Ethnobotanical investigation on herbal remedies for musculoskeletal disorders in Dakshina Kannada district, Karnataka, India

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Ethnobotany Research and Applications 29:9 (2024) - http://dx.doi.org/10.32859/era.29.9.1-48
Manuscript received: 11/03/2024 - Revised manuscript received: 07/05/2024 - Published: 08/05/2024

Research

Abstract

Background: Musculoskeletal disorders (MSDs) are of common occurrence among the elderly people which impair mobility and associated with mild to acute pain. A large number of synthetic drugs are available to treat different kinds of MSDs but often associated with severe side effects. People of rural and remote regions overcome these problems by traditional herbal treatments available locally which are safe and effective. Traditional herbal therapies are age-old practices evolved and orally transferred to generations over a period of time. Hence, this survey has been undertaken to document the ethnomedicinal practices pertaining to MSDs.

Methods: Ethnobotanical surveys were carried out during April 2018 to October 2023 in rural and remote regions of Dakshina Kannada district of Karnataka state, India, to collect primary data on usage of medicinal plants for treating MSDs. Information was gathered from 149 traditional practitioners through semi-structured open ended interviews using a questionnaire. The data was analyzed by conventional methods and quantitative parameters such as use value (UV), relative frequency of citation (RFC) and informant consensus factor (ICF).

Results: A total of 210 plant species belonging to 68 families have been documented. This survey has recorded 352 herbal preparations with 634 use reports to treat arthritis, backache, bone fracture, joint pain, muscle pain, spasm and vertigo. Medicinal plant species which exhibited high RFC values are *Brassica nigra* (0.27), *Cuminum cyminum* (0.24), *Ricinus communis* (0.21) and *Allium sativum* (0.21). High ICF value is reported for the disease category vertigo (ICF=0.67), followed by spasm (ICF=0.56), bone fracture (ICF=0.51), muscle pain (ICF=0.27), backache (ICF=0.18), joint pain (ICF=0.12) and the least ICF value for arthritis (ICF=0.03).

Conclusions: Fabaceae was the most dominant family in terms of species diversity (22 species), followed by Apocyanaceae, Malvaceae and Rubiaceae (9 species each); Phyllanthaceae and Rutaceae (8 species each); Acanthaceae (7 species), Euphorbiaceae, Lamiaceae, Myrtaceae and Moraceae (6 species each); Lauraceae, Poaceae and Solanaceae (5 species each). Plant species such as *Brassica nigra*, *Cuminum cyminum* and *Vitex negundo* have been used to treat 6 disease categories; *Cocos nucifera*, *Croton persimilis*, *Rauvolfia serpentina*, *Ricinus communis*, *Scleropyrum pentandrum* and *Tamarindus indica* were used to treat 5 disease categories. The main route of administration of drug was external application (82.10%). Among the documented plant species, 17 species are endemic to Western Ghats and Peninsular India. Plant species *Syzygium travancoricum* is critically endangered whereas *Borassus flabellifer*, *Syzygium caryophyllatum* and *Tectona grandis* are in endangered category as per IUCN red list.

Keywords: Medicinal plants, Arthritis, Traditional knowledge, Informant consensus factor

Background

Musculoskeletal conditions are relevant across the life span of an individual. The problems associated with musculoskeletal system range from conditions that arise suddenly and are short-lived (such as fractures, sprains and strains) to long-term conditions such as chronic primary low back pain and osteoarthritis**.** The most common feature of MSDs is pain and restricted mobility which weakens people's capability to work (Rathi & Rathi 2020). World health organization has estimated that about 20-33% of people across the globe live with painful musculoskeletal conditions of which 9.6% are men and 18% are women. These disorders are more common among the elder generations. MSDs such as arthritis, back pain, muscle pain and bone fractures are the second most common cause of disability in the world. In Asia, there is a very high prevalence of MSDs especially in India and China (Kantasrila *et al*. 2020). Modern lifestyle of humans such as improper diet, lack of regular exercise, wrong posture, long working hours and heavy physical work are the major causes for developing pain related musculoskeletal symptoms (Mownika *et al*. 2021).

At a global level, for MSD's various treatment modalities are used which include ultrasound treatment, administration of analgesics and non-steroidal anti-inflammatory drugs, disease modifying anti-rheumatic drugs but their use neither provide adequate pain relief nor modifies the disease process. However, the severe side effects associated with these treatments often limit their use (Malik *et al*. 2018, Lindler *et al*. 2020, Mownika *et al*. 2021). An US based survey between 1992 and 2010 indicated that MSDs accounted for about 29-35% of all occupational illnesses involving days away from work. According to a survey, musculoskeletal pain nearly affects one in every four adults and the annual cost of managing pain ranged from 560 to 635 billion dollars for the United States (Esakkimuthu *et al*. 2021). Herbal preparations used by traditional healers play an important role to combat MSDs as they are safe, effective, inexpensive and easily available. A study indicated that nearly 70% of patients suffering with MSDs prefer herbal therapies (Gupta *et al*. 2015).

In India, various traditional healthcare systems such as Siddha, Ayurveda and Unani are in practice which uses more than 7500 species of flowering plants (Esakkimuthu *et al*. 2021, Saroya 2017). The evergreen forests in the central Western Ghats of Dakshina Kannada district are home for several ethnic communities. The traditional practitioners of this region belong to tribal communities such as Nalike, Naikas, Malekudiyas, Koragas, and non-tribal ethnic communities such as Belchavada, Bhandary, Billava, Havyaks, Bunts, Devadiga, Kumbara, Mugera, Patali, Rajapura Saraswaths, Vishwakarma, Vokkaliga, Parava, Ganigas and Yadavas. They practice and rely on traditional medicine for the primary health care (Bhandary 2000, Yogeesha & Krishnakumar 2022 a). Western Ghats region of India is one of the biodiversity hotspots in the world due to its species richness and endemism. It has a significant wealth of socio-cultural traditions and associated knowledge system developed from time immemorial (Lingaraju *et al*. 2013). A rich tradition on usage of medicinal plants among the tribes and ethnic people makes India as one of the ethnobotanical hotspots of the world. The tribal people of the country mainly harvest non-timber forest products and traditionally employ those in different medicinal preparations for effective recovery from diseases (Pradhan & Mondal 2023). Researchers were successful in exploring ethno-medicinal information in different regions of Western Ghats of Karnataka (Bhandary 2000, Bhat 2005, Gireesha & Raju 2013, Lingaraju *et al*. 2013, Rajakumar & Shivanna 2009, Parinitha *et al*. 2004, Mahishi *et al*. 2005, Bhandary & Chandrashekar 2014, Savinaya *et al*. 2016, Acharya *et al*. 2022). Similarly, studies conducted in Uttara Kannada district of Central Western Ghats region in Karnataka State revealed that Siddis (Bhandary *et al*. 1995), Gowlis (Bhandary *et al*. 1996), Kunabis (Harsha *et al*. 2002), Khare Vokkaliga communites (Achar *et al*. 2010) have significant ethnic medicinal knowledge.

In the last decade, researchers have resorted to in-depth documentation of ethno-medicinal information on specific diseases such as herpes in Coastal regions of Karnataka (Bhandary & Chandrashekar 2011), wounds, bone fracture and arthritis in Uttara Kannada district (Bhat *et al*. 2012, Upadhya *et al*. 2012, Bhat *et al*. 2019), psychological disorders in Vijayapur district (Laddimath & Rao 2016), migraine, sprains and neurological disorders in Dakshina Kannada district (Yogeesha & Krishnakumar 2022 a, Yogeesha & Krishnakumar 2022 b, Yogeesha & Krishnakumar 2023). Even though, ethnobotanical investigations on medicinal plants have got huge momentum in the last few years, till date a few of such studies followed systematic strategies based on the quantitative ethnobotanical approaches for the documentation of this knowledge. Hence a systematic data collection from traditional practitioners and its logical interpretation is the key to the desired outcome on the uses of medicinal plants which has been followed in our present study. Considerable numbers of traditional healers of this region are recognized as specialists in the treatment of various categories of MSDs. Hence, an attempt was made to document medicinal information to treat such disorders.

Materials and Methods

Study area

Dakshina Kannada is the southern district of Karnataka state, India, attached to the Western Ghats on the eastern side, with an area of 4866 km^2. It lies between 12°23' - 13°49' North latitude and 74°37' - 75°41' East longitude. Geographically, the district is divided into 7 taluks of which, Puttur, Sullia, Kadaba, Belthangady and Bantwal are located along the Western Ghats. Mangalore taluk is urbanized and located along the Western coast (Figure 1). Annual average rainfall varies from 3500 mm and 4550 mm. Kumaradhara, Netravathi, Nandini, Phalguni, Shambhavi and Payaswani are the major rivers of the district. Majority of people inhabiting the rural areas are farmers who cultivate various plantation crops such arecanut, cashew, cocoa, coconut, pepper and rubber. Present surveys were carried out in Western Ghats region of this district.

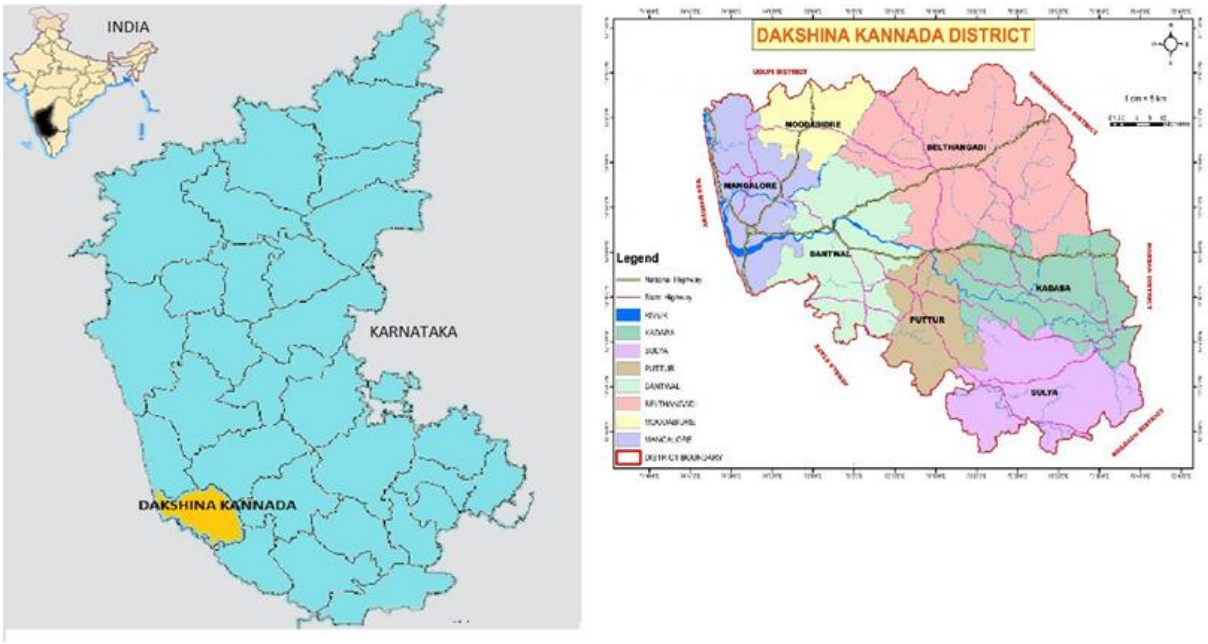

Figure 1. Map of the study area showing location of the survey in Dakshina Kannada district, Karnataka, India.

Ethno-botanical survey and plant identification

The data for this investigation were obtained through direct interviews with the local traditional practitioners. The studies were conducted between April 2018 and October 2023. Traditional practitioners from the tribal communities such as Koraga, Malekudiya, Naika and Nalike settled in forest patches and various ethnic communities Belchavada, Bhandary, Billava, Bunts, Devadiga, Havyaka, Kumbara, Mugera, Patali, Rajapura Saraswaths, Vishwakarma, Vokkaliga, Parava, Ganigas and Yadavas were interviewed. The verbal consent of the informants was sorted before documentation. Importance of the survey was explained to them with the aid of the local heads. Each practitioner was visited three times during different seasons to ensure reliable and exhaustive data. Information was collected through open ended discussions with a semi-structured questionnaire (Martin 1995, Hoffman & Gallaher 2007). The written consent of the practitioners was taken after documentation (Appendix I). Inconsistent information given before and those of successive visits on a particular plant species were considered unreliable and rejected. In accordance with conventional inquiry process, data was collected using local dialects (Figure 2). Photographs of each plant species were taken and herbaria of plants were prepared for authentic identification. Plant specimens were identified using relevant floras such as Flora of South Kanara (Bhat 2014), Flora of Karnataka (Saldanha 1984), and Flora of Presidency of Madras (Gamble 1984). The valid names of the plant species were updated visiting Plants of the World Online (https://powo.science.kew.org). The voucher specimens were deposited in the herbarium of the Department of Applied Botany, Mangalore University, Karnataka state, India.

Figure 2. Data collection by interviewing traditional practitioners

IUCN Conservation status

Identified plant species were checked for their conservation status by consulting the Red List of Threatened Species (https://www.iucnredlist.org/) database.

