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A review on ethno medicinal plants for joint diseases from Assam, India

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Abstract
Medicinal plants have been used for centuries in almost all parts of the world. The disease process is not new and the humans are facing these problems since centuries. Proper medicaments are been carried out in different forms and different techniques. Use of medicinal plants are the primary sources in those days and till today the reliability is not declined in modern era. Climatic condition of Assam and its neighbouring areas are the primary cause for the influence or trigger of different kinds of diseases and Joint related diseases is one among them. The ethnic tribes are using different kinds of medicinal plant in their day to day life to get rid of such kinds of ailments. The effective plant preparations and habits are declining day to day due to unavailability of the herbs and also lack of interest by the local tribes for proper conservation and uses. The present communication deals with the review of ethno medicinal plants used by different ethnic groups of Assam against various joint diseases like arthritis, joint pain and inflammation, gout, lumbago, rheumatism and sprain. Total 116 species under 100 genera has been reviewed and compiled. 115 of them belong to angiosperms and 1 belongs to pteridophytes. An attempt has been made to document the scientific approaches of these medicinal plants under one umbrella.

Keywords: Ethno-botany, Ethnic tribes, joint diseases, Assam

1. Introduction
Assam, a part of one of the biodiversity hotspots, occupies a special place in Northeastern India located between $24^0$44' N to $27^0$45'N latitude and $89^0$41'E to $96^0$02'E longitude, covering 2.4% of the geographical area of the country, i.e. 78,438 sq. km. The annual rainfall ranges between 305 cm. max. to 178 cm. min. with an average of 211.76 cm. The temperature recorded in summer is 37^0C max. and 18^0C min. and 26^0C max. and 7^0C min. in winter, with an average humidity of 83.00% [1]. Major plain ethnic groups group of Assam are Kacharis, Deories, Mishings, Rabha, Bodo and ethnic groups in hills are Kukis, Karbis, Dimasas, Hmar etc [2]. The climatic condition of Assam has a great influence on the disease process of various joint disorders. Several studies has been put forwarded by different researchers around the world that indicates the climatic influence in the pain related joint disorders is one among them [3-5]. In recent years the prevalence of joint diseases is increasing day by day due to mal effects of various kinds of pesticides and chemicals used in many vegetables and other eatables. The immune system of the human being has been changed dramatically due the effect of such kinds of pesticides. Several studies can be seen by different researchers around the world, showing serious grievances for the disease process of joint and other diseases [6-8].

In the rural areas of Assam many people are suffering from various joint diseases. The ethnic tribes are using several kinds of herbs in their day to day life as a remedy for these diseases. Gruesome effect has been documented by several scholars around the globe regarding the disease process. The ethnic tribes are using these medicaments since decades and this knowledge are being transmitted from one generation to other. But due to the influence of modernization the influence of such practices are declining day by day. Many herbs may become endangered in near future due to climatic variations and deforestations. Proper scientific and conservation are being needed to fridge the plant species for future use.

2. Enumeration
For the present review folklore medicinal plants for joint diseases used by different ethnic communities of Assam are compiled from published literature. Scientific name of the plants are arranged alphabetically with family, local name, parts used, diseases condition and reported area and ethnic group involved.

Table 1: List of medicinal plants against various joint diseases

Sl. No.	Scientific Name (Family)	Local Name	Parts used	Disease Condition	Reported Area (Tribe/Community)
1.	*Abrus precatorius* Linn. (Papilionaceae)	Latumoni	Root	Rheumatism	Dibru Saikhowa [9]
2.	*Abutilon indicum* (L.) Sw. (Malvaceae)	Japapetari	Root, bark and Fruit	Arthritis	Golaghat (Plain Tribe) [10]
3.	*Acalypha australis* Linn. (Euphorbiaceae)		Leaf	Rheumatism	Sonitpur (Plain Tribe) [11]
4.	*Achyranthes aspera* Linn. (Amaranthaceae)	Samphraulta	Root	Arthritis	Kamrup (Boro) [12]

