park/garden with a theme heal through breath under medicinal floral air. Genetic marking
112 and monographic labeling of this flora and to start research and development on these medicinal flora focusing
113 major diseases like cancer, tuberculosis, STD etc towards a preventive measure. The School of Pharmacy, GNITC,
114 Hyderabad also striving hard to conduct awareness programs, workshops, empowerment programs and seminars
115 focusing on the theme of Medicinal and Nutritional values of the flora of the Telangana, India, so that even a
116 common man knows about the nutritional and medicinal values of the flora that grows near to his environment.

117 IV.

118 **11 Conclusion**

119 The main focus of this article is to create awareness to the public/ researchers about the medicinal importance
120 of the common flora that distributed widely inside the Hyderabad and many of us don't know the importance
121 of these flora and deforesting this flora and many of these flora due to ignorance will be under endangered list
122 in future, if utmost care is not taken place. This can happen only through organizing workshops or seminars on
123 the significance of this medicinal flora and how to gain money from this flora through some homemade elixirs
124 prepared from these plants. The government bodies must encourage these types of organizations where there
125 ambition is to promote medicinal flora for healthy and wealthy India. GNITCSP001 Erythratidine [??], N,
126 N-dimethyltryptophan [8], erythagallin A [9].

127 The tribes of Hingoli, Maharashtra, India use this bark powder as Antirheumatic and internally as a decoction
128 to treat tetanus [15] 2.

129 *Eruca sativa* (Brassicaceae)

130 **12 GNITCSP002**

131 Kaempferol, Rhamnocitrin [19] The local people of Mihalgazi district (Turkey) uses the leaves in treatment of
132 Diabetes, ulcer, kidney diseases, asthma, high cholesterol [23].

133 **13 3.**

134 *Euphorbia tirucalli* (Euphorbiaceae) GNITCSP003 ?-amyrin acetate, lupenone , daucosterol [27].

135 In Malabar of India and Moluccas, the latex is used as an emetic and an antisyphilitic [28].

136 **14 4.**

137 *Alstonia scholaris* (Apocynaceae) GNITCSP004 Sarpagine [32].

138 In Bay islands, the tribes used it as an antimicrobial [36].

139 **15 5.**

140 *Aloe vera* (Liliaceae) GNITCSP005 P-coumaric acid [38] , aloe-emodin & chrysophanol [39].

141 During the 16th century, the Indian tribes uses this as healing plant, it is one of the 16 holy plants having
142 divine status, the Indian tribes uses this plant as mosquito repellent, it also used on wood as insect repellent [43].

143 **16 6.**

144 *Catharanthus roseus* (Apocyanaceae)

17 GNITCSP006

145 Rhazimol [47], Vindoline [48].

147 The Bhilla tribe of Maharashtra, India uses this leaf decoction in treatment of leucorrhoea/menstrual complaint
148 [51].

18 7.**19 Bougainvillea glabra (Nyctaginaceae)****20 GNITCSP007**

152 Betacyanins [55], Oleanoic acid acetate [56], Pinitol, Quercetin [57], Bougainvinones A-H [58].

153 The leaf decoction is used in treatment of cough and sore throat by Mexican folks/tribes [61].

21 8.

155 *Psidium guajava* (Myrtaceae) GNITCSP008

156 Lyxopyranoside [65], lanost-7-en-3 β -ol-26oic acid [66].

157 In Saint Lucia, the local tribes uses a tea of the new leaves of *Psidium guajava*, guava, with sugar is given for
158 worms and bellyache but the most common medicinal use is to stop diarrhea. [68]. 9.

22 Phyllanthus niruri (Euphorbiaceae) GNITCSP009

160 Neonirtetralin [72], 4,4,8-trimethoxy chroman [73], Corilagin, ethyl brevifolincarboxylate [74].

161 The local person of India, china and Africa uses this plant paste to treat hepatic disorders [77].

23 10.

163 *Cymbopogon citratus* (Poaceae) GNITCSP010 myrcene, citronellal, citronellol and geraniol [78].

164 Lemongrass is a folk remedy for coughs, elephantiasis, flu, gingivitis, headache, leprosy, malaria, ophthalmic,
165 pneumonia and vascular disorders. Studies have shown that the lemon grass has antibacterial and antifungal
166 properties. Mixed with pepper, it's a home therapy for menstrual troubles and nausea [78].