Disease categorization

Medical terminologies for tribal terms of different diseases, symptoms and ailments recorded during the survey were assigned by consulting allopathic medical practitioners. Finally, all the diseases and symptoms were categorized following the standard method of Cook (1995) with some necessary modifications based on the present investigations.

Data Analysis

The data was analyzed using MS Excel by conventional methods and quantitative techniques. The information such as scientific name of the plant, family name, voucher specimen number, vernacular name, parts used in the herbal formulation and their ethnomedicinal uses were attributed to each species. Ethnobotanical quantitative parameters such as Use-Value (UV), Relative Frequency of Citation (RFC)) and Informant Consensus Factor (ICF) were employed in analyzing the data. Data of this investigation were cross-checked with Ayurvedic literature and presented in Table 1.

Use-Value (UV)

The relative importance of each plant species used in herbal remedy is reported as the use value and it was calculated using the following formula (Albuquerque *et al*. 2006),

$$UV = \sum Us/N$$

Where, 'UV' is Use-value for the species, '∑Us' is sum of the uses mentioned for a species and 'N' is the total number of informants

Relative Frequency of Citation (RFC)

Relative frequency of citation is obtained by dividing the number of informants mentioning the use of a particular species to the total number of informants participated in the study. Highest number of citations for a particular plant species suggests for its wide use in a community. It is calculated using the following formula (Tardío & Pardo-de Santayana 2008),

$$RFC = FC/N$$

Where, 'RFC' is relative frequency of citation, 'FC' is number of informants who mentioned a particular species and 'N' is the total number of informants.

RFC value usually ranges between 0 and 1. RFC value is close to zero when only few informants mention a particular species and the upper limit (one) is obtained when a greater number of informants quote a particular species.

Informant Consensus factor (ICF)

The informant consensus factor (ICF) is a measure employed to find out intercultural relevance and acceptability of use of a particular plant species in consideration. This value for a disease category ranges from 0 to 1. ICF values are low (near 0), if plants are selected randomly or if there is no exchange of information among healers and ICF values will be high (near 1) if there is a well-defined selection criterion in the community or if the information is exchanged between the informants.

The ICF is calculated using the following formula (Heinrich *et al*. 1998),

$$ICF = (Nur-Nt)/(Nur-1)$$

Where 'Nur' is the number of citations in each ailment category and 'Nt' is number of taxa used for particular ailment category.

Results and Discussion

Demographic details of Practitioners

A total of 149 traditional practitioners (105 males and 44 females) were interviewed in the study area. Majority of the practitioners are males. This could be because in the rural societies, men are mostly involved in outdoor activities and women take care of household. Moreover, collection of raw materials from the wild is often challenging for women. Among the practitioners, 137 practitioners inherited their traditional knowledge as a family heirloom and only 12 practitioners acquired the knowledge through internship under established practitioners. Majority of traditional practitioners are farmers (85.91%) followed by agricultural labourers (12.75%) and registered medical practitioners (1.34%). The age group of 61-80 years was well represented (45.64%) followed by 41-60 years (42.95%), above 81 years (6.71%) and 21-40 years (4.70%). The demographic data suggests a predominance of older generation. A very few younger people are practicing this system. This is because majority of the rural younger generation migrates to cities in search of livelihood. These findings are in line with earlier ethnobotanical investigations (Bhandary 2000, Bhat *et al*. 2019, Caunca & Balinado 2021, Hu *et al*. 2020, Nadaf *et al*. 2018, Mohanty *et al*. 2015, Chekole *et al*. 2017). There is a need to encourage younger generation to ensure continuity and preservation of this precious knowledge system.

Enumeration of ethnomedicinal plants

A total of 210 plants belonging to 68 families have been documented to treat arthritis, backache, bone fracture, joint pain, muscle pain, spasm and vertigo (Table 1).

Table 1. Ethno-medicinal plants used in the treatment of musculoskeletal disorders

Botanical name, Family, Voucher specimen number	Part used	Common name	UV	RFC	IUCN status	Disease treated	Previous literature reports
Abrus precatorius L., Fabaceae, YGA 228	Leaf	Gulaganji	0.40	0.03	NE	Backache, Spasm	Rheumatism (Santhoshkumar *et al*. 2019); bone fracture (Upadhya *et al*. 2012); wound healing (Sharma & Sahu 2022); arthritis (Subramoniam *et al*. 2013); musculoskeletal ailments (Esakkimuthu *et al*. 2021)
Abrus pulchellus Thwaites., Fabaceae, YGA 132	Leaf	Usulu balli	0.67	0.02	NE	Muscle Pain, Backache	NR
Acampe praemorsa (Roxb.) Blatt. & McCann., Orchidaceae, YGA 086	Root	Mara bare	NC	0.01	NE	Arthritis	Rheumatism (Nambiar *et al*. 1985); rheumatism, bone fracture, arthritis (Saroya 2017)
Achyranthes aspera L., Amaranthaceae, YGA 055	WP	Uttarani	0.33	0.04	NE	Backache, Joint Pain	Pain in joints (Esakkimuthu *et al*. 2021); antiarthritic (Sharma & Sahu 2022)
Actinodaphne angustifolia (Blume) Nees, Lauraceae, YGA 235	Leaf	Manjana mara	0.29	0.05	NE	Vertigo, Bone Fracture	Spasmolytic (Khare 2008)
Actinodaphne tadulingami Gamble, Lauraceae, YGA 229	Leaf	Manjanayaka	0.33	0.04	NT	Vertigo, Bone Fracture	NR
Adenanthera pavonia L., Fabaceae, YGA 103	Leaf	Chinni kai	0.50	0.03	NE	Joint Pain, Spasm	Rheumatism (Santhoshkumar *et al*. 2019); anti-inflammatory (Khare 2008)
Aegle marmelos (L.) Correa., Rutaceae, YGA 062*	Bark, Leaf	Bilva patre	0.33	0.02	NT	Arthritis	Anti-inflammatory (Khare 2008); arthritis (Subramoniam *et al*. 2013); rheumatism, bone fracture (Sharma & Sahu 2022); anti-inflammatory (Saroya 2017)
Allium cepa L., Amaryllidaceae, YGA 163*	Bulb	Neerulli	0.75	0.03	NE	Arthritis, Bone Fracture, Vertigo	Rheumatism (Santhoshkumar *et al*. 2019); anti-inflammatory, antispasmodic (Khare 2008); quadriplegia (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); anti-inflammatory (Saroya 2017)

Allium sativum L., Amaryllidaceae, YGA 164*	Bulb	Belluli	0.13	0.21	NE	Arthritis, Muscle Pain, Backache, Joint Pain	Bone fracture (Santhoshkumar *et al*. 2019); pain in knees (Esakkimuthu *et al*. 2021); lumbago (Bhat 2005); arthritis (Subramoniam *et al*. 2013); musculoskeletal disorders (Rathi & Rathi 2020); bone fracture, arthritis (Sharma & Sahu 2022); muscle pain, arthritis (Saroya 2017)
Allophylus rheedei (Wight) Radlk., Sapindaceae, YGA 060	Leaf	Mooru kabarina soppu	0.38	0.05	NE	Arthritis, Muscle Pain, Bone Fracture	NR
Aloe vera (L.) Burm.f., Asphodelaceae, YGA 013	Leaf	Lolerasa	0.15	0.18	NE	Arthritis, Backache, Joint Pain, Bone Fracture	Anti-inflammatory (Khare 2008); joint pain (Esakkimuthu *et al*. 2021); wound healing (Sharma & Sahu 2022); arthritis (Saroya 2017)
Alstonia scholaris (L.) R. Br., Apocyanaceae, YGA 114	Bark	Balindra mara	0.33	0.04	LC	Arthritis, Spasm	Rheumatism (Nambiar *et al*. 1985), rheumatism (Santhoshkumar *et al*. 2019); spasmolytic (Khare 2008)
Anacardium occidentale L., Anacardiaceae, YGA 144*	Bark	Geru mara	0.33	0.02	LC	Bone Fracture	NR
Andrographis paniculata (Burm.f.) Nees., Acanthaceae, YGA 067	Leaf, Stem	Kiratha kaddi	0.43	0.05	NE	Arthritis, Backache, Joint Pain	Vertigo (Uddin & Zidorn 2020); hemiplegia (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); arthritis (Subramoniam *et al*. 2013); anti-inflammatory (Sharma & Sahu 2022)
Annona muricata L., Annonaceae, YGA 225*	Leaf, Seed	Laxmana phala	NC	0.01	LC	Arthritis	NR
Antidesma acidum Retz., Phyllanthaceae, YGA 104	Leaf	Murgina kodu soppu	0.06	0.11	LC	Bone Fracture	Bone fracture, arthritis (Yogeesha & Kumar 2022)
Antidesma montanum Blume., Phyllanthaceae, YGA 194	Leaf, Bark	Koral soppu	0.1	0.07	LC	Bone fracture	Bone fracture (Yogeesha & Kumar 2022); bone fracture (Bhat 2005)
Arachis hypogaea L., Fabaceae, YGA 131*	Seed	Nela kadale	1.00	0.01	NE	Arthritis, Joint Pain	NR
Areca catechu L., Arecaceae, YGA 224*	Leaf, Seed	Adike	1.00	0.01	DD	Arthritis, Joint Pain	Sedative (Khare 2008)
Aristolochia indica L., Aristolochiaceae, YGA 068	Root, Leaf	Iswara beru	0.18	0.15	NE	Arthritis, Muscle Pain, Joint Pain, Bone Fracture	Joint pain (Nambiar *et al*. 1985)
Aristolochia tagala Cham., Aristolochiaceae, YGA 153	Bark, Root	Maleshwari	1.00	0.01	NE	Arthritis, Bone Fracture	NR
Artocarpus gomezianus Wall. ex Trecul., Moraceae, YGA 151	Bark	Unde puli	NC	0.01	NE	Arthritis	NR

Artocarpus heterophyllus Lam., Moraceae, YGA 191	Bark, Leaf	Halasu	0.67	0.02	NE	Arthritis, Joint Pain	Arthritis (Santhoshkumar *et al*. 2019); musculoskeletal ailments (Esakkimuthu *et al*. 2021)
Asparagus racemosus Willd., Asparagaceae, YGA 106	Root	Shathavari	NC	0.01	NE	Arthritis	Gout (Khare 2008); arthritis (Mownika *et al*. 2021); arthritis (Subramoniam *et al*. 2013); gout, antispasmodic (Sharma & Sahu 2022); gout (Saroya 2017)
Asystasia gangetica (L.) T.Anderson., Acanthaceae, YGA 097	Stem, Leaf, Root, WP	Maithal	0.57	0.05	NE	Arthritis, Backache, Joint Pain, Bone Fracture	Rheumatism (Santhoshkumar *et al*. 2019); rheumatism (Bhat 2005)
Averrhoa carambola L., Oxalidaceae, YGA 047*	Fruit	Dare puli	0.25	0.03	NE	Arthritis	Rheumatism (Bhat 2005); anti-inflammatory, antispasmodic (Khare 2008)
Azadirachta indica A.Juss., Meliaceae, YGA 043*	Leaf, Seed	Kahi bevu	0.27	0.10	LC	Arthritis, Backache, Joint Pain, Spasm	Rheumatism (Nambiar *et al*. 1985); rheumatism (Santhoshkumar *et al*. 2019); anti-inflammatory (Khare 2008); joint pain (Esakkimuthu *et al*. 2021); arthritis (Subramoniam *et al*. 2013); gout, wound healing, analgesic (Sharma & Sahu 2022); neuromuscular pain, bone fracture (Saroya 2017)
Baccharoides anthelmintica (L.) Moench., Asteraceae, YGA 195	Seed	Kaala jeerige	1.00	0.01	NE	Arthritis, Joint Pain	Arthritis (Bairy 2007); arthritis (Babu *et al*. 2020)
Baringtonia racemosa (L.) Spreng., Lecythidaceae, YGA 115	Bark, Leaf, Fruit	Samudra maphala	0.33	0.02	NE	Arthritis	Arthritis (Subramoniam *et al*. 2013)
Barleria prionitis L., Acanthaceae, YGA 121	Leaf, Root	Goranti	1.00	0.03	LC	Arthritis, Muscle Pain, Backache, Joint Pain	Arthritis (Chandrasekar & Chandrasekar 2017); rheumatism (Santhoshkumar *et al*. 2019); gout, wound healing, neuromuscular disease (Sharma & Sahu 2022); anti-inflammatory (Saroya 2017)
Bergera koenigii L., Rutaceae, YGA 065*	Leaf	Karibevu	0.50	0.03	LC	Arthritis, Joint Pain	Rheumatism (Santhoshkumar *et al*. 2019); spasmolytic, anti-inflammatory (Khare 2008)
Blepharis maderaspatansis (L.) B.Heyne ex Roth., Acanthaceae, YGA 021	Leaf	Gadimaddu	1.00	0.02	NE	Arthritis, Backache, Joint Pain	Bone fracture (Santhoshkumar *et al*. 2019)
Borassus flabellifer L., Arecaceae, YGA 066	Leaf, ES, Fruit	Thale	1.00	0.01	EN	Arthritis, Joint Pain	Joint pain (Acharya *et al*. 2022); anti-inflammatory (Khare 2008); pain in joints (Esakkimuthu *et al*. 2021); arthritis (Subramoniam *et al*. 2013)