5.	*Acorus calamus* Linn. (Araceae)	Bishbildi (Boro), Boch (Plain Tribe)	Rhizome Leaf	Arthritis	Kamrup (Boro) [12]
				Gout, Rheumatism, Lumbago	Assam (Plain tribes) [13]
6.	*Adhatoda zeylanica* Medik. (Acanthaceae)	Pudi	Roots	Joint inflammation	Barak Valley (Rogmei) [14]
7.	*Allium sativum* Linn. (Alliaceae)	Rason (Boro), Naharu (Plain Tribe)	Cloves	Gout and swelling	Kamrup (Boro) [12]
				Lumbago	Assam (Plain tribes) [13]
8.	*Alocasia indica* Schott. (Araceae)	Kankachu	Stem, Rhizome	Arthritis	Barak Valley (Deb Barma) [14]
		Mankosu		Joint pain	Bongaigaon (Koch Rajbangshi) [15]
9.	*Alpinia allughos* Roxb. (Zingiberacea)	ToraGoch	Rhizome	Rheumatism	Golaghat (Plain Tribe) [10]
10.	*Amomum dealbatum* Roxb. (Zingiberacea)	Aidu	Rhizome & root	Joint pain	North Cachar Hills (Lushai) [16]
11.	*Ananas comosus* (L.) Mer. (Bromeliaceae)	Anaras, Matikothal	Root	Gout and rheumatism	Assam (Plain tribes) [13]
12.	*Asparagus racemosus* Willd. (Liliaceae)	Nsenma	Whole plant	Rheumatic pain	North Cachar Hills (Zeme) [17]
13.	*Azadirachta indica* Juss. (Meliaceae)	Neem	Oil	Rheumatism	Kamrup (Rabha) [18]
14.	*Bambusa balcooa* Roxb. (Poaceae)	Bhalukabanh	Shoot	Sprain	Assam (Plain tribes) [13]
15.	*Betula alnoides* Buch-Ham. ex D. Don (Betulaceae)	Khringjao & Kadingglen (Hill tribes)	Stem bark	Joints pain and Sprain	Assam (Plain tribes) [19], North East India [20]
16.	*Brassica nigra* (L.) Koch. (Brassicaceae)	Sariah	Seed oil	Rheumatism	Assam (Plain tribes) [13]
17.	*Calotropis gigantea* (L.) R.Br. (Asclepiadaceae)	Aganbiphang (Boro)	Leaf	Gout and swelling	Kamrup (Boro) [12]
18.	*Calotropis iarrhea* R. Br. (Asclepiadaceae)	Opegamgoi	Warm leaf	Rheumatism	Cachar (Vaiphei) [21]
19.	*Cannabis sativa* L. (Cannabinaceae)	Bhang	Leaf	Gout	Tinsukia (Moran) [22]
20.	*Capsicum frutescens* L. (Solanaceae)	Jhaluk	Fruit	Rheumatic pain	Goalpara (Rabha) [23]
21.	*Cardiospermum halicacabum* Linn. (Sapindaceae)	Kapalphuta	Whole plant	Rheumatism	Brahmaputra Valley (Plain Tribe) [24]
22.	*Cassia tora* L. (Caesalpiniaceae)	Medelua/Bilokhoni	Leaf	Rheumatism	Dibrugarh (SonowalKachari) [25]
23.	*Christella parasiticus* (L.) Lev. (Thelypteridaceae)	Bihlogani	Leaf	Rheumatism	Sonitpur (Plain Tribe) [26]
24.	*Cissampelos pareira* Linn. (Convolvulaceae)	TubukiLota	Root	Gout Rheumatism	Assam (Plain tribes) [13]
25.	*Cissus quadrangularis* Linn. (Vitaceae)	Harjoralota	Stem	Rheumatism	Assam (Plain tribes) [13]
26.	*Citrullus colocynthis* Schard. (Cucurbitaceae)	Kuwabhaduri	Leaf	Gout	Lakhimpur (Plain Tribe) [27]
27.	*Citrus aurantifolia* (Chr.) Sw. (Rutaceae)	Nemu	Fruit	Sprain	Kamrup (Rabha) [18]
28.	*Citrus limon* (L.) Burm.f. (Rutaceae)	Kajinemu	Seed	Inflammation of joints	Assam (Plain tribes) [13]
29.	*Clerodendrum colebrookianum* Walp. (Verbenaceae)	Bharangi	Whole plant	Gout	North East India [20], Golaghat (Mishing) [28]
				Rheumatism	Barak Valley [29]
30.	*Coix lachryma-jobi* Linn. (Poaceae)	Kauri moni (Assamese)	Root	Lumbago	Assam (Plain Tribe) [13]
31.	*Colocasia esculenta* (L.) Schott. (Araceae)	Bor-Kachu	Petiole	Rheumatism and Lumbago	Assam (Deori) [30]
32.	*Coptis teeta* Wall. (Ranunculaceae)	Misimitita	Root	Gout Rheumatism	Assam (Plain tribes) [13]
33.	*Costus speciosus* (Koen.) Smith (Costaceae)	Jamlakhuti	Root	Rheumatoid arthritis	Sivasagar (Plain Tribe) [31]
34.	*Crateva religiosa* (Forst) Hook. F. (Capparidaceae)	Barungoch	Leaf	Rheumatism	Assam (Plain tribes) [13], (Tai-Khamyang) [32]