24 11.

168 *Emblia officinalis* (Phyllanthaceae) GNITCSP011 β -glucogallin [89], Pectin [90], Phyllembin [91], Emblicanin A
169 and B [92].

170 In Unani folklore, The plant is used both as a medicine and as a tonic to build up lost vitality and vigor [96].

171 12. In Nigeria, the decoction of boiled leaves is used to treat diabetes, in cameroon, the leaves are used to
172 treat arthritis [115]. In treatment of amenorrhoea, jaundice, antiulcer, febrifuge [128].

25 Vetivera**26 17.**

175 *Simarouba glauca* (Simaroubaceae) GNITCSP017 glaucarubine [131] Indigenous tribes throughout the South
176 American rainforest uses bark decoction in treatment of fevers, malaria, and dysentery, as a hemostatic agent
177 [135]. used in the treatment phlegm and rheumatism [139].

27 19.

179 *Mirabilis jalpa* (Nyctaginaceae) GNITCSP019 Miraxanthins, Indicaxanthin [141].

180 The native people of Mexico use *M. jalpa* uses in gastrointestinal disorders [145]. ¹

¹The Medicinal Flora in Gurunanak School of Pharmacy, Gnitc, Ibrahimpatnam, Hyderabad, Telangana, India: A Research Based Review



2

Figure 1: Figure 2 :

b) Habitat: Aloe vera having a less stem or very short-stemmed plant growing to 60-100 cm (24-39 in) tall, spreading by offsets. The leaves are thick and fleshy, green to grey-green, with some varieties showing white flecks on their upper and lower stem

surfaces. The margin of the leaf is serrated and has seriate and brownish [16] small white teeth. The flowers are produced in

c) Vernacular Names: English name: Rocket Salad, summer on a spike up to 90 cm (35 in) tall, each
Hindi: Tara Mira, Malayalam: Rucola Bengali: Suffed flower being pendulous, with a yellow tubular corolla
shorshi, Sanskrit: Sarishapa [17] 2-3 cm (0.8-1.2 in) long. Like other Aloe species,

d) Phytochemical constituents: Alkaloids, Cardiac Aloe vera forms arbuscular mycorrhiza, a symbiosis
glycosides, Flavonoids, Phenolics, Ascorbic acid, that allows the plant better access to mineral

Saponins and Tannins [18]. e) Isolated

Phytochemicals: kaempferol, Rhamnocitrin [19] f) Nutritional values: The values mentioned are per 100 g 1. Calories: 25

K.calories, 2. Total Fat: 1 g, 3. Sodium: 27 mg, 4. Potassium: 369 mg, Carbohydrates: 4 g, Dietary fibre: 2 g, Sugars: 2 g, Protein: 2 g, Vitamin A: 47 %, Vitamin C: 25%, Calcium: 16%, Iron: 8% [20]. g) Pharmacological uses: Anticancer [19], Antimicrobial [21]. iii. Euphorbia

tirucalli a) Botanical description: Scientific Name: Euphorbia tirucalli, Family name: Euphorbiaceae b) Habitat: E. tirucalli is a many-branched succulent plant. Trees or shrubs, producing abundant milky latex when injured, 2-6 m tall, dioecious, having a Flavonoids, Tannins, Saponins [26]. and saponins [46]. d) Phytochemical constituents: Alkaloids, Terpenoids, depsidones, steroids and triterpenoids, alkaloids cakkalavi, Telugu: cemudu, [25]. sugars,

phenols and tannins, depsides and Marathi: sher-kandvel, Sanskrit: saptala, Tamil: d) Phytochemical constituents: organic acids,

g) Pharmacological uses: analgesic, anthelmintics,

antiarthritic, antibacterial/ antifungal/ antimicrobial,

anti-HIV, anti-inflammatory, antioxidant, antiviral,

biodiesel production, CNS depressant/neuropathic

pain, cytotoxicity/ anticancer, genotoxic/ mutagenic, g) Pharmacological uses: Antineoplastic, Antidiabetic, hepatoprotective, insect repellants, immune-Antioxidant [50].

modulatory, larvicidal, molluscicidal/ ovicidal/ h) Traditional claims: Relieving muscle pain,

piscicidal, myelopoiesis, proteolytic/ chitinolytic [27]. depression of the central nervous system, also used

h) Traditional claims: In India, it is useful in treatment of to heal wounds [50].

biliousness, leprosy and leucorrhoea. In Brazil, it is i) Folklore uses: The Bhilla tribe of Maharashtra, India used against cancriods, cancer, sarcomas, tumors, uses this leaf decoction in treatment of leucorrhoea/ etc [27]. menstrual complaint [51].