Brassica nigra (L.) K.Koch., Brassicaceae, YGA 137*	Seed	Sasive	0.15	0.27	LC	Arthritis, Muscle Pain, Backache, Joint Pain, Bone Fracture, Spasm	Joint pain (Nath & Deka 2011)
Breynia vitis-idaea (Burm.f.) C.E.C.Fisch., Phyllanthaceae, YGA 058	Leaf	Palli soppu	0.50	0.01	LC	Arthritis	NR
Bridelia stipularis (L.) Blume., Phyllanthaceae, YGA 123	Bark, Leaf	Banda gida	1.00	0.01	LC	Arthritis, Bone Fracture	Bone fracture (Santhoshkumar *et al*. 2019)
Bryophyllum pinnatum (Lam.) Oken., Crassulaceae, YGA 160	Leaf	Kaadu basale	NC	0.01	NE	Joint Pain	Vertigo (Uddin & Zidorn 2020)
Bulbophyllum sterile (Lam.) Suresh., Orchidaceae, YGA 083	Leaf	Pole kai	1.00	0.02	NE	Arthritis, Joint Pain, Bone Fracture	NR
Bunium bulbocastanum L., Apiaceae, YGA 146	Seed	Kari jeerige	0.36	0.07	NE	Arthritis, Backache, Joint Pain, Bone Fracture	NR
Caesalpinia bonduc (L.) Roxb., Fabaceae, YGA 064	Leaf, Fruit, Seed	Kalengi kai	0.67	0.02	LC	Arthritis, Joint Pain	Bone fracture, rheumatism (Santhoshkumar *et al*. 2019); antirheumatic (Khare 2008); arthritis (Subramoniam *et al*. 2013)
Calophyllum apetalum Willd., Calophyllaceae, YGA 071	Seed	Sirihonne	NC	0.01	VU	Arthritis	Rheumatism (Nambiar *et al*. 1985); rheumatism (Bhat 2005); arthritis (Subramoniam *et al*. 2013)
Calophyllum inophyllum L., Calophyllaceae, YGA 070	Seed, Leaf	Ponne mara	0.18	0.07	LC	Arthritis, Backache	Rheumatism (Bhandary 2000); antiarthritic, anti-inflammatory (Khare 2008); arthralgia (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007)
Calotropis gigantea (L.) Dryand., Apocyanaceae, YGA 017	Leaf, Latex, Root	Ekka	0.21	0.13	NE	Arthritis, Muscle Pain, Backache, Joint Pain	Rheumatism (Nambiar *et al*. 1985); musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); lumbago (Bhat 2005); musculoskeletal disorders (Rathi & Rathi 2020); rheumatism (Sharma & Sahu 2022)
Camellia sinensis (L.) Kuntze., Theaceae, YGA 188*	Leaf, ST	Chaha gida	NC	0.01	DD	Backache	Sedative (Nadaf *et al*. 2019); arthritis (Subramoniam *et al*. 2013)
Canthium coromandelicum (Burm.f.) Alston., Rubiaceae, YGA 073	Bark, Leaf	Karemullu	1.00	0.01	NE	Arthritis, Bone Fracture	NR
Capsicum annuum L., Solanaceae, YGA 222*	Fruit	Menasu	0.50	0.01	LC	Arthritis	Rheumatism (Santhoshkumar *et al*. 2019); muscle spasm, rheumatism (Khare 2008)
Careya arborea Roxb., Lecythidaceae, YGA 045	Bark	Daddalu mara	0.60	0.03	NE	Arthritis, Muscle Pain, Backache	Arthritis (Bhat *et al*. 2019)
Carica papaya L., Caricaceae, YGA 166*	Leaf, Bark	Pappayi	0.33	0.02	DD	Bone Fracture	Bone fracture (Upadhya *et al*. 2012); anti-inflammatory (Khare 2008)

Cassia fistula L., Fabaceae, YGA 117	Bark	Konde mara	0.40	0.03	LC	Arthritis, Spasm	Inflammation, rheumatism (Nambiar *et al*. 1985); bone fracture (Santhoshkumar *et al*. 2019); musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); arthritis (Subramoniam *et al*. 2013); arthritis (Sharma & Sahu 2022); rheumatism, rib pain (Saroya 2017)
Ceiba pentandra (L.) Gaertn., Malvaceae, YGA 129*	Bark	Hasige hatthi mara	NC	0.01	LC	Arthritis	Rheumatism (Khare 2008)
Chassalia curviflora (Wall.) Thwaites., Rubiaceae, YGA 027	WP	Kadu Garudapatala	NC	0.01	NE	Arthritis	Joint pain, muscle pain (Gowramma *et al*. 2020)
Chrysopogon zizanioides (L.) Roberty., Poaceae, YGA 090*	Root	Lavancha	NC	0.01	NE	Arthritis	NR
Cinnamomum verum J.Presl., Lauraceae, YGA 052	Bark, Leaf	Dalchinni	0.16	0.17	NE	Arthritis, Muscle Pain, Backache, Joint Pain	Arthritis (Santhoshkumar *et al*. 2019); joint pain (Acharya *et al*. 2022); arthritis (Subramoniam *et al*. 2013); anti-inflammatory, wound healing (Sharma & Sahu 2022)
Cissus quadrangularis L., Vitaceae, YGA 033	Stem, Leaf	Sanduballi	0.25	0.08	NE	Arthritis, Joint Pain, Bone Fracture	Bone fracture, rheumatism (Santhoshkumar *et al*. 2019); bone fracture (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); lumbago (Bhat 2005); musculoskeletal disorders (Rathi & Rathi 2020)
Citrus limon (L.) Osbeck., Rutaceae, YGA 030*	Leaf, Fruit	Nimbe	0.29	0.09	LC	Arthritis, Muscle Pain, Backache, Joint Pain	Bone fracture (Santhoshkumar *et al*. 2019); rheumatism (Khare 2008); joint pain (Nath *et al*. 2011)
Citrus medica L., Rutaceae, YGA 005*	Leaf	Mahaphala	0.29	0.09	LC	Arthritis, Muscle Pain, Joint Pain, Vertigo	Joint pain, bone fracture (Santhoshkumar *et al*. 2019); spasmodic pain (Sharma & Sahu 2022)
Citrus reticulata Blanco, Rutaceae, YGA 221*	Fruit	Narangi	0.20	0.03	NE	Vertigo	Sprain (Yogeesha & Krishnakumar 2022)
Clerodendrum infortunatum L., Lamiaceae, YGA 050	Root	Ittovu	0.67	0.02	LC	Arthritis, Bone Fracture	Rheumatism (Khare 2008)
Cocos nucifera L., Arecaceae, YGA 223*	Fruit, Seed, Leaf, ES	Thengu	0.56	0.06	NE	Arthritis, Muscle Pain, Backache, Bone Fracture, Vertigo	Sedative (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); anti-inflammatory (Bhat 2005); bone fracture (Upadhya *et al*. 2009)

Coriandrum sativum L., Apiaceae, YGA 217*	Seed	Kothambari	0.50	0.03	NE	Backache, Joint Pain	Sedative (Nadaf *et al*. 2019); arthritis (Chandrasekar & Chandrasekar 2017); anti-inflammatory (Khare 2008); arthritis (Subramoniam *et al*. 2013); vertigo (Saroya 2017)
Coscinium fenestratum (Gaertn.) Colebr., Menispermaceae, YGA 230	Stem, Root	Maramanjal	0.33	0.04	DD	Arthritis, Spasm	Joint pain (Santhoshkumar *et al*. 2019); fractures (Khare 2008); arthritis (Subramoniam *et al*. 2013)
Cosmostigma cordatum (Poir.)M.R.Almeida., Apocyanaceae, YGA 036	Leaf, Stem	Peru kujumbe	NC	0.01	NE	Arthritis	Anti-inflammatory (Bhat 2005)
Crotolaria pallida Aiton., Fabaceae, YGA 219	Leaf	Giji giji kayi	NC	0.01	NE	Arthritis	NR
Croton persimilis Mull.Arg., Euphorbiaceae, YGA 042	Bark, Leaf, Root	Somara mara	0.36	0.09	NE	Arthritis, Muscle Pain, Backache, Joint Pain, Bone Fracture	Sprains (Nambiar *et al*. 1985); arthritis (Bhandary *et al*. 1996)
Cuminum cyminum L., Apiaceae, YGA 119*	Seed	Jeerige	0.17	0.24	NE	Arthritis, Muscle Pain, Backache, Joint Pain, Bone Fracture, Spasm	Rheumatism (Bhat 2005); quadriplegia (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); joint pain (Acharya *et al*. 2022); arthritis (Subramoniam *et al*. 2013); analgesic, anti-inflammatory (Sharma & Sahu 2022); antispasmodic (Khare 2008)
Curcuma longa L., Zingiberaceae, YGA 034*	RH	Arashina	0.57	0.05	DD	Arthritis, Muscle Pain, Joint Pain, Bone Fracture	Arthritis, bone fracture (Yogeesha & Kumar 2022); anti-inflammatory (Khare 2008); arthritis (Subramoniam *et al*. 2013); gout, sprains, antispasmodic (Sharma & Sahu 2022); arthritis (Saroya 2017)
Cyanthillium cinereum (L.) H.Rob., Asteraceae, YGA 167	Leaf	Sahadevi	NC	0.01	NE	Backache	Rheumatism (Santhoshkumar *et al*. 2019)
Cyclea peltata (Lam.) Hook.f. &Thomson., Menispermaceae, YGA 051	Leaf, Root, WP	Padli soppu	0.33	0.04	NE	Arthritis, Muscle Pain	Sprain (Lingaraju *et al*. 2013); arthritis (Subramoniam *et al*. 2013); bone fracture (Khare 2008)
Cynodon dactylon (L.) Pers., Poaceae, YGA 044	WP	Garike	0.50	0.03	NE	Arthritis, Joint Pain	Pain in knees (Esakkimuthu *et al*. 2021); bone fracture (Upadhya *et al*. 2012); wound healing, anti-inflammatory (Sharma & Sahu 2022)

Cyperus rotundus L., Cyperaceae, YGA 148	Root	Bhadramusti	NC	0.01	LC	Arthritis	sedative (Nadaf *et al*. 2019); anti-inflammatory, analgesic (Khare 2008); arthritis (Subramoniam *et al*. 2013); gout, wound healing, antispasmodic (Sharma & Sahu 2022); analgesic, sedative (Saroya 2017)
Dalbergia horrida (Dennst.) Mabb., Fabaceae, YGA 079	Bark	Parantholu	NC	0.01	NT	Backache	NR
Datura metel L., Solanaceae, YGA 232	Leaf	Ummatti	0.40	0.03	NE	Spasm, Vertigo	Antispasmodic, muscle pain, arthritis (Santhoshkumar *et al*. 2019); cramps (Khare 2008); rheumatism (Bhandary 2000); rheumatism (Bhat 2005); musculoskeletal ailments (Esakkimuthu *et al*. 2021)
Eclipta prostrata (L.) L., Asteraceae, YGA 084	Leaf	Brangaraja	0.67	0.02	LC	Muscle Pain, Backache	Arthritis (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); arthritis (Subramoniam *et al*. 2013); analgesic, vertigo (Sharma & Sahu 2022); anti-inflammatory (Saroya 2017)
Elettaria cardamomum (L.) Maton., Zingiberaceae, YGA 074*	Seed	Elakki	NC	0.01	NE	Bone Fracture	Rheumatism (Khare 2008); arthritis (Subramoniam *et al*. 2013); antispasmodic, anti-inflammatory, wound healing (Sharma & Sahu 2022); antispasmodic (Khare 2008)
Eleusine coracana (L.) Gaertn., Poaceae, YGA 143*	Seed	Ragi	NC	0.01	NE	Bone Fracture	Sprain (Khare 2008)
Embelia tsjeriam-cottam (Roem. & Schult.) A. DC., Primulaceae, YGA 140	Fruit, Leaf	Vayuvilanga	1.00	0.01	NE	Arthritis, Bone Fracture	Arthritis (Bhat 2019)
Entada rheedii Spreng., Fabaceae, YGA 187	Bark, Seed	Pallekai	0.50	0.01	NE	Arthritis	Rheumatism (Santhoshkumar *et al*. 2019); lumbago (Bhat 2005)
Erythrina variegata L., Fabaceae, YGA 053	Bark, Leaf	Pongare	0.40	0.03	LC	Arthritis, Joint Pain	Arthritis (Bhat 2005); arthritis (Subramoniam *et al*. 2013)
Eucalyptus tereticornis Sm., Myrtaceae, YGA 100	Bark, Leaf	Neelagiri	0.25	0.03	LC	Arthritis	NR
Euphorbia neriifolia L., Euphorbiaceae, YGA 048	Stem, Leaf	Kolkalli	0.60	0.03	LC	Arthritis, Joint Pain, Bone Fracture	Joint pain (Santhoshkumar *et al*. 2019); joint pain (Wilson *et al*. 2007)