35.	*Crinum asiaticum* L. (Amaryllidaceae)	Mwshousambram	Bulb	Rheumatic pain	Sonitpur (Boro) [33]
36.	*Croton tiglium* Linn. (Euphorbiaceae)	Konibih	Leaf	Rheumatism	Assam (Tai-Khamyang) [32]
37.	*Curcuma caesia* Roxb. (Zingiberacea)	Kola halodhi	Rhizome	Gout	Assam (Plain tribes) [13], Sonitpur (Plain Tribe) [26]
				Sprains	Sonitpur (Plain Tribe) [26]
38.	*Curcuma domestica* Valeton (Zingiberacea)	Haldhi	Rhizome	Rheumatism	Assam (Plain tribes) [13], Tinsukia (Moran) [22]
				Rheumatoid arthritis	Sivasagar (Plain Tribe) [31]
				Sprains	Kamrup (Plain Tribe) [34], North Cachar Hills (Dimasa) [35]
39.	*Cuscuta reflexa* Roxb. (Convolvulaceae)	Aakashbolly	Whole plant	Rheumatic pain	Golaghat (Mishing) [28]
40.	*Cynodon dactylon* Pers. (Poaceae)	Dubori bon	Whole plant	Rheumatism	Tinsukia (Moran) [22]
41.	*Cyperus rotundus* Linn. (Cyperaceae)	Keya bon	Tuber	Inflammation of joints	Assam (Plain tribes) [13]
42.	*Datura fastuosa* Linn. (Solanaceae)	Dhatura	Whole plant	Rheumatism	Kamrup (Plain Tribe) [34]
43.	*Datura innoxia* P. Mill. (Solanaceae)	Dhutra	Leaf	Joint pain	Cachar (DimasaKachari) [36]
44.	*Datura metel* L. (Solanaceae)	Dhatua (Plain Tribe) Invetpar (Hmar)	Leaf	Rheumatism	Assam (Plain tribes) [13], Cachar (Hmar) [37]
45.	*Datura stramonium* L. (Solanaceae)	Kimbomg (Dimasa) Invetpar (Hmar) Dhatura (Assamese)	Leaf	Rheumatic pain	Assam (Plain tribes) [13], Cachar (Hmar) [37], North Cachar Hills (DimasaKachari) [38]
			Seed	Gout	Dibrugarh (Plain Tribe) [39]
46.	*Dioscorea deltoidea* Wall. ex Griseb. (Dioscoreaceae)	Kathalu		Rheumatism	Sonitpur (Plain Tribe) [11]
47.	*Elettaria cardamomum* Maton (Zingiberacea)	Elachi	Fruit	Rheumatism	Assam (Plain tribes) [13]
48.	*Entada scandens* Benth. (Mimosaceae)	MakoriGhila	Seed	Rheumatism	Golaghat (Plain Tribe) [10]
49.	*Erythrina stricta* Roxb. (Papilionaceae)	Modar	Root Flower	Gout	Assam (Plain tribes) [13]
				Rheumatism	Tinsukia (Moran) [22]
50.	*Euphorbia antiquorum* L. (Euphorbiaceae)	Siju	Leaf	Rheumatism	Assam (Plain Tribe) [40]
51.	*Euphorbia ligularia* Roxb. (Euphorbiaceae)	Siju	Leaf	Rheumatism	Assam (Plain tribes) [40] [13]
52.	*Euryale ferox* Salisb. (Nymphaeaceae)	Nikari	Leaf	Rheumatism	Brahmaputra Valley (Plain Tribe) [24]
53.	*Ficus benghalensis* Linn. (Moraceae)	Borgach	Leaf	Gout	Lakhimpur (Plain Tribe) [27]
54.	*Girardinia diversifolia* (Link.) Fries (Urticaceae)	Sorat	Root, Bark	Rheumatism	Assam (Plain tribes) 13]
55.	*Glycosmis arborea* (Roxb.) DC (Rutaceae)	Matibel	Leaf	Gout and swelling	Kamrup (Boro) [12]
56.	*Gossypium herbaceum* Linn. (Malvaceae)	Kopah	Leaf	Rheumatism and gout	Assam (Plain tribes) [13]
57.	*Hedychium coronarium* Koen. ex Retz. (Zingiberacea)	Pakkhilaphul	Rhizome	Rheumatism	Golaghat (Plain Tribe) [10]
58.	*Heliotropium indicum* L. (Boraginaceae)	Hatisuria bon	Leaf	Sprain	Darrang (Plain Tribe) [41]
				Lumbago	Assam (Plain tribes) [13]
59.	*Hemidesmus indicus* R.Br. (Asclepiadaceae)	Anantamul	Root	Rheumatism	Assam (Plain tribes) [13]
60.	*Holarrhena pubescens* (Buch-Ham) Wall.ex G. Don. (Apocynaceae)	Dudhkuri	Fruit bark, Root, Seed	Gout Rheumatism	Assam (Plain tribes) [13]
61.	*Hydrocotyle rotundifolia* Roxb. (Apicaeae)	Horumanimuni	Leaf, Roots	Rheumatism	Sivasagar (Mishing) [42]