1

Telangana, India

Figure 3: Table 1 :

	zizanioides (Poaceae)	GNITCSP012	vetiverol, vetivenene [100].	
13.	Tylophora indica (Apocynaceae)	GNITCSP013	tylophorine, kaempferol, ?-amyrin [106].	anti-Allergy, Antirheumatic and dermatitis [109].
14.	Jatropha curcas (Euphorbiaceae)	GNITCSP014	curcacycline-A [112].	

Figure 4:

181 .1 Acknowledgements

182 The authors expressing their sincere thanks to the management of Guru Nanak Institutions Technical Campus,
183 Ibrahimpatnam, Hyderabad, Telangana state, India for providing a peaceful environment to draft this review
184 as a part of our Future focus to develop our medicinal plant park and also for providing continuous support to
185 maintain this medicinal plant garden. We continuing our sincere thanks to Dr. S. Rajan, Field botanist, CCRAS,
186 Ayush, Emrald, Tamilnadu for his continuous support to identify the correct taxonomic names of our flora.

187 .2 Author Contribution

188 This work was carried out in collaboration between both authors. Author MVNLC (Dr. M.V.N.L. Chaitanya)
189 managed the Literature searches and drafted the manuscript, Author PS (Dr. P. Suresh) guided, corrected the
190 manuscript and arranged it in a scientific manner. Both authors read and approving the final manuscript.

191 [Anthony and Annie] , H Anthony , Annie .

192 [Robert] , B C Robert .

193 [Stephen] , W D Stephen .

194 [Evans] , D G Evans .

195 [Montserat] , G C Montserat .

196 [J G] , J G , Andy .

197 [Sjohn] , J K Timothy; M Sjohn .

198 [T Pullaiah et al.] , . J T Pullaiah , Indian , Bot . 2015 p. .

199 [Kumar et al.] , A Kumar , ; A Lingadurai , Jain .

200 [Subrhamanian and Suriyamoorthy] , H Subrhamanian , Suriyamoorthy .

201 [Devaki] , K Devaki . *Int J Pharm Pharm Sci* 2016 p. .

202 [Ghosal and Dutta] , S Ghosal , S K Dutta .

203 [Sato et al.] , M Sato , ; S Tanaka , ; Fujiwara , ; R Hirata , Yamaguchi .

204 [Etho] , H Etho . *Phytomedicine*

205 [M Z Rahman et al.] , M Z Rahman , ; Sultana , ; F Cf Faruquee , Ferdous .

206 [Ms Rahman] , Ms Rahman .

207 [Haque et al.] , R Haque , ; A Ali , Saha .

208 [Mangathayaru and Sarah] , K Mangathayaru , Sarah .

209 [Preeti and Chandrawati] , K Preeti , Chandrawati . 2017 p. .

210 [Gulfraz and Sadiq] , M Gulfraz , Sadiq .

211 [Helana et al.] , M Helana , ; G Reham , Shafik .

212 [Sharma and Pant] , N Sharma , B D Pant .

213 [Srivastava] , J Srivastava . 2017 p. .

214 [Zohara and Schafferman] , Y Zohara , Schafferman .

215 [Waseem et al.] , A Waseem , ; K Shilpa , Sanjay . 2017 p. .

216 [Wang and Liu] , X Y Wang , L P Liu .

217 [Kang] , T G Kang .

218 [Prashant and Shital] , Y M Prashant , S P Shital . *Asian Pac J Trop Biomed* 2017 p. .

219 [S B Manjeshwar] , S B Manjeshwar . *Chin. J. Integr. Med* 2012 p. .

220 [Gong and Wang] , M Gong , Wang .

221 [Kambizi and Sultana] , L Kambizi , Sultana .

222 [A F De Almeida and Ramos] , A F De Almeida , Ramos .

223 [S S Moreira Da S De Almeida] , S S Moreira Da S De Almeida . *ACSJ* 2016 p. .