Ficus benghalensis L., Moraceae, YGA 081	Bark	Goli mara	0.67	0.02	NE	Arthritis, Backache	Rheumatism, lumbago (Nambiar *et al*. 1985); arthritis (Chandrasekar & Chandrasekar 2017); bone fracture (Upadhya *et al*. 2012); wound healing (Sharma & Sahu 2022); rheumatism (Khare 2008)
Ficus drupacea Thunb., Moraceae, YGA 158	Bark, Leaf	Goni mara	0.20	0.03	LC	Arthritis	NR
Ficus microcarpa L.f., Moraceae, YGA 233	Bark	Kirugoli	0.67	0.02	LC	Spasm, Backache	Antispasmodic (Khare 2008); rheumatism (Bhandary 2000); rheumatism (Bhat 2005)
Ficus racemosa L., Moraceae, YGA 171	Bark	Atthi	1.00	0.02	LC	Arthritis, Backache, Joint Pain	Inflammations (Khare 2008)
Ficus religiosa L., Moraceae, YGA 091*	Bark	Ashwattha	0.50	0.03	LC	Arthritis, Spasm	Bone fracture (Santhoshkumar *et al*. 2019)
Flueggea leucopyrus Willd., Phyllanthaceae, YGA 186	Leaf	Kurambel	1.00	0.01	LC	Arthritis, Joint Pain	Rheumatism (Bhandary 2000)
Garcinia indica (Thouars) Choisy., Clusiaceae, YGA 145*	Leaf, Bark	Punarpuli	0.50	0.01	VU	Arthritis	Anti-inflammatory (Khare 2008); wound healing (Sharma & Sahu 2022)
Garcinia morella (Gaertn.) Desr., Clusiaceae, YGA 234	Bark	Ardhala	0.25	0.03	LC	Vertigo	NR
Garcinia xanthochymus Hook.f. ex.T. Anderson., Clusiaceae, YGA 190	Leaf	Jaarige	NC	0.01	LC	Arthritis	Anti-inflammatory (Hamidon *et al*. 2016)
Glycyrrhiza glabra L., Fabaceae, YGA 227	Leaf, Stem	Jesta maddu	NC	0.01	LC	Arthritis	Anti-inflammatory, arthritis, spasmolytic (Khare 2008); joint pain (Wilson *et al*. 2007); arthritis (Subramoniam *et al*. 2013); arthritis (Sharma & Sahu 2022)
Gnetum ula Brongn., Gnetaceae, YGA 087	Leaf	Nokate	NC	0.01	LC	Arthritis	Antiarthritic (Khare 2008)
Haldina cordifolia (Roxb.) Ridsdale., Rubiaceae, YGA 226	Bark	Anavu	0.50	0.01	NE	Arthritis	Inflammation (Nambiar *et al*. 1985); joint pain (Acharya *et al*. 2022)
Helicteres isora L., Malvaceae, YGA 231	Leaf	Kayyol	0.25	0.03	NE	Vertigo	Antispasmodic (Sharma & Sahu 2022); arthritis (Anielkumar *et al*. 2015)
Hemidesmus indicus (L.) R.Br.ex Schult., Apocyanaceae, YGA 018	Root, Leaf, Stem	Namadari	0.20	0.07	NE	Arthritis, Joint Pain	Rheumatism (Nambiar *et al*. 1985); arthritis (Chandrasekar & Chandrasekar 2017); rheumatism (Santhoshkumar *et al*. 2019); antiarthritic (Khare 2008); joint pain (Wilson *et al*. 2007); arthritis (Subramoniam *et al*. 2013); wound healing, arthritis (Sharma & Sahu 2022); rheumatism (Saroya 2017)

Hesperethusa crenulata (Roxb.) M.Roem., Rutaceae, YGA 024	Bark, Leaf, Root	Majikkare	0.60	0.03	LC	Arthritis, Backache, Joint Pain	(Wangthong *et al*. 2010); arthritis (Mownika *et al*. 2021)
Hibiscus rosa- sinensis L., Malvaceae, YGA 082*	Root, FL	Dasavala	0.67	0.02	NE	Arthritis, Joint Pain	NR
Holarrhena pubescens Wall. ex G.Don., Apocyanaceae, YGA 016	Bark, Leaf	Kodenchi	0.30	0.07	LC	Arthritis, Joint Pain, Bone Fracture	Sprains, arthritis (Santhoshkumar *et al*. 2019); bone fracture (Parinitha *et al*. 2004); arthritis (Subramoniam *et al*. 2013); antispasmodic, anti-inflammatory (Sharma & Sahu 2022)
Holoptelea integrifolia (Roxb.) Planch., Ulmaceae, YGA 037	Bark, Leaf	Rahu beeja	0.40	0.03	NE	Arthritis, Joint Pain	Rheumatism (Nambiar *et al*. 1985); rheumatism (Khare 2008); arthritis (Subramoniam *et al*. 2013)
Homonoia riparia Lour., Euphorbiaceae, YGA 174	Leaf, Stem	Bada Dada	0.67	0.02	LC	Arthritis, Joint Pain	Muscle fractures (Santhoshkumar *et al*. 2019); spasmolytic (Khare 2008)
Hopea ponga (Dennst.) Mabb., Dipterocarpaceae, YGA 211	Leaf	Kalmara	0.50	0.01	VU	Bone Fracture	NR
Hybanthus enneaspermus (L.) F.Muell., Violaceae, YGA 113	WP	Purusharathna	1.00	0.01	NE	Joint Pain, Bone Fracture	Joint pain (Santhoshkumar *et al*. 2019); arthritis (Subramoniam *et al*. 2013)
Hydnocarpus wightianus Blume., Achariaceae, YGA 213	Seed	Netti kayi	0.60	0.03	NE	Arthritis, Backache, Joint Pain	Arthritis (Santhoshkumar *et al*. 2019); anti-inflammatory, rheumatism (Khare 2008)
Ichnocarpus frutescens (L.) W. T. Aiton., Apocyanaceae, YGA 088	Stem, Leaf, WP	Peru balli	0.50	0.01	NE	Arthritis	Bone fracture, rheumatism (Santhoshkumar *et al*. 2019)
Indigofera tinctoria L., Fabaceae, YGA 059	Leaf	Neeli soppu	0.67	0.02	NE	Arthritis, Muscle Pain	Lumbago (Nambiar *et al*. 1985); lumbago (Khare 2008); joint pain (Wilson *et al*. 2007)
Ixora brachiata Roxb., Rubiaceae, YGA 154	Bark	Kurejji	NC	0.01	NE	Arthritis	Inflammation (Santhoshkumar *et al*. 2019); joint pain (Acharya *et al*. 2022)
Ixora coccinea L., Rubiaceae, YGA 028	Root, Leaf	Kepula	0.33	0.06	NE	Arthritis, Backache, Vertigo	Vertigo (Bhat 2000); joint pain (Acharya *et al*. 2022); sedative, anti-inflammatory (Khare 2008)
Jasminum grandiflorum L., Oleaceae, YGA 057*	Leaf	Jajimallige	NC	0.01	NE	Arthritis	NR
Jasminum malabaricum Wight., Oleaceae, YGA 209	Leaf	Kadu mallige	0.50	0.05	NE	Arthritis, Muscle Pain, Joint Pain, Bone Fracture	NR
Jatropha curcas L., Euphorbiaceae, YGA 102	Leaf, Seed	Beli almuda	0.40	0.07	LC	Arthritis, Joint Pain, Bone Fracture, Spasm	Arthritis (Chandrasekar & Chandrasekar 2017); arthritis (Santhoshkumar *et al*. 2019); pain in knees (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007)

Justicia adhatoda L., Acanthaceae, YGA 085	Leaf	Aadusoge	NC	0.01	LC	Arthritis	Musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); anti-inflammatory (Sharma & Sahu 2022); wounds, rheumatism (Saroya 2017)
Justicia gendarussa Burm.f., Acanthaceae, YGA 025	Leaf	Kari nekki Vathankolli	0.09	0.07	LC	Arthritis	Arthritis (Chandrasekar & Chandrasekar 2017); muscle pain, lumbago, rheumatism, bone fracture (Santhoshkumar *et al*. 2019); rheumatism (Khare 2008); joint disorders (Bhat 2005)
Kaempferia galanga L., Zingiberaceae, YGA 105*	RH	Kasturi gedde	NC	0.01	DD	Arthritis	Arthritis (Chandrasekar & Chandrasekar 2017); arthritis (Subramoniam *et al*. 2013)
Lawsonia inermis L., Lythraceae, YGA 136	Leaf	Madarangi	0.50	0.01	LC	Backache	Anti-inflammatory, antispasmodic (Khare 2008); rheumatism (Wilson *et al*. 2007)
Leea indica (Burm. f.) Merr., Vitaceae, YGA 124	Leaf	Nedil soppu	1.00	0.01	LC	Arthritis, Backache	Vertigo (Khare 2008); rheumatism (Bhat 2005)
Leucas aspera (Willd.) Link., Lamiaceae, YGA 004	Leaf	Thumbe	0.31	0.09	NE	Arthritis, Backache, Bone Fracture, Vertigo	Rheumatism (Santhoshkumar *et al*. 2019); musculoskeletal ailments (Esakkimuthu *et al*. 2021)
Litsea glutinosa (Lour) C.B. Rob., Lauraceae, YGA 039	Bark, Leaf	Erachikutti	0.15	0.17	LC	Arthritis, Joint Pain, Bone Fracture, Spasm	Rheumatism (Nambiar *et al*. 1985); bone fracture (Santhoshkumar *et al*. 2019); rheumatism, antispasmodic (Khare 2008); arthritis (Babu *et al*. 2020); bone fracture (Babu *et al*. 2018); musculoskeletal disorders (Rathi & Rathi 2020)
Litsea wightiana (Nees) Hook.f., Lauraceae, YGA 210	Bark, Leaf	Ellukutti	0.13	0.16	NT	Bone Fracture, Arthritis, Spasm	Anti-inflammatory (Madhayan *et al*. 2022)
Loeseneriella arnottiana (Wight) A. C. Sm., Celastraceae, YGA 170	Root, Leaf	Maderu balli	0.50	0.01	NE	Arthritis	Anti-inflammatory (Prajna *et al*. 2016)
Madhuca neriifolia (Moon) H.J.Lam., Sapotaceae, YGA 214	Seed	Nanil	0.33	0.02	LC	Arthritis	Rheumatism (Nambiar *et al*. 1985); rheumatism (Bhat 2005)
Magnolia champaca (L.) Baill. ex Pierre., Magnoliaceae, YGA 072*	Seed	Sampige	0.67	0.02	LC	Arthritis, Backache	Rheumatism (Nambiar *et al*. 1985); rheumatism (Khare 2008); joint pain (Wilson *et al*. 2007)
Memecylon umbellatum Burm.f., Melastomataceae, YGA 019	Leaf, Root	Ollekodi	0.33	0.04	NE	Arthritis, Backache	Spasmolytic (Khare 2008)
Merremia tridentata (L.) Hallier f., Convolvulaceae, YGA 095	Stem, Leaf	Naikula balli	0.40	0.07	NE	Arthritis, Muscle Pain, Joint Pain, Bone Fracture	Rheumatism (Santhoshkumar *et al*. 2019); joint pain (Khare 2008); arthritis (Babu *et al*. 2020)

Mesua ferrea L., Calophyllaceae, YGA 220	Seed	Naga sampige	0.50	0.01	NE	Arthritis	Rheumatism (Nambiar *et al*. 1985); anti-inflammatory (Khare 2008); arthritis, antispasmodic (Sharma & Sahu 2022); gout (Saroya 2017)
Mimosa pudica L., Fabaceae, YGA 093	WP, Root	Muttidare muni	0.50	0.04	LC	Arthritis, Muscle Pain, Backache	Rheumatism (Nambiar *et al*. 1985); arthritis (Chandrasekar & Chandrasekar 2017); musculoskeletal ailments (Esakkimuthu *et al*. 2021)
Morinda citrifolia L., Rubiaceae, YGA 041*	Bark, Leaf	Noni	0.67	0.02	NE	Arthritis, Muscle Pain	Anti-inflammatory (Khare 2008)
Moringa oleifera Lam., Moringaceae, YGA 015*	Bark	Nugge soppu	0.25	0.08	LC	Arthritis, Backache, Joint Pain	Bone fracture, rheumatism (Santhoshkumar *et al*. 2019); pain in knees (Esakkimuthu *et al*. 2021); arthritis (Subramoniam *et al*. 2013); arthritis (Saroya 2017); antispasmodic (Khare 2008)
Mucuna pruriens (L.) DC., Fabaceae, YGA 183	Root	Nayi sulang	2.00	0.01	LC	Arthritis, Joint Pain	Neck pain (Esakkimuthu *et al*. 2021); anti-inflammatory (Saroya 2017)
Mussaenda laxa (Hook.f.) Hutch., Rubiaceae, YGA 236	Leaf	Bellotti gida	0.40	0.03	NE	Spasm, Muscle Pain	NR
Myristica fragrans Houtt., Myristicaceae, YGA 012*	Fruit, Bark	Jayikai	0.17	0.08	DD	Arthritis, Joint Pain	Rheumatism, anti-inflammatory, spasmolytic (Khare 2008); joint pain (Wilson *et al*. 2007); sprains, antispasmodic (Sharma & Sahu 2022); muscular pain, joint pain (Saroya 2017)
Myristica malabarica Lam., Myristicaceae, YGA 061	Bark, Fruit	Doddajaikai Ramapathre	0.33	0.04	VU	Arthritis, Backache	Joint pain (Bhat 2005); rheumatism (Khare 2008)
Naravelia zeylanica (L.) DC., Ranunculaceae, YGA 014	Leaf, Stem, Root	Parambolu Umi Balli	0.67	0.02	NE	Arthritis, Joint Pain	Arthritis (Chandrasekar & Chandrasekar 2017); rheumatism, anti-inflammatory (Khare 2008)
Naregamia alata Wight & Arn., Meliaceae, YGA 155	WP	Nelacheri	0.25	0.03	NE	Arthritis	Rheumatism (Nambiar *et al*.1985); antirheumatic (Khare 2008); rheumatism (Bhat 2005)
Nelumbo nucifera Gaertn., Nelumbonaceae, YGA 173	Root, FL	Thavare	NC	0.01	NE	Vertigo	Vertigo (Khare 2008)
Neolamarckia cadamba (Roxb.) Bosser., Rubiaceae, YGA 092	Bark	Kadamba	0.14	0.05	NE	Arthritis	NR
Nyctanthes arbor-tristis L., Oleaceae, YGA 054	Bark, Leaf, Root	Parijatha	0.50	0.03	LC	Arthritis, Joint Pain	Bone fracture (Santhoshkumar *et al*. 2019); bone fracture (Upadhya *et al*. 2012); rheumatism, antispasmodic (Khare 2008)