62.	*Impatiens balsamina* Linn. (Balsaminaceae)	Demdauka	Plant	Joint pain	Brahmaputra Valley (Plain Tribe) [24]
63.	*Imperata cylindrica* (L.) Beauv. (Poaceae)	Ulu	Root stock	Arthritis	Kamrup (Boro) [12]
64.	*Ipomoea hispida* Zuc. (Convolvulaceae)		Leaf	Rheumatism	Cachar (Deshwali) [43]
65.	*Jatropha curcas* L. (Euphorbiaceae)	Bhot-Era	Root	Gout	Assam (Plain tribes) [13]
66.	*Jatropha gossipifolia* L. (Euphorbiaceae)	Bhot-Era	Leaf	Gout and rheumatism, Sprain	Assam (Plain tribes) [13]
67.	*Justicia gendarussa* Linn. (Acanthaceae)	JatraHidhi	Root, leaf	Gout Rheumatism	Assam (Plain tribes) [13]
				Rheumatism	Golaghat (Plain Tribe) [10]
68.	*Lantana camara* Linn. (Verbenaceae)	Gaudhali	Leaf	Rheumatism	Brahmaputra Valley (Plain Tribe) [24]
69.	*Lasia spinosa* (Linn.) Thumb. (Araceae)	Kantha	Rhizome	Arthritis, Rheumatic pain	Southern Assam (Chorei) [44]
70.	*Lens culinaris* Medic. (Papilionaceae)	Mosurdali	Seed	Rheumatism	Assam (Plain tribes) [13]
71.	*Leucas plukenetii* (Roth) Spreng. (Lamiaceae)	Khangsinsa	Leaf	Rheumatic Pain	Assam (Boro) [45]
72.	*Mesua ferrea* Linn. (Clusiaceae)	Nahar	Rhizomatous stem, Flower, Bark	Gout	Dibrugarh (Plain Tribe) [39]
				Rheumatism	Sonitpur (Plain Tribe) [11]
73.	*Michelia champaka* L. (Magnoliacea)	Champa-Phull	Bark	Rheumatism	Assam (Mishing) [46]
74.	*Mimosa pudica* Linn. (Mimosaceae)	Lagibiphang	Whole plant	Gout and swelling	Kamrup (Boro) [12]
75.	*Mirabilis jalapa* L. (Nyctaginaceae)	Samkabli (Dimasa)	Leaf	Sprain and joint swelling	North Cachar Hills (Dimasa) [35]
76.	*Momordica charantia* L. (Cucurbitaceae)	Galha (Dimasa) Changkha (Lushai) Kagaichi (Zeme), Titakerela (Plain tribes)	Fruit leaf	Rheumatism	North Cachar Hills (DimasaKachari) [38] (Lushai) [16] (Zeme) [17], Majuli and Darrang (Plain tribes) [47]
				Gout	Majuli and Darrang (Plain tribes) [47]
77.	*Moringa oleifera* Lam. (Moringaceae)	Sajina	Bark, Roots Seed	Gout and swelling	Kamrup (Boro) [12]
				Rheumatic pain	Sivasagar (Plain Tribe) [31], Cachar (Bengali, Manipuri) [21]
				Gout and rheumatism, Joint pain	Assam (Plain tribes) [13]
78.	*Musa balbisiana* Colla (Musaceae)	Vimkol	Fruit peel	Gout, Sprains	Sonitpur (Plain Tribe) [26]
				Gout	Assam (Plain tribes) [13]
79.	*Myristica fragrance* Houtt. (Myristicaceae)	Jaiphal	Fruit	Rheumatism	Assam (Plain tribes [13]
80.	*Nigella sativa* Linn. (Ranunculaceae)	Kaljira	Seed	Rheumatism	Assam (Plain tribes) [13]
81.	*Ocimum sanctum* L. (Lamiaceae)	Barpai (Hmar), Shyamsata (Riang)	Whole Plant	Gout	Cachar (Hmar, Riang) [21]
82.	*Oxyceros longiflora* (Lamk.) Yamazaki (Rubiaceae)		Root	Gout and rheumatism	Assam (Plain tribes) [13]
83.	*Padarea foetida* L. (Rubiaceae)	Bhedailota	Leaf	Rheumatism	Golaghat (Plain Tribe) [10], Dibrugarh (Sonowal Kachari) [25]
84.	*Paderia scandens* (Lour.) Merr. (Rubiaceae)	Bhedailota	Leaf	Rheumatism	Assam (Plain tribes) [13]
85.	*Phlogacanthus tubiflorus* Nees. (Acanthaceae)	Ronga-Bahak	Flower	Rheumatism	Assam (Plain tribes) [13]
86.	*Piper betel* L. (Piperaceae)	Pan	Leaf	Arthritis	Kamrup (Rabha) [18]
87.	*Piper longum* L. (Piperaceae)	Pipoli	Fruit, Root	Arthritis	Kamrup (Boro) [12]
				Gout	Tinsukia (Moran) [22], Kamrup (Plain Tribe) [34]