224 [Gajalakshmi and Vijayalakshmi] , S Gajalakshmi , Vijayalakshmi .

225 [V D Rajeswari] , V D Rajeswari . *Int J Pharm Bio Sci* 2013 p. .

226 [S Y Kamble and Patil] , S R S Y Kamble , Patil .

227 [Sawant et al.] , P S Sawant; S Sawant , ; , S Pawar , ; E A Singh . *IJTK* 2010 p. .

228 [Gupta et al.] , V Gupta , ; L George , Joseph .

229 [Singhal] , M Singhal .

- 230 [Arumugam et al.] , N Arumugam , K Swetha , ; A Gangadhara . *Int J Pharm Pharm Sci* 2013 p. .
- 231 [Sunil and Kumar] , J Sunil , Kumar .
- 232 [Khan] , M S Y Khan . *Trop J Pharm Res* 2013 p. .
- 233 [L T Do et al.] , L T Do , ; P Aree , Siripong .
- 234 [Pham] , T N Pham .
- 235 [Nguyen] , P K Nguyen .
- 236 [Tip-Pyang] , S Tip-Pyang . *J Nat Prod* 2016 p. .
- 237 [Islam et al.] , M Z Islam , M T Hossain , ; F Hossen .
- 238 [Akter] , M S Akter .
- 239 [Aziz and Rafiqkhan] , N Aziz , Rafiqkhan .
- 240 [Priyanka et al.] , B Priyanka , ; V Ali , Aeri .
- 241 [Bhowmik] , M Bhowmik . *Int J Pharm Pharm Sci* 2016 p. .
- 242 [Holm et al.] , L Holm , ; E Doll , ; J Holm , Pancho .
- 243 [Du Ekaete et al.] , Du Ekaete , ; D Ukana , Akpabio .
- 244 [Wx Wei et al.] , Wx Wei , ; O Gong , Ishrud .
- 245 [Zheng] , Zheng . *BioMed Res. Int* 2016 p. .
- 246 [Kaur and Kaur] , N Kaur , Kaur .
- 247 [Manvitha and Bidya] , K Manvitha , Bidya . *Int. j. herb. med* 2014 p. .
- 248 [Shah et al.] , G Shah , ; N Shri; V Panchal , ; B Sharma , ; As Singh , Mann . *J Adv Pharm Technol Res* 2011
- 249 p. .
- 250 [Vinitketkumnuen et al.] , U Vinitketkumnuen , ; N Puatanachokchai; P Kongtawelert , Lertprasertsuke .
- 251 [Bhandari and Kamdod] , P R Bhandari , M Kamdod . *Int. J. Green Pharm* 2012 p. .
- 252 [Puppala et al.] , M Puppala , ; Gb Ponder; P Suryanarayana , Reddy .
- 253 [Jm Petrash and Dv Labarbera] , ; Jm Petrash , Dv Labarbera . *PLoS One* 2012 p. .
- 254 [A K Agarwal et al.] , P A K Agarwal , ; P Goyal; Lakashminarasimhaiah , ; P Goyal , Desai .
- 255 [Sumalatha] , Sumalatha . *Int.J.Curr. Microbiol. App.Sci* 2013 p. .
- 256 [Islam] , M S Islam . *J Pharmacogn Phytochem* 2015 p. .
- 257 [Jain and Pandey] , R Jain , Pandey .
- 258 [Mahant] , R N Mahant .
- 259 [V Krishnaveni] , S V Krishnaveni . *Int J Pharm Bio Sci* 2016 p. .
- 260 [K K Chahal and Bharadwaj] , U K K Chahal , Bharadwaj . (S Kaushal)
- 261 [Balasankar and Vanilarasu] , D Balasankar , Vanilarasu .
- 262 [P S Preetha; S Rajeswari and Umadevi] , ; M P S Preetha; S Rajeswari , Umadevi .
- 263 [Ranemma et al.] , M Ranemma , ; Nagendram; S Niranjana , ; C Narshimha , Mohan .
- 264 *Int.J.Curr.Microbiol.App.Sci* 2017 p. .
- 265 [Gupta and Mukhtar] , M Gupta , H M Mukhtar .
- 266 [Ahmad] , S Ahmad . *J. Pharm. Sci. & Res* 2010 p. .
- 267 [Kaur and Singh] , H Kaur , Singh . *Int J Pharm Sci Res* 2012 p. .
- 268 [A S Rani and Patnaik] , A S Rani , Patnaik .
- 269 [G] , G .
- 270 [Saidulu] , B Saidulu . *FS J Res Basic& App Sci* 2012 p. .
- 271 [Bashir et al.] , A Bashir , ; S Ali , Bashir .
- 272 [Zhang and Zhang] , X P Zhang , M L Zhang .
- 273 [Su] , X H Su .
- 274 [Huo] , C H Huo .
- 275 [Gu] , Y C Gu .
- 276 [Insanu et al.] , M Insanu , ; O Anggadireja , Kayser . *Planta Med* 2010 p. .
- 277 [Nepal et al.] , S Nepal , ; Kumar , Hps Makkar .