Ocimum basilicum L., Lamiaceae, YGA 125*	Leaf	Kamakasturi	0.25	0.05	NE	Muscle Pain, Joint Pain	Arthritis (Chandrasekar & Chandrasekar 2017); bone fracture (Santhoshkumar *et al*. 2019); anti-inflammatory, antispasmodic (Khare 2008)
Ocimum tenuiflorum L., Lamiaceae, YGA 040*	Leaf	Tulasi	0.50	0.05	NE	Arthritis, Muscle Pain, Backache, Joint Pain	Arthritis (Santhoshkumar *et al*. 2019); antirheumatic, antispasmodic (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); arthritis (Sharma & Sahu 2022); anti-inflammatory (Saroya 2017)
*Opuntia dillen*ii (Ker Gawl.) Haw., Cactaceae, YGA 157	Stem	Paapaskalli	0.50	0.03	LC	Arthritis, Joint Pain	Anti-inflammatory (Khare 2008)
Oryza sativa L., Poaceae, YGA 196*	Seed	Bhattha	0.67	0.02	NE	Joint Pain, Bone Fracture	Anti-inflammatory (Khare 2008)
Phyllanthus amarus Schumach. & Thonn., Phyllanthaceae, YGA 094	Leaf, WP	Nela nelli	0.43	0.05	NE	Arthritis, Backache, Joint Pain	Anti-inflammatory (Khare 2008)
Phyllanthus emblica L., Phyllanthaceae, YGA 078	Bark, Leaf	Nellikai	0.50	0.04	LC	Muscle Pain, Backache, Joint Pain	Inflammations (Nambiar *et al*. 1985); arthritis (Babu *et al*. 2020); gout, analgesic, anti-inflammatory (Sharma & Sahu 2022)
Phyllanthus urinaria L., Phyllanthaceae, YGA 208	WP	Kempu nelanelli	NC	0.01	NE	Bone Fracture	Musculoskeletal disorders (Rathi & Rathi 2020)
Physalis minima L., Solanaceae, YGA 238	WP	Guppate gida	0.50	0.03	LC	Spasm, Joint Pain	Anti-inflammatory (Khare 2008); rheumatism (Bhandary 2000)
Piper betle L., Piperaceae, YGA 032*	Leaf, Root	Bacchire	0.33	0.06	NE	Arthritis, Backache, Bone Fracture	Arthritis (Chandrasekar & Chandrasekar 2017)
Piper longum L., Piperaceae, YGA 063*	Fruit	Hippali	0.29	0.05	NE	Arthritis, Joint Pain	Muscle pain (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021)); arthritis (Subramoniam *et al*. 2013); arthritis, gout, lumbago (Sharma & Sahu 2022)
Piper nigrum L., Piperaceae, YGA 029*	Seed	Karimenasu	0.22	0.12	NE	Arthritis, Backache, Joint Pain, Bone Fracture	Arthritis (Nambiar *et al*. 1985); arthritis (Chandrasekar & Chandrasekar 2017); musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); arthritis (Bhat 2005); arthritis (Subramoniam *et al*. 2013); antispasmodic, anti-inflammatory, analgesic (Sharma & Sahu 2022); muscle pain, rheumatism (Saroya 2017)

Plumbago indica L., Plumbaginaceae, YGA 099	Leaf	Chitramoola	1.00	0.01	NE	Arthritis, Joint Pain	Rheumatism (Santhoshkumar *et al*. 2019); musculoskeletal ailments (Esakkimuthu *et al*. 2021); rheumatism (Bhat 2005)
Pongamia pinnata (L.) Pierre., Fabaceae, YGA 107	Bark, Leaf, Seed	Honge mara Korungu mara	0.57	0.05	LC	Arthritis, Joint Pain, Bone Fracture, Spasm	Arthritis (Chandrasekar & Chandrasekar 2017); rheumatism (Santhoshkumar *et al*. 2019); spasmolytic, rheumatism (Khare 2008); pain in knees (Esakkimuthu *et al*. 2021); arthritis (Subramoniam *et al*. 2013)
Psidium guajava L., Myrtaceae, YGA 150*	Leaf	Perala	0.50	0.01	LC	Arthritis	Anti-inflammatory (Khare 2008); muscle pain (Malik *et al*. 2018); rheumatism (Upadhya *et al*. 2009)
Pterocarpus marsupium Roxb., Fabaceae, YGA 112	Bark	Benga	0.36	0.07	NT	Arthritis, Backache, Joint Pain, Bone Fracture	Rheumatism (Nambiar *et al*. 1985); arthritis (Subramoniam *et al*. 2013); analgesic, anti-inflammatory (Sharma & Sahu 2022); anti-inflammatory (Saroya 2017)
Punica granatum L., Lythraceae, YGA 206*	Fruit	Dalimbe	NC	0.01	LC	Joint Pain	Anti-inflammatory (Sharma & Sahu 2022)
Rauvolfia serpentina (L.) Benth.ex Kurz., Apocyanaceae, YGA 023	Root	Sarphagandha, Garudapathala	0.22	0.15	NE	Arthritis, Muscle Pain, Joint Pain, Bone Fracture, Vertigo	Vertigo (Sharma & Sahu 2022)
Rhynchostylis retusa (L.) Blume, Orchidaceae, YGA 237	Root	Seetha gida	0.40	0.03	NE	Spasm, Joint Pain	Rheumatism (Kumar *et al*. 2021)
Ricinus communis L., Euphorbiaceae, YGA 020	Seed, Root, Leaf	Castor	0.16	0.21	NE	Arthritis, Backache, Joint Pain, Bone Fracture, Spasm	Arthritis (Chandrasekar & Chandrasekar 2017); arthritis (Santhoshkumar *et al*. 2019); lumbago, arthritis (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); lumbago, sprain (Bhat 2005); arthritis (Subramoniam *et al*. 2013); musculoskeletal disorders (Rathi & Rathi 2020) ; arthritis, gout, neuromuscular disease (Sharma & Sahu 2022); arthritis, lumbago (Saroya 2017)
Rubia cordifolia L., Rubiaceae, YGA 133	Root	Manjista	NC	0.01	NE	Arthritis	Arthritis (Chandrasekar & Chandrasekar 2017); rheumatism, anti-inflammatory (Khare 2008); joint pain (Malik *et al*. 2018); arthritis (Subramoniam *et al*. 2013); fracture, wound healing, (Sharma & Sahu 2022); bone fracture (Saroya, 2017)

Russelia equisetiformis Schltdl. & Cham., Plantaginaceae, YGA 120*	Stem	Kenjige	1.00	0.01	NE	Arthritis, Joint Pain	Analgesic, anti-inflammatory (Awe *et al*. 2004)
Ruta graveolens L., Rutaceae, YGA 109	Leaf	Nagadali	0.50	0.01	NE	Arthritis	Rheumatism (Santhoshkumar *et al*. 2019); spasmolytic, anti-inflammatory (Khare 2008)
Salacia chinensis L., Celastraceae, YGA 135	Leaf, Root	Ekanayaka	0.33	0.08	NE	Arthritis, Muscle Pain, Joint Pain, Bone Fracture	NR
Samanea saman (Jacq.) Merr., Fabaceae, YGA 176	Bark	Devadaru	NC	0.01	NE	Arthritis	NR
Santalum album L., Santalaceae, YGA 096	HW	Gandha	NC	0.01	VU	Bone Fracture	Joint pain (Santhoshkumar *et al*. 2019); anti-inflammatory (Khare 2008); arthritis (Subramoniam *et al*. 2013); analgesic (Sharma & Sahu 2022); inflammations (Warrier 1993)
Schleichera oleosa (Lour.) Merr., Sapindaceae, YGA 199	Seed	Chakote mara	0.33	0.04	LC	Arthritis, Spasm	Joint pain (Santhoshkumar *et al*. 2019); rheumatism (Khare 2008); joint pain (Acharya *et al*. 2022)
Scleropyrum pentandrum (Dennst.) Mabb., Santalaceae, YGA 069	Seed	Nayikuli	0.50	0.07	LC	Arthritis, Backache, Joint Pain, Bone Fracture, Spasm	Musculoskeletal disorders (Kantasrila *et al*. 2020)
Selaginella pallescens (C.Presl) Spring., Selaginellaceae, YGA 152	WP	Hamsapada	NC	0.01	NE	Bone Fracture	NR
Senegalia rugata (Lam.) Britton & Rose., Fabaceae, YGA 118	Leaf	Seege kai	0.50	0.01	NE	Arthritis	NR
Senna alata (L.) Roxb., Fabaceae, YGA 007	Leaf	Ane thajank	0.50	0.01	LC	Arthritis	Fractures (Santhoshkumar *et al*. 2019)
Senna occidentalis (L.) Link., Fabaceae, YGA 008	Leaf, Root	Pettha thajank	0.25	0.05	LC	Arthritis, Bone Fracture	NR
Sesamum indicum L., Pedaliaceae, YGA 200*	Seed	Ellu	0.44	0.06	NE	Arthritis, Bone Fracture, Spasm, Vertigo	Rheumatism, lumbago (Bhat 2005); joint pain (Bairy 2007); bone fracture (Upadhya *et al*. 2012); musculoskeletal ailments (Esakkimuthu *et al*. 2021); wound healing, analgesic (Sharma & Sahu 2022); rheumatism (Saroya 2017)
Setaria italica (L.) P.Beauv., Poaceae, YGA 126*	Seed	Navane	NC	0.01	NE	Bone Fracture	Bone fracture (Santhoshkumar *et al*. 2019); rheumatism (Khare 2008); rheumatism (Warrier 1993)
Sida acuta Burm.f., Malvaceae, YGA 089	Root	Bheemana kaddi	1.00	0.01	NE	Arthritis, Joint Pain	Rheumatism (Nambiar *et al*. 1985); spasmolytic (Khare 2008); joint pain (Wilson *et al*. 2007)

Sida alnifolia L., Malvaceae, YGA 009	Root, Leaf	Kurdotti Kadira	0.19	0.14	NE	Arthritis, Backache, Joint Pain, Bone Fracture	NR
Sida cordata (Burm.f.) Borssum., Malvaceae, YGA 201	Leaf	Heramane balli	1.00	0.01	NE	Backache, Joint Pain	Rheumatism (Santhoshkumar *et al*. 2019); arthritis (Khare 2008); bone fracture (Babu *et al*. 2018); arthritis (Warrier 1993)
Sida mysorensis Wight & Arn., Malvaceae, YGA 202	Stem, Leaf	Antuthutti	0.50	0.01	NE	Arthritis	NR
Sida rhombifolia L., Malvaceae, YGA 239	Root	Atibala	0.67	0.02	NE	Spasm, Backache	Rheumatism, arthritis (Nambiar *et al*. 1985); arthritis (Santhoshkumar *et al*. 2019); rheumatism (Khare 2008); rheumatism (Subramoniam *et al*. 2013); rheumatism, muscle pain (Bhat 2005); musculoskeletal ailments (Esakkimuthu *et al*. 2021)
Sphagneticola calendulacea (L.) Pruski., Asteraceae, YGA 189	Leaf	Haladi garuga	0.33	0.02	NE	Backache	NR
Spondias pinnata (L.f.) Kurz., Anacardiaceae, YGA 204*	Leaf	Ambate mara	0.50	0.01	NE	Muscle Pain	Arthritis (Chandrasekar & Chandrasekar 2017); muscular arthritis (Khare 2008)
Stachytarpheta jamaicensis (L.) Vahl. Verbenaceae, YGA 001	WP	Kari uttarane	0.33	0.02	LC	Arthritis	Anti-inflammatory, rheumatism (Khare 2008)
Strychnos colubrina L., Loganiaceae, YGA 010	Bark, Leaf	Kayar balli	NC	0.01	NE	Arthritis	Rheumatism (Khare 2008); rheumatism (Bhat 2005)
Strychnos nux-vomica L., Loganiaceae, YGA 205	Bark, Leaf	Kayar mara	0.50	0.01	NE	Arthritis	Arthritis (Santhoshkumar *et al*. 2019); musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); arthritis (Bhat 2005); arthritis, antispasmodic (Sharma & Sahu 2022); lumbago, muscle weakness (Saroya 2017)
Syzygium aromaticum (L.)Merr. & L.M.Perry., Myrtaceae, YGA 076*	FL, Bark, Fruit	Lavanga	0.36	0.07	NE	Arthritis, Muscle Pain, Backache, Joint Pain	Anti-inflammatory (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); neuromuscular disease, wound healing (Sharma & Sahu 2022)
Syzygium caryophyllatum (L.) Alston., Myrtaceae, YGA 080	Bark	Kuntanerale	1.00	0.01	EN	Arthritis, Backache	NR
Syzygium cumini (L.) Skeels., Myrtaceae, YGA 142	Bark	Nerale	0.67	0.02	LC	Arthritis, Backache	Arthritis, anti-inflammatory (Khare 2008); arthritis (Subramoniam *et al*. 2013); bone fracture (Babu *et al*. 2018); wound healing, anti-inflammatory (Sharma & Sahu 2022)