				Rheumatism	Kamrup (Plain Tribe) [34]
88.	*Piper nigrum* L. (Piperaceae)	Jaluk	Fruit	Gout	Tinsukia (Moran) [22], Dibrugarh (Plain Tribe) [39]
89.	*Plumbago zeylanica* Linn. (Plumbaginaceae)	Agyachi	Root	Gout and Rheumatism	Assam (Plain tribes) [13]
90.	*Pongamia pinnata* (L.) Piewe (Lamk.) Bennet. (Papilionaceae)	Koroch	Seed	Rheumatism	Assam (Plain tribes) [13]
91.	*Ranunculus sceleratus* Linn. (Ranunculaceae)	Leheti	Whole Plant	Rheumatism	Nagaon (Plain Tribe) [48]
92.	*Rhynchostylis retusa* Christ. *(*Orchidaceae)	Kopouphool	Leaf, Stem, Root	Rheumatism	Sonitpur (Plain Tribe) [11]
93.	*Ricinus communis* L. (Euphorbiaceae)	Era (Assamese), Mutih (Hmar),	Leaf, Stem, Root, Seed	Rheumatism	Carcah (Hmar) [21], Kamrup (Plain Tribe) [34], Assam (Plain tribes) [13]
				Rheumatic pain and swelling	Lakhimpur (Plain tribe) [49]
				Joints and sprain	Assam (Plain tribes) [13]
94.	*Schrebera swietenioides* Roxb. (Oleaceae)	Ghanta-karna	Root	Gout	Assam (Plain tribes) [13]
95.	*Sesbania grandiflora* (L.) Pers. (Papilionaceae)	Bok-phul	Leaf	Sprain	Assam (Plain tribes) [13]
96.	*Sida cordifolia* Linn. (Malvaceae)	Lafasaiku	Leaf	Gout and swelling	Kamrup (Boro) [12]
97.	*Sida rhombifolia* L. (Malvaceae)	Barella (Tea garden community), Osomboriala (Boro)	Whole Plant	Rheumatism	Brahmaputra Valley (Plain Tribe) [24], Cachar (Tea garden community) [21], Assam (Boro) [50]
98.	*Solanum indicum* Linn. (Solanaceae)		Root	Rheumatism	Nalbari (Plain Tribe) [51]
99.	*Solanum nigrum* L. (Solanaceae)	Pokmou	Shoot	Rheumatic pain	Assam (Plain tribes) [13], Darrang (Plain Tribe) [41]
				Gout	Brahmaputra Valley (Plain Tribe) [24]
100.	*Solanum torvum* Swartz. (Solanaceae)	Kantakari	Root	Rheumatism	Nalbari (Plain Tribe) [51]
101.	*Stephania glandulifera* Miers. (Menispermacaea)		Root Tuber	Rheumatism	Assam (Plain tribes) [13]
102.	*Sterculia villosa* Roxb. (Sterculiaceae)	Odal	Stem bark	Lumbago	Assam (Plain tribes) [13]
103.	*Tamarindus indica* L. (Caesalpiniaceae)	Tengtere (Hmar), Taintai (Riang)	Leaf	Rheumatism	Cachar (Hmar, Riang) [21]
104.	*Terminalia arjuna* Wight et Arn. (Combretaceae)	Arjun -pepo	Seed	Rheumatism and lumbago	Assam (Deori) [30]
105.	*Tinospora cordifolia* (Willd.) Hk.f. &Thoms. (Menispermacaea)	Hagunilota	Leaf, Bark, Stem, Root	Rheumatism	Assam (Plain tribes) [13], North East India [20], Kamrup (Plain Tribe) [34]
				Gout	Assam (Plain tribes) [13], Dibrugarh (Sonowal Kachari) [25]
106.	*Tragia involucrata* Linn. (Euphorbiaceae)	Surat	Root	Gout	Tinsukia (Moran) [22], Dibrugarh (Plain Tribe) [39]
107.	*Trapa bispinosa* Roxb.(Trapaceae)	Hingari	Fruit	Lumbago	Brahmaputra Valley (Plain Tribe) [24]
108.	*Typha elephantina* Roxb. (Typhaceae)		Bark, Root	Rheumatism	Assam (Plain tribes) [13]
109.	*Urena lobata* L. (Malvaceae)	Bon vendi (Plain Tribe), Bachita (Barman), Sehnap (Lushai),Haggravendi (Boro),Saberthied (Jaintia), Tingneh (Zeme)	Root Leaf Fruits	Rheumatic pain	Brahmaputra Valley (Plain Tribe) [24], Cachar (Barman) [21] North Cachar Hills (Zeme) [17] (Lushai) [16]
				Gout and swelling	Kamrup (Boro) [12]
				Sprain	North Cachar Hills (Jaintia) [52]
110.	*Vetivera zizanoides* (Linn.) Nash. (Poaceae)	Birina	Root	Rheumatic pain and sprains	Jorhat (Plain tribe) [53]