- 278 [Prasad and Izam] , D M R Prasad , Izam .
279 [Khan] , M M R Khan . *J. Med. Plants Res* 2012 p. .
280 [Manosi et al.] , D Manosi , ; M Suvra , Bhudimanta .
281 [Jayaram] , H Jayaram . *Int.Res.J.Pharm* 2013 p. .
282 [S K Barbara and Boetteher] , M S S K Barbara , Boetteher .
283 [Teskejörg and Rillkoetter] , J Teskejörg , ; J Rillkoetter . *Indian J. Chem., Sect B* 2015 p. .
284 [B E Iorliam et al.] , B B E Iorliam , Yarkwan , Au J.T . 2013 p. .
285 [Silva] , A R Silva . *Complement Altern Med* 2017 p. .
286 [Ab Chate et al.] , Ab Chate , ; Sb Tole , Sm Patil . *J Pharmacogn Phytochem* 2016 p. .
287 [Ahmad et al.] , T Ahmad , A T Hamid , ; A Sharma .
288 [Bhardwaj] , Bhardwaj . *Int. J. Adv. Res* 2017 p. .
289 [Arivu and Muthulingam] , Arivu , Muthulingam .
290 [Supriya] , Supriya . *Int J Curr Pharm Res* 2017 p. .
291 [By Sathish Kumar and Fathima] , E By Sathish Kumar , Fathima . 2017 p. .
292 [Kaladhar and Nandikolla] , D Kaladhar , Nandikolla . *Int J Farm &Tech* 2010 p. .
293 [Me Goleniowski and Bongiovanni] , Me Goleniowski , Bongiovanni .
294 [Aoki et al.] , K Aoki , ; Cortes , Mc Ram?rez .
295 [Gomez-Hern] , M Gomez-Hern .
296 [Ashok] , Ashok .
297 [T R Athiralakshmy] , T R Athiralakshmy . *AS Divyamol*
298 [S K Sadhu et al.] , A S K Sadhu , ; P Panadda , Takashi .
299 [S A Bhalerao and Verma] , D R S A Bhalerao , Verma .
300 [V S Didwana] , V S Didwana .
301 [N C Teli] , N C Teli . *Ann.Pl.Sci* 2014 p. .
302 [Ali and Bashir ()] , Ali , Bashir . *J. Nat. Prod* 1984. p. .
303 [Song ()] , K M Song . *Biotechnol. Prog* 1992. p. .
304 [Matsushima ()] , T Matsushima . *Mutat Res* 1994. p. .
305 [Amar ()] , Z Amar . *Econ. Bot* 1998. p. .
306 [Chattopadhyay ()] , Chattopadhyay . *J Ethnopharmacol* 2001. p. .
307 [Chen et al. ()] , Y Chen , Zhong Yao , Cai . 2002. p. .
308 [Arima and Gen-Ichi ()] , H Arima , Gen-Ichi . *Biosci. Biotechnol. Biochem* 2002. p. .
309 [Pan ()] , Y J Pan . *Bull.Korean Chem.Soc* 2002. p. .
310 [A J Afolayan ()] , A J Afolayan . *Pharm. Biol* 2005. p. .
311 [Tchoumboungang et al. ()] , F Tchoumboungang , P Zollo; E Dagne , ; Y Mekonnen . *Planta Medica* 2005. p. .
312 [M Allimuzzaman ()] , M Allimuzzaman . *J Pharm Sci* 2006. p. .
313 [Ajaiyeoba and Kingston ()] , E Ajaiyeoba , Kingston . *Pharm. Biol* 2006. p. .
314 [Tangpu and Yadav ()] , V Tangpu , Yadav . *Pharmacologyonline* 2006. p. .
315 [Palacio et al. ()] , L Palacio , ; Co Nunez , ; Jj Cantero . *J Ethnopharmacol* 2006. p. .
316 [Islam ()] , M S Islam . *Pharm J* 2007. p. .
317 [O M Ishibashi ()] , O M Ishibashi . *J Nat Med* 2007. p. .
318 [T D Samanta and Laskar ()] , S T D Samanta , Laskar . *Food Chem* 2008. p. .
319 [Ethnopharmacol ()] , Francisco J Ethnopharmacol . 2008. p. .
320 [S Arunkumar ()] , M S Arunkumar . *Muthuselvam. World J. Agric. Sci* 2009. p. .
321 [Rubina et al. ()] , L Rubina , ; E Priyanka , Jeyakumar . *Braz J Microbiol* 2009. p. .
322 [Singh ()] , H P Singh . *J. chem. pharm. Res* 2009. p. .
323 [Choudhary ()] , M I Choudhary . *Afr. J. Biotechnol* 2009. p. .
324 [Shi ()] , Q W Shi . *Chem Biodivers* 2009. p. .
325 [N R Barman ()] , N R Barman . *Pharmacog. Rev* 2010. p. .