Syzygium travancoricum Gamble., Myrtaceae, YGA 098	Bark	Vathankolli	0.43	0.05	CR	Arthritis, Bone Fracture, Spasm	Arthritis (Rajalakshmi *et al*. 2016)
Tabernaemontana divaricata (L.) R.Br ex Roem. & Schult., Apocyanaceae, YGA 130*	Bark, Leaf	Nandi battalu	0.50	0.04	LC	Arthritis, Muscle Pain, Bone Fracture	Anti-inflammatory (Khare 2008)
Tamarindus indica L., Fabaceae, YGA 022*	Leaf, Fruit	Hunase	0.42	0.08	LC	Arthritis, Muscle Pain, Backache, Joint Pain, Bone Fracture	Bone fracture (Santhoshkumar *et al*. 2019); anti-inflammatory (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007)
Tectona grandis L.f., Lamiaceae, YGA 038*	Leaf, Bark	Saguvani	0.50	0.04	EN	Arthritis, Backache, Joint Pain	Arthritis (Chandrasekar & Chandrasekar 2017); anti-inflammatory (Khare 2008)
Terminalia bellirica (Gaertn.) Roxb., Combretaceae, YGA 075	Bark, Leaf	Shanthikai	0.67	0.02	LC	Arthritis, Bone Fracture	Arthritis (Subramoniam *et al*. 2013); neuromuscular disease, wound healing (Sharma & Sahu 2022)
Terminalia chebula Retz., Combretaceae, YGA 011	Fruit	Anilekai	0.67	0.02	LC	Backache, Arthritis	Musculoskeletal ailments (Esakkimuthu *et al*. 2021); joint pain (Wilson *et al*. 2007); arthritis (Subramoniam *et al*. 2013); arthritis, gout, wound healing , antispasmodic (Sharma & Sahu 2022); muscular rheumatism (Saroya 2017)
Terminalia crenulata Roth., Combretaceae, YGA 077	Bark, Leaf	Banupu	0.43	0.05	NE	Arthritis, Muscle Pain, Bone Fracture	NR
Terminalia paniculata Roth., Combretaceae, YGA 203	Leaf	Maruva	NC	0.01	NE	Bone Fracture	Arthritis (Bhat 2005)
Thottea siliquosa (Lam.) Ding Hou., Aristolochiaceae, YGA 198	Root	Chakranike	0.50	0.01	NE	Arthritis	NR
Thunbergia mysorensis (Wight) T.Anderson., Acanthaceae, YGA 122*	Leaf	Vishalyakarini	0.40	0.06	NE	Arthritis, Muscle Pain, Joint Pain, Bone Fracture	NR
Tinospora cordifolia (Willd.) Miers., Menispermaceae, YGA 002	Leaf, Stem	Amritha balli	0.14	0.19	NE	Arthritis, Muscle Pain, Backache, Joint Pain	Bone fracture, rheumatism (Nambiar *et al*. 1985); anti-inflammatory, antirheumatic (Khare 2008); arthritis (Subramoniam *et al*. 2013); musculoskeletal disorders (Rathi & Rathi 2020); arthritis, gout, fracture, antispasmodic, analgesic (Sharma & Sahu 2022); gout (Saroya 2017)
Tinospora sinensis (Lour.) Merr., Menispermaceae, YGA 035	Stem, Leaf	Katu amritha balli	0.17	0.04	NE	Arthritis	Rheumatism (Nambiar *et al*. 1985); joint pain (Santhoshkumar *et al*. 2019); anti-inflammatory, antirheumatic (Khare 2008)

Trachyspermum ammi (L.) Sprague., Apiaceae, YGA 165*	Root, Leaf	Ajamoola	NC	0.01	NE	Arthritis	Arthritis (Chandrasekar & Chandrasekar 2017); spasmolytic (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); neuromuscular disease, anti-inflammatory (Sharma & Sahu 2022); antispasmodic (Saroya 2017)
Tragia involucrata L., Euphorbiaceae, YGA 182	Root	Aakire	2.00	0.01	NE	Arthritis, Joint Pain	Arthritis (Subramoniam *et al*. 2013)
Tribulus terrestris L., Zygophyllaceae, YGA 177	Root	Neggila mullu	NC	0.01	LC	Arthritis	Spasmolytic, anti-inflammatory (Khare 2008); joint pain, back pain (Malik *et al*. 2018); arthritis (Wilson *et al*. 2007); arthritis (Subramoniam *et al*. 2013); arthritis. antispasmodic (Sharma & Sahu 2022); arthritis (Saroya 2017)
Trigonella foenum-graecum L., Fabaceae, YGA 147*	Seed	Menthe	0.67	0.04	NE	Arthritis, Muscle Pain, Spasm, Vertigo	Joint pain (Yogeesha & Kumar 2022); muscle relaxant (Khare 2008); musculoskeletal ailments (Esakkimuthu *et al*. 2021); back pain (Malik *et al*. 2018); arthritis (Subramoniam *et al*. 2013); musculoskeletal disorders (Rathi & Rathi 2020)
Urena lobata L., Malvaceae, YGA 046	Root	Vana bende	2.00	0.01	LC	Arthritis, Joint Pain	Rheumatism (Nambiar *et al*. 1985); bone fracture (Santhoshkumar *et al*. 2019); spasmolytic, rheumatism, lumbago (Khare 2008)
Uvaria narum (Dunal) Blume, Annonaceae, YGA 185	Root	Karimaderu	0.50	0.01	NE	Arthritis	Rheumatism (Nambiar *et al*. 1985); rheumatism (Khare 2008)
Vateria indica L., Dipterocarpaceae, YGA 101	Bark, Leaf	Bilidhoopa	1.00	0.02	VU	Arthritis, Backache, Bone Fracture	Rheumatism (Nambiar *et al*. 1985); arthritis (Chandrasekar & Chandrasekar 2017); rheumatism, anti-inflammatory (Khare 2008); rheumatism (Bhat 2005)
Ventilago maderaspatana Gaertn., Rhamnaceae, YGA 127	Root, Leaf	Aithala beelu	0.27	0.10	NE	Arthritis, Muscle Pain, Backache, Bone Fracture	NR

Vitex negundo L., Lamiaceae, YGA 003	Leaf, ST	Nekki	0.27	0.15	LC	Arthritis, Backache, Joint Pain, Bone Fracture, Spasm, Vertigo	Arthritis (Chandrasekar & Chandrasekar 2017); rheumatism (Santhoshkumar *et al*. 2019); rheumatism, anti-inflammatory (Khare 2008); pain in knees (Esakkimuthu *et al*. 2021); lumbago (Bhat 2005); arthritis (Subramoniam *et al*. 2013); musculoskeletal disorders (Rathi & Rathi 2020); antispasmodic, arthritis (Sharma & Sahu 2022); rheumatism (Saroya 2017)
Vitis vinifera L., Vitaceae, YGA 192*	Fruit	Grape	NC	0.01	LC	Backache	Arthritis (Chandrasekar & Chandrasekar 2017); gout, anti-inflammatory (Khare 2008); anti-inflammatory (Saroya 2017)
Withania somnifera (L.) Dunal., Solanaceae, YGA 169*	Root	Ashwagandha	NC	0.01	NE	Arthritis	Rheumatism (Santhoshkumar *et al*. 2019); anti-inflammatory, antiarthritic (Khare 2008); neck pain (Esakkimuthu *et al*. 2021); joint pain (Malik *et al*. 2018); joint pain (Wilson *et al*. 2007); arthritis (Subramoniam *et al*. 2013); neuromuscular disease, musculoskeletal disorders (Sharma & Sahu 2022)
Wrightia tinctoria R.Br., Apocyanaceae, YGA 006	Bark, Leaf	Ingirpale	NC	0.01	NE	Arthritis	Anti-inflammatory (Khare 2008); anti-inflammatory (Bhat 2005)
Zanthoxylum rhetsa (Roxb) DC., Rutaceae, YGA 168	Bark	Kavate	0.43	0.05	LC	Arthritis, Backache, Joint Pain	Rheumatism (Nambiar *et al*. 1985); bone fracture (Santhoshkumar *et al*. 2019)
Zingiber officinale Roscoe., Zingiberaceae, YGA 179*	RH	Ginger	0.40	0.03	DD	Arthritis, Bone Fracture	rheumatism, anti-inflammatory (Khare 2008); pain in knees (Esakkimuthu *et al*. 2021); joint pain (Malik *et al*. 2018); arthritis (Subramoniam *et al*. 2013); arthritis, neuromuscular disease (Sharma & Sahu 2022)
Ziziphus oenopolia (L.) Mill., Rhamnaceae, YGA 049	Root	Choori mullu	NC	0.01	NE	Arthritis	NR
Ziziphus rugosa L., Rhamnaceae, YGA 156	Bark, Leaf	Kotte mullu	0.50	0.03	NE	Arthritis, Bone Fracture	NR

UV=Use value; RFC=Relative frequency of citation; LC=Least concern; DD=Data deficient; NE=Not evaluated; VU=Vulnerable; EN=Endangered; CR=Critically endangered; NT= Near threatened; NR= New reports; NC= Not considered; RH= Rhizome; ST= Shoot tip; ES=Endosperm; WP=Whole plant; HW=Heart wood; FL=Flower; * indicates Cultivated species

Among the recorded species, 208 are angiosperms, one gymnosperm and one pteridophyte. The most important family in terms of number of species was Fabaceae (22 species), followed by Apocyanaceae, Malvaceae and Rubiaceae (9 species each), Phyllanthaceae, and Rutaceae (8 species each), Acanthaceae (7 species), Euphorbiaceae, Lamiaceae, Myrtaceae and Moraceae (6 species each), Lauraceae, Poaceae and Solanaceae (5 species each), Asteraceae, Apiaceae, Combretaceae, Menispermaceae and Zingiberaceae (4 species each), Arecaceae, Aristolochiaceae, Calophyllaceae, Clusiaceae, Oleaceae, Orchidaceae, Vitaceae, Rhamnaceae and Piperaceae (3 species each) and the remaining 52 species belong to 40 different families. Our findings agree with earlier surveys conducted in Karnataka and different localities where Fabaceae, Apocyanaceae, Rutaceae, Phyllanthaceae, Rubiaceae, Acanthaceae, Malvaceae, Euphorbiaceae and Lamiaceae to be the dominant families (Kantasrila *et al*. 2020, Singh *et al*. 2020, Yogeesha & Kumar, 2022).

Compilation of medicinal plants used by ethnic communities for the treatment of various human ailments in South India revealed that among 2000 plant species, family Fabaceae was dominant (192 species) followed by Asteraceae (104 species), Lamiaceae (89 species), Malvaceae (87 species), Apocynaceae (73 species), Acanthaceae (65 species), Rubiaceae (64 species), Poaceae (57 species) and Euphorbiaceae (56 species) (Santhoshkumar *et al*. 2019). The common use of species from these families could be due to their relative abundance in all types of climates, availability and high therapeutic potential. These families also possess a wide variety of aromatic, medicinal plants producing essential oils which contains variety of bioactive compounds responsible for healing activities (Biswas *et al*. 2010).

Among 210 plant species, trees were dominant (81 species) followed by herbs (52 species), shrubs (39 species) and climbers (38 species). Utilization of trees and herbaceous species in herbal preparations for musculoskeletal disorders is in line with previous investigations carried out in different regions (Yogeesha & Kumar 2022, Syamala *et al*. 2014). Among the documented species, 154 were wild (73.33%) and 56 species are cultivated (26.67%). This data reveals the importance of wild species in traditional medicine which requires proper conservation strategies and sustainable utilization of the wild plant wealth. However, some expert practitioners have their own medicinal gardens.

Parts used, method of preparation and application of herbal drugs

It was noticed that various plant parts of different species are used in the preparation of herbal drugs to treat musculoskeletal disorders (Figure 3). Leaves (37.43%) were found to be the most useful part in drug preparation followed by bark (17.84%), root (14.33%), seed (9.36%), fruit (6.14%), stem (5.26%), whole plant (4.68%), flower (1.17%), rhizome and shoot tip (0.88% each), bulb, endosperm and latex (0.58% each) and heart wood (0.29%).