111.	*Vigna mungo* L. (Papilionaceae)	MatiMah	Seed	Rheumatism	Golaghat (Plain Tribe) [10]
112.	*Vitex negundo* L. (Verbenaceae)	Pochatia (Assamese), Tingpir (Hmar)	Leaf	Rheumatic pain	Assam (Plain tribes) [13], Kamrup (Plain Tribe) [34], Cachar (Hmar) [21]
				Gout and swelling	Kamrup (Boro) [12]
				Gout	Assam (Plain tribes) [13]
				Joint pain	Sonitpur (Plain Tribe) [26], Bongaigaon (Koch Rajbangshi) [15]
				Rheumatoid arthritis and gout	Kamrup (Plain Tribe) [54]
113.	*Zanthoxyllum nitidum* (Rosc.) DC. (Rutaceae)	Zabrang	Leaf, Bark and Root	Rheumatism	Assam (Plain tribes) [13], (Tai-Khamyang) [32] (Mishing) [55]
				Gout	Majuli and Darrang (Plain tribes) [47]
114.	*Zingiber montanum* (J, Koen.) Link ex A. Dietr. (Zingiberacea)	Banadrk (Nepali), Borahu (Plain tribes)	Rhizome	Rheumatism	Assam (Plain tribes) [13]
				Sprain and inflammation	Assam (Plain tribe) [19] (Nepalese) [56]
115.	*Zingiber officinal* Rosc. (Zingiberacea)	Ada (Plain Tribe), Haizeng (Boro)	Leaf, Rhizome	Arthritis	Kamrup (Boro) [12]
				Rheumatic pain	Assam (Plain tribes) [13], Assam (Deori) [30]
				Gout	Tinsukia (Moran) [22]
				Lumbago	Assam (Deori) [30]
116.	*Zingiber zerumbet* (L.) Sm. (Zingiberacea)		Rhizome	Rheumatism	Assam (Plain tribes) [13]