- 326 [Krishnaveni and Mirunalini ()] , M Krishnaveni , Mirunalini . *J Basic Clin Physiol Pharmacol* 2010. p. .
- 327 [Balakrishna ()] , Balakrishna . *J Pharmacol Pharmacother* 2011. p. .
- 328 [U P Jayashri et al. ()] , S U P Jayashri , Biradar , Indian . *J Nat Prod Resour* 2011. p. .
- 329 [Tariq et al. ()] , H Tariq ; ; M Imran ; ; R Qureshi; A Zeenat . *Pak. J. Bot* 2011. p. .
- 330 [Emad ()] , Emad . *J. Med. Plants Res* 2011. p. .
- 331 [Wang ()] , H B Wang . *Chin J Integr Med* 2011. p. .
- 332 [Danlami et al. ()] , U Danlami ; ; Rebecca ; ; Db Machan , Ts Asuquo . *J Appl Pharm Sci* 2011. p. .
- 333 [Manasi and Gaikwad ()] , P Manasi , D K Gaikwad . *J. Pharm. Sci. & Res* 2011. p. .
- 334 [Vinay et al. ()] , K G Vinay , S Malhotra , Ayu . 2012. p. .
- 335 [Mariajancyrani et al. ()] , J Mariajancyrani ; ; A Chandramohan; Saravanan , Elayaraja . *Asian J. Plant Sci. Res* 2013. p. .
- 336 [I E Udo ()] , I E Udo . *Asian J. Plant Sci. Res* 2013. p. .
- 337 [Bhowmik ()] , Bhowmik . *J. Med. Plants. Stud* 2013. p. .
- 338 [H A Abdelgadir and Staden ()] , J V H A Abdelgadir , Staden . *S Afr J Bot* 2013. p. .
- 339 [N H Michelle ()] , N H Michelle . *Cancer Res* 2014. p. .
- 340 [Pan ()] , L Pan . *Phytochem Lett* 2014. p. .
- 341 [Choudhary et al. ()] , S Choudhary ; ; V Gita , Chaudhary . *Chem Xpress* 2014. p. .
- 342 [D B Menon ()] , D B Menon . *Asian J Pharm Clin Res* 2014. p. .
- 343 [Singh ()] , G K Singh . 2015. p. .
- 344 [Ds and Rathore ()] , Ds , Rathore . *Int J Pharm Sci Res* 2015. p. .
- 345 [Sandhu ()] , A K Sandhu . 2015. p. .
- 346 [Uzun and Alya ()] , M Uzun , K Alya . *Pharm. Biol* 2016. p. .
- 347 [Mokammel ()] , M A Mokammel . *Res. J. Med. Plant* 2016. p. .
- 348 [Nys Lee ()] , Nys Lee . *J. Pharm. Pharmacol* 2016. p. .
- 349 [Vk Sharanya ()] , Vk Sharanya . *IJPRR* 2016. p. .
- 350 [Gupta and Ijhm ()] , M Gupta , Ijhm . 2016. p. .
- 351 [Nisha ()] , P Nisha . *Asian J. Plant Sci. Res* 2016. p. .
- 352 [Sirhindi ()] , G Sirhindi . *Phytother. Res* 2017. p. .
- 353 [Jitpure ()] , Jitpure . 2017. p. .
- 354 [Palaniappan and Ijast ()] , R Palaniappan , Ijast . 2017. p. .
- 355 [Stadtlander et al. ()] , T Stadtlander ; ; N Romano ; ; K Becker . *Fish Physiol Biochem* 2018. p. .
- 356 [Aloe vera (Liliaceae)] *Aloe vera (Liliaceae)*,
- 357 [Alstonia scholaris (Apocynaceae)] *Alstonia scholaris (Apocynaceae)*,
- 358 [V Anuradha and Goyal ()] *Anc Sci Life*, M M V Anuradha , Goyal . 1995. p. .
- 359 [Piattelli and Imperato ()] ‘Betacyanins from bougainvillea’. M Piattelli , Imperato . *Phytochemistry* 1970. p. .
- 360 [Bougainvillea glabra (Nyctaginaceae) 8. Psidium guajava (Myrtaceae) 9] *Bougainvillea glabra (Nyctaginaceae)*
- 361 *8. Psidium guajava (Myrtaceae) 9, (Phyllanthus niruri (Euphorbiaceae)*
- 362 [Cascabela thevetia (Apocynaceae) 17. Simarouba glauca (Simaroubaceae) 18. Putranjiva roxburghii (Putranjivaceae) 19. Mirabilis jalpa (Nyctaginaceae) 20, (Saraca asoca (Fabaceae)
- 363 [Cascabela thevetia (Apocynaceae) 17. Simarouba glauca (Simaroubaceae) 18. Putranjiva roxburghii (Putranjivaceae) 19. Mirabilis jalpa (Nyctaginaceae) 20, (Saraca asoca (Fabaceae)
- 364 [Catharanthus roseus (Apocyanaceae)] *Catharanthus roseus (Apocyanaceae)*,
- 365 [Cymbopogon citratus (Poaceae)] *Cymbopogon citratus (Poaceae)*,
- 366 [Embllica officinalis (Phyllanthaceae) 12. Vetivera zizanioides (Poaceae)] *Embllica officinalis (Phyllanthaceae) 12. Vetivera zizanioides (Poaceae)*,
- 367 [Bhathacharya] ‘Erythrinachemical and pharmacological evaluation II: Alkaloids of Erythrina variegata L’. S K Bhathacharya . *J Pharm Sci*
- 370 [Ever recorded Maximum and minimum temperatures up to 2010” (PDF). India Meteorological Department (2015)]
- 371 *Ever recorded Maximum and minimum temperatures up to 2010” (PDF). India Meteorological Department,*
- 372 www.bis.org.in/other/quake.htm<http://www.bis.org.in/other/quake.htm>3 March 31. 2015.