The most commonly used parts are leaves since, leaves are the rich reservoirs of diverse secondary metabolites. Leaves are the most preferred parts in the preparation of formulations due to the accumulation of secondary metabolites, easy extraction procedures compared to other parts and sustainable utilization of plant resources (Abba & Dogara 2021, Singh *et al*. 2023).

It was observed that most of the documented plants are used in combination of 2 or more species in preparing 265 herbal drugs, whereas 87 preparations were made from single herbs (Table 2). Several ways of herbal preparations for use were identified in the study. Three most commonly used preparations are oil (38.92%), paste (32.67%) and decoction (22.45%). These are followed by powder and crude form (1.42% each), juice (1.14%), herbal gruel (0.85%), tablet (0.57%), medicated food and lehya (0.28% each) (Figure 4). The different ingredients such as rock sugar, rice water, camphor, honey, termite nest mud, rice washed water, oil, ghee, cow's milk, cow's urine, egg's white, palm jaggery were used to prepare drug formulations. These ingredients serve as a medium and also enhance the medicinal value of the drug (Senthilkumar *et al*. 2013). Water was the primary solvent in most preparations, particularly decoctions because most plant metabolites are soluble in it (Singh *et al*. 2023). Most of the herbal preparations prescribed to the patients were without any standardized doses. However, appropriate dosages were recommended based on, age, gender and physical appearance of the patients and severity of symptoms. Medicinal preparations are administered to patients either externally or internally. Out of the 352 formulations, external uses were dominant (82.10%) than internal uses (17.90%). In case of oral administration, formulations must be tested for more efficacy and safety as this can directly target delicate organs (Caunca & Balinado 2021).

Table 2. Formulations prescribed by traditional practitioners for the treatment of various musculoskeletal ailments.

1. Arthritis

Plant Name and Parts Used	Mode of Preparation	Mode of Application
Sida alnifolia (Root)	Crushed, boiled in coconut oil.	External
Holarrhena pubescens (Bark & Leaf)	Ground in rice water & made into a paste.	External
Litsea wightiana (Bark & Leaf)	Ground into a paste.	External
Ficus drupacea (Leaf)	Ground into a paste.	External
Vitex negundo (Tender Leaf)	Crushed, boiled in sesame oil.	External
Justicia gendarussa (Leaf)	Decoction is prepared.	Medicated bath
Tinospora sinensis (Stem & Leaf)	Crushed, add cow's milk, rock sugar & decoction is prepared.	Oral
Sida mysorensis (Leaf & Stem)	Ground in cow's raw milk, ghee & made into a paste.	External
Senna occidentalis (Root)	Bioled with rice.	Oral
Senna occidentalis (Root)	Ground in rice water & made into a paste.	External
Litsea glutinosa (Leaf & Bark)	Dried, powdered & mixed with cow's hot milk.	Oral
Syzygium travancoricum (Bark)	Decoction is prepared.	Medicated bath
Nyctanthes arbor-tristis (Leaf)	Decoction is prepared.	Oral
Sesamum indicum (Seed) + *Ricinus communis* (Leaf)	Seeds of *Sesamum indicum* boiled with milk, crushed into a paste.	Applied on forehead and is covered by *Ricinus communis* Leaf
Ficus drupacea (Leaf) + *Piper betle* (Leaf)	Crushed, decoction is prepared.	Medicated bath
Cosmostigma cordatum (Leaf & Stem)	Crushed with equal quantity of sesame oil & coconut oil.	External
Aloe vera (Leaf)	Crush with egg albumen & made into a paste.	External
Tamarindus indica (Leaf)	Crushed, decoction is prepared.	Medicated bath
Stachytarpheta jamaicensis (Whole plant) + *Tinospora cordifolia* (Stem)	Ground, decoction is prepared.	Oral
Neolamarckia cadamba (Bark) + *Tinospora cordifolia* (Stem)	Crushed, decoction is prepared.	Oral
Sida alnifolia (Root) + *Memecylon umbellatum* (Root)	Crushed, add jaggery & decoction is prepared.	Oral
Leucas aspera (Leaf) + *Piper longum* (Fruit)	Crushed, decoction is prepared.	Oral
Hemidesmus indicus (Root) + *Trigonella foenum-graecum* (Seed) + *Coscinium fenestratum* (Root & Stem)	Ground with rice water & hot paste is prepared.	External
Aloe vera (Leaf) + *Moringa oleifera* (Bark)	Ground into a paste.	External
Allophylus rheedei (Leaf) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed)	Ground, boiled in coconut oil.	External
Mucuna pruriens (Root) + *Tragia involucrata* (Root)	Ground in coconut oil.	External
Calotropis gigantea (Leaf) + *Ventilago maderaspatana* (Root) + *Allium sativum* (Bulb)	Ground, boiled in sesame oil.	External
Citrus limon (tender Leaf) + *Psidium guajava* (tender Leaf) + *Cuminum cyminum* (Seed)	Crushed, decoction is prepared.	Oral

Mimosa pudica (Whole plant) + *Calotropis gigantea* (Leaf)	Crushed, boiled in coconut oil & cow's ghee.	External
Cinnamomum verum (Bark) + *Eucalyptus tereticornis* (Leaf & Bark) + *Allium sativum* (Bulb) + *Allium cepa* (Bulb)	Crushed, boiled in sesame oil.	External
Pongamia pinnata (Bark) + *Croton persimilis* (Bark & Leaf) + *Haldina cordifolia* (Bark)	Ground, boiled with equal quantity of coconut oil & sesame oil.	External
Trigonella foenum-graecum (Seed) + *Withania somnifera* (Root) + *Curcuma longa* (Rhizome) + *Zingiber officinale* (Rhizome)	Dried, powdered & mixed with milk.	Oral
Sida alnifolia (Root) + *Cuminum cyminum* (Seed) + *Crotolaria pallida* (Leaf) + *Aloe vera* (Leaf)	Ground, boiled in sesame oil.	External
Cinnamomum verum (Leaf) + *Myristica malabarica* (Bark) + *Allium sativum* (Bulb) + *Bunium bulbocastanum* (Seed)	Ground, boiled in sesame oil.	External
Chassalia curviflora (Whole plant) + *Ixora coccinea* (Root) + *Borassus flabellifer* (Fruit mesocarp)	Ground, boiled with ghee & sesame oil.	External
Morinda citrifolia (Bark) + *Croton persimilis* (Root) + *Tinospora cordifolia* (Stem) + *Cynodon dactylon* (Whole plant)	Ground, decoction is prepared.	Oral
Baringtonia racemosa (Bark) + *Careya arborea* (Bark) + *Azadirachta* indica (Leaf) + *Syzygium cumini* (Bark) + *Curcuma longa* (Rhizome)	Ground, decoction is prepared.	Oral
Averrhooa carambola (Fruit) + *Ziziphus oenopolia* (Root) + *Tinospora sinensis* (Stem) + *Euphorbia neriifolia* (Stem)	Ground, boiled in sesame oil.	External
Clerodendrum infortunatum (Root) + *Aristolochia indica* (Root) + *Urena lobata* (Root)	Ground, boiled in coconut oil.	External
Syzygium travancoricum (Bark) + *Cinnamomum verum* (Bark) + *Euphorbia neriifolia* (Stem) + *Tinospora sinensis* (Stem)	Crushed, boiled in cow's urine & made into a paste.	External
Cocos nucifera (Leaf)	Decoction is prepared from petiole fiber.	Medicated bath
Jasminum grandiflorum (Leaf) + *Breynia-vitis-idaea* (Leaf) + *Memecylon umbellatum* (Leaf) + *Indigofera tinctoria* (Leaf) + *Sida alnifolia* (Root) + *Piper longum* (Fruit) + *Myristica malabarica* (Bark)	Crushed, boiled with equal quantity of sesame oil & coconut oil.	External
Vitex negundo (Leaf) + *Aristolochia indica* (Root) + *Rauvolfia serpentia* (Root)	Crushed, boiled in coconut oil.	External
Ricinus communis (Seed) + *Myristica malabarica* (Bark) + *Piper longum* (Fruit) + *Scleropyrum pentadrum* (Seed)	Ground, boiled in sesame oil.	External
Calotropis gigantea (Root) + *Bulbophyllum sterile* (Leaf)	Ground in cow's urine & made into a paste.	External
Ixora coccinea (Leaf) + *Tamarindus indica* (Leaf)	Crushed & decoction is prepared.	External
Calotropis gigantea (Leaf) + *Senna occidentalis* (Leaf) + *Senna alata* (Leaf) + *Acampe praemorsa* (Root)	Ground with rice water & made into a paste.	External
Gnetum ula (Leaf) + *Justicia gendarussa* (Leaf) + *Tamarindus indica* (Leaf)	Crushed & decoction is prepared.	Medicated bath
Ichnocarpus frutescens (Whole plant) + *Citrus limon* (Fruit) + *Vitex negundo* (Leaf) + *Leucas*	Crushed, boiled in coconut oil.	External

aspera (Leaf) + *Sida alnifolia* (Root) + *Sida acuta* (Root) + *Chrysopogon zizanioides* (Root) + *Cinnamomum verum* (Bark)		
Neolamarckia cadamba (Bark) + *Syzygium caryophyllatum* (Bark) + *Ficus religiosa* (Bark) + *Piper longum* (Fruit) + *Myristica fragrans* (Fruit) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed)	Crushed, boiled in coconut oil.	External
Asystasia gangetica (Whole plant) + *Naregamia alata* (Whole plant) + *Hesperethusa crenulata* (Leaf)	Ground in rice water & made into a paste.	External
Moringa oleifera (Bark) + *Holoptelea integrifolia* (Leaf) + *Vitex negundo* (Leaf) + *Erythrina variegata* (Leaf) + *Jasminum malabaricum* (Leaf)	Crushed & boiled in coconut oil.	External
Vateria indica (Bark)	Decoction is prepared.	Oral
Cissus quadrangularis (Stem) + *Azadirachta indica* (Leaf) + *Nyctanthes arbor-tristis* (Leaf)	Decoction is prepared.	Oral
Leucas aspera (Leaf) + *Vitex negundo* (Leaf) + *Trigonella foenum-graecum* (Seed) + *Citrus limon* (Leaf) + *Citrus medica* (Leaf) + *Kaempferia galanga* (Rhizome) + *Brassica nigra* (Seed) + *Madhuca neriifolia* (Seed) + *Jatropha curcas* (Seed)	Crushed, boiled in sesame oil.	External
Tamarindus indica (Leaf) + *Citrus medica* (leaf) + *Jasminum malabaricum* (Leaf) + *Pongamia pinnata* (Bark) + *Asparagus racemosus* (Root)	Decoction is prepared.	Medicated bath
Vitex negundo (Leaf) + *Leucas aspera* (Leaf) + *Baringtonia racemosa* (Leaf) + *Ricinus communis* (Leaf) + *Cyclea peltata* (Whole plant)	Crushed, boiled with a mixture of ghee, coconut oil & sesame oil.	External
Euphorbia neriifolia (Stem) + *Azadirachta indica* (Leaf) + *Aegle marmelos* (Bark) + *Calotropis gigantea* (Leaf) + *Leucas aspera* (Leaf) + *Aristolochia indica* (Root) + *Justicia gendarussa* (Leaf) + *Senna occidentalis* (Leaf)	Crushed, boiled in sesame oil.	External
Vitex negundo (Leaf) + *Leucas aspera* (Leaf) + *Citrus medica* (Leaf) + *Wrightia tinctoria* (Bark & Leaf) + *Senna alata* (Leaf) + *Senna occidentalis* (Leaf) + *Sida alnifolia* (Whole plant) + *Strychnos colubrina* (Bark & Leaf)	Ground into a paste.	External
Terminalia chebula (Fruit) + *Myristica fragrans* (Fruit) + *Allium sativum* (Bulb) + *Zingiber officinale* (Rhizome)	Ground, tablet is prepared.	Oral
Cissus quadrangularis (Stem) + *Litsea glutinosa* (Leaf) + *Russelia equisetiformis* (Stem) + *Ricinus communis* (Seed) + *Barleria prionitis* (Leaf & Root)	Ground, boiled in coconut oil.	External
Jasminum malabaricum (Leaf) + *Piper betle* (Leaf) + *Allophylus rheedei* (Leaf) + *Thunbergia mysorensis* (Leaf) + *Bridelia stipularis* (Leaf)	Ground, boiled in sesame oil.	External
Strychnos nux-vomica (Leaf & Bark)	Crushed in rice washed water & made into a paste.	External
Piper longum (Fruit) + *Cassia fistula* (Bark) + *Syzygium aromaticum* (Bark) + *Brassica nigra* (Seed) + *Glycyrrhiza glabra* (Whole plant)	Crushed, boiled in coconut oil.	External