3. Discussion and conclusion

The present study has brought into light total 116 plant species under 100 genera against 7 types of joint diseases. 115 of them belong to angiosperms and 1 belongs to pteridophytes. Highest plant species belongs to family Zingiberaceae (9) followed by Solanaceae and Euphorbiaceae (8), Papilionaceae (6), Poaceae and Malvaceae (5), Rutaceae and Araceae (4), Verbenaceae, Rubiaceae, Ranunculaceae, Piperaceae, Convolvulaceae, Asclepiadaceae and Acanthaceae (3), Mimosaceae, Menispermacaea, Lamiaceae, Cucurbitaceae, Caesalpiniaceae and Amaryllidaceae (2) and others represented by 1 species. Total 22 tribes are involved and represented by 14 districts, 3 regions viz. Entire Assam, Barak Valley and Brahmaputra Valley. Highest plants are reported against rheumatism followed by gout, sprain, arthritis, joint pain etc. Different plant parts which are used against various diseases are leaf, stem, root, rhizome, bark, fruit etc. It shows the importance of medicinal plants among ethnic groups of Assam for the treatment of various joint diseases.

The ethnic tribes are using different kinds of medicinal plants in their day to day life and also use them as a secondary line of treatment procedure in present era. The villages are having poor hospital facility and these herbal plants are showing some light in their life by giving them relief from their sufferings. The herbal treatment is being transformed from generation to generation with minimal documentation and preservations as a result of which many of the treatment techniques are being deformed or abolished. Proper preservation and scientific approaches are being necessary for the proper documentation of the herbs that are being used by the ethnic tribes of Assam. Many research activities are being carried out by different researchers and some morals has been uplifted for the proper documentation of these herbs and knowledge. Finally, it can be concluded that proper documentation, preservation, create awareness among ethnic groups and pharmacological analysis of theses medicinal plants are highly solicited for future purpose so that effective and validated herbal treatment can be reformed and classed for future use and care.

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