- 375 [Figure 1: Medicinal flora of School of Pharmacy] *Figure 1: Medicinal flora of School of Pharmacy*, GNITC,
376 Hyderabad, India 1. Erythratidine 2. N, N-dimethyltryptophan.
- 377 [N E Abu and Ezeomeke ()] 'I Somadina; A Promise'. S N E Abu , Ezeomeke . *J. Med. Plants Res* 2016. p. .
- 378 [Anwar et al. ()] *The pharmacognostic and pharmacological studies on medicinal valued herbal drugs, Erythrina*
379 *variegata* Var. *Orientalis*, *Matricaria chamomilla*, M Anwar , D Ph , Thesis , Karachi . 2006. University of
380 Karachi. (Pakistan: Faculty of Pharmacy. *Psoralea corylifolia* and *Chenopodium album*)
- 381 [Tylophora indica (Apocynaceae) 14. *Jatropha curcas* (Euphorbiaceae) 15. *Cinnamomum zeylanicum* (Lauraceae)]
382 *Tylophora indica* (Apocynaceae) 14. *Jatropha curcas* (Euphorbiaceae) 15. *Cinnamomum zeylanicum*
383 (Lauraceae),
- 384 [Herberger ()] *World weeds. Natural Histories and Distribution*, J Herberger . 1997. New York: John Wiley &
385 Sons.