Citrus medica (Leaf) + *Justicia gendarussa* (Leaf) + *Alstonia scholaris* (Bark) + *Leea indica* (Leaf) + *Brassica nigra* (Seed)	Ground, boiled with equal quantity of coconut oil & sesame oil.	External
Hesperethusa crenulata (Leaf) + *Scleropyrum pentandrum* (Seed)	Crushed, boiled with equal quantity of coconut oil & sesame oil.	External
Justicia gendarussa (Leaf)	Decoction is prepared.	Medicated bath
Rubia cordifolia (Root) + *Justicia adhatoda* (Leaf) + *Syzygium aromaticum* (Bark) + *Cinnamomum verum* (Bark) + *Eucalyptus tereticornis* (Bark & Leaf)	Ground, boiled in coconut oil.	External
Myristica malabarica (Fruit) + *Aegle marmelos* (Bark) + *Syzygium aromaticum* (Flower bud) + *Jatropha curcas* (Seed) + *Calophyllum inophyllum* (Seed)	Ground, boiled in coconut oil.	External
Brassica nigra (Seed)	Hot paste is prepared.	External
Breynia vitis-idaea (Leaf)	Decoction is prepared.	Medicated bath
Aristolochia indica (Root) + *Rauvolfia serpentina* (Root) + *Tinospora cordifolia* (Stem) + *Andrographis paniculata* (Stem & Leaf)	Crushed, boiled with equal quantity of sesame oil & coconut oil.	External
Vitex negundo (Shoot tip) + *Citrus limon* (Fruit) + *Averrhoa carambola* (Fruit) + *Garcinia indica* (Leaf) + *Croton persimilis* (Leaf)	Crushed into a paste.	External
Justicia gendarussa (Leaf) + *Hemidesmus indicus* (Root) + *Myristica fragrans* (Fruit) + *Ruta graveolens* (Leaf) + *Cyperus rotundus* (Root) + *Bergera koenigii* (Leaf) + *Calophyllum inophyllum* (Seed)	Ground, boiled in sesame oil.	External
Psidium guajava (Tender Leaf) + *Justicia gendarussa* (Leaf) + *Nyctanthes arbor-tristis* (Bark) + *Vitex negundo* (Leaf) + *Erythrina variegata* (Bark) + *Holarrhena pubescens* (Bark) + *Tamarindus indica* (Leaf) + *Zanthoxylum rhetsa* (Bark)	Decoction is prepared.	External
Justicia gendarussa (Leaf) + *Averrhoa carambola* (Fruit) + *Tamarindus indica* (Leaf) + *Citrus limon* (Fruit) + *Brassica nigra* (Seed)	Ground, boiled in sesame oil.	External
Garcinia indica (Bark) + *Artocarpus gomezianus* (Bark)	Decoction is prepared.	Oral
Justicia gendarussa (Leaf) + *Embelia tsjeriam-cottam* (Fruit) + *Averrhoa carambola* (Fruit) + *Euphorbia neriifolia* (Stem) + *Ricinus communis* (Seed) + *Eucalyptus tereticornis* (Bark)	Ground, boiled with the mixture of ghee, sesame oil & coconut oil.	External
Rauvolfia serpentina (Root) + *Aristolochia indica* (Root) + *Ventilago maderaspatana* (Root) + *Merremia tridentata* (Leaf) + *Bunium bulbocastanum* (Seed) + *Pterocarpus marsupium* (Bark)	Crushed, boiled in sesame oil.	External
Calophyllum inophyllum (Seed) + *Mesua ferrea* (Seed) + *Ricinus communis* (Seed) + *Hydnocarpus wightianus* (Seed)	Ground, boiled in sesame oil.	External
Vitex negundo (Leaf) + *Calophyllum inophyllum* (Leaf) + *Pongamia pinnata* (Bark)	Crushed in rice water & made into a paste.	External
Ricinus communis (Leaf) + *Sida alnifolia* (Root) + *Citrus medica* (Leaf)	Decoction is prepared.	Oral

Calotropis gigantea (Leaf) + *Ventilago maderaspatana* (Root) + *Allium sativum* (Bulb)	Crushed and boiled in sesame oil.	External
Pterocarpus marsupium (Bark) + *Cinnamomum verum* (Bark) + *Ixora brachiata* (Bark) + *Sida alnifolia* (Root)	Crushed with cow's urine & made into paste.	External
Syzygium cumini (Bark) + *Salacia chinensis* (Root) + *Ceiba pentandra* (Bark) + *Sida alnifolia* (Root)	Decoction is prepared.	Oral
Ichnocarpus frutescens (Stem & Leaf) + *Merremia tridentata* (Stem & Leaf) + *Tinospora cordifolia* (Stem) + *Phyllanthus amarus* (Leaf)	Decoction is prepared.	Oral
Cinnamomum verum (Bark & Leaf) + *Terminalia crenulata* (Bark & Leaf) + *Ziziphus rugosa* (Bark & Leaf) + *Senna occidentalis* (Leaf) + *Euphorbia neriifolia* (Stem) + *Opuntia dillenii* (Stem)	Ground & hot paste is prepared.	External
Calophyllum inophyllum (Seed) + *Hydnocarpus wightianus* (Seed) + *Brassica nigra* (Seed) + *Magnolia champaca* (Seed) + *Cocos nucifera* (Seed) + *Sesamum indicum* (Seed) + *Jatropha curcas* (Seed)	Oil is extracted.	External
Ixora coccinea (Root) + Ventilago maderaspatana (Root) + *Cinnamomum verum* (Bark) + *Ocimum tenuiflorum* (Leaf) + *Azadirachta indica* (Leaf)	Crushed, boiled in coconut oil.	External
Blepharis maderaspatensis (Leaf) + *Mimosa pudica* (Root) + *Aristolochia indica* (Root) + *Rauvolfia serpentina* (Root)	Ground, boiled in coconut oil.	External
Andrographis paniculata (Leaf) + *Aristolochia indica* (Root) + *Neolamarckia cadamba* (Bark) +*Tinospora cordifolia* (Stem) + *Vitex negundo* (Leaf) + *Leucas aspera* (Leaf) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed)	Crushed, boiled with ghee, coconut oil & sesame oil.	External
Tinospora cordifolia (Stem) + *Naregamia alata* (Whole plant) + *Ziziphus rugosa* (Leaf) + *Justicia gendarussa* (Leaf) + *Tamarindus indica* (Leaf) + *Senegalia rugata* (Leaf) + *Croton persimilis* (Root) + *Hemidesmus indicus* (Root) + *Hydnocarpus wightianus* (Seed) + *Azadirachta indica* (Seed) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed)	Crushed, boiled in equal quantity of coconut oil & sesame oil.	External
Ventilago maderaspatana (Root) + *Sida alnifolia* (Root) + *Ricinus communis* (Seed & Root) + *Loeseneriella arnottiana* (Root) + *Phyllanthus amarus* (Whole plant)	Ground, boiled in coconut oil.	External
Croton persimilis (Root) + *Terminalia chebula* (Fruit) + *Ixora coccinea* (Root)	Crushed, boiled in sesame oil.	External
Sida alnifolia (Root) + *Tinospora cordifolia* (Stem) + *Cassia fistula* (Bark) + *Samanea saman* (Bark) + *Tribulus terrestris* (Root) + *Jatropha curcas* (Seed)	Crushed, boiled in sesame oil.	External
Homonoia riparia (Stem) + *Moringa oleifera* (Bark) + *Pterocarpus marsupium* (Bark) + *Terminalia bellirica* (Bark) + *Curcuma longa* (Rhizome) + *Haldina cordifolia* (Bark)	Ground, boiled with equal quantity of sesame oil & coconut oil.	External
Holarrhena pubescens (Bark) + *Leucas aspera* (Leaf) + *Vitex negundo* (Leaf) + *Justicia gendarussa* (leaf) + *Piper nigrum* (Seed) + *Brassica nigra* (Seed) + *Cuminum cyminum* (Seed)	Crushed with mud of termite nest & coconut oil, made into a paste.	External

Sida alnifolia (Root) + *Pterocarpus marsupium* (Bark) + *Cinnamomum verum* (Bark) + *Allium cepa* (Bulb) + *Brassica nigra* (Seed)	Ground, boiled with equal quantity of coconut oil & sesame oil.	External
Cinnamomum verum (Bark) + *Moringa oleifera* (Bark) + *Aegle marmelos* (Leaf) + *Ruta graveolens* (Leaf)	Ground in rice water & made into a paste.	External
Ventilago maderaspatana (Root) + *Hibiscus-rosa-sinensis* (Flower) + *Ficus racemosa* (Bark)	Crushed & boiled in coconut oil.	External
Careya arborea (Bark)	Decoction is prepared.	Medicated bath
Justicia gendarussa (Leaf) + *Alstonia scholaris* (Bark) + *Calophyllum inophyllum* (Leaf) + *Cinnamomum verum* (Bark)	Ground, boiled with equal quantity of sesame oil & coconut oil.	External
Jasminum malabaricum (Leaf)	Decoction is prepared.	Medicated bath
Aristolochia indica (Root) + *Naregamia alata* (Whole plant) + *Tinospora cordifolia* (Stem) + *Hemidesmus indicus* (Root) + *Rauvolfia serpentina* (Root)	Ground, boiled with equal quantity of coconut oil & sesame oil.	External
Clerodendrum infortunatum (Root) + *Cyclea peltata* (Root) + *Flueggea leucopyrus* (Leaf)	Ground, boiled with equal quantity of coconut oil & sesame oil.	External
Cinnamomum verum (Bark) + *Thunbergia mysorensis* (Leaf) + *Uvaria narum* (Root) + *Ricinus communis* (Seed) + *Piper nigrum* (Fruit) + *Myristica fragrans* (Fruit) + *Zingiber officinale* (Rhizome)	Ground, boiled with equal quantity of coconut oil & sesame oil.	External
Ficus drupacea (Leaf)	Decoction is prepared.	Medicated bath
Holoptelea integrifolia (Leaf) + *Moringa oleifera* (Bark) + *Naravelia zeylanica* (Root) + *Capsicum annuum* (Fruit) + *Brassica nigra* (Seed)	Ground, boiled in coconut oil.	External
Entada rheedii (Bark)	Decoction is prepared.	Medicated bath
Scleropyrum pentandrum (Seed) + *Uvaria narum* (Root) + *Ixora coccinea* (Root) + *Tectona grandis* (Bark & Leaf) + *Jatropha curcas* (Seed) + *Bunium bulbocastanum* (Seed)	Crushed, boiled in coconut oil.	External
Aristolochia indica (Root) + *Rauvolfia serpentina* (Root) + *Ventilago maderaspatana* (Root)	Ground, boiled in coconut oil.	External
Ixora coccinea (Leaf) + *Memecylon umbellatum* (Leaf)	Decoction is prepared.	Medicated bath
Holoptelea integrifolia (Leaf) + *Naregamia alata* (Whole plant) + *Leucas aspera* (Leaf) + *Cinnamomum verum* (Bark) + *Myristica malabarica* (Fruit) + *Syzygium aromaticum* (Bark)	Ground & boiled in coconut oil.	External
Garcinia xanthochymus (Leaf) + *Artocarpus heterophyllus* (Leaf)	Decoction is prepared.	Medicated bath
Holoptelea integrifolia (Bark) + *Aristolochia indica* (Root) + *Cinnamomum verum* (Bark) + *Baccharoides anthelmintica* (Seed)	Ground with Camphor, boiled in coconut oil.	External
Aristolochia indica (Root) + *Rauvolfia serpentina* (Root) + *Baringtonia racemosa* (Fruit) + *Citrus limon* (Fruit)	Crushed into a paste.	External
Memecylon umbellatum (Leaf) + *Caesalpinia bonduc* (Leaf)	Decoction is prepared.	Medicated bath
Cinnamomum verum (Bark) + *Piper nigrum* (Friut) + *Rauvolfia serpentina* (Root) + *Myristica fragrans* (Fruit & Bark) + *Tectona grandis* (Leaf)	Crushed, boiled in sesame oil.	External

+ *Cuminum cyminum* (Seed) + *Areca catechu* (Seed) + *Trachyspermum ammi* (Leaf)		
Allophylus rheedei (Leaf) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed) + *Bunium bulbocastanum* (Seed)	Ground, boiled in coconut oil.	External
Ventilago maderaspatana (Root) + *Barleria prionitis* (Root) + *Cinnamomum verum* (Bark) + *Ficus benghalensis* (Bark) + *Allium sativum* (Bulb) + *Bunium bulbocastanum* (Seed)	Ground, boiled with equal quantity of sesame oil & coconut oil.	External
Zanthoxylum rhetsa (Bark) + *Croton persimilis* (Root) + *Cissus quadrangularis* (Stem) + *Myristica fragrans* (Fruit & Bark) + *Allium sativum* (Bulb)	Crushed, boiled with equal quantity of sesame oil & coconut oil.	External
Ficus benghalensis (Bark) + *Ficus drupacea* (Bark & Leaf) + *Calotropis gigantea* (Leaf) + *Cinnamomum verum* (Bark) + *Aloe vera* (Leaf)	Hot paste is prepared.	External
Canthium coromandelicum (Leaf) + *Annona muricata* (Seed & Leaf) + *Myristica fragrans* (Bark) + *Hibiscus rosa-sinensis* (Root)	Ground, boiled in coconut oil.	External
Aristolochia indica (Root) + *Neolamarckia cadamba* (Bark) + *Rauvolfia serpentina* (Root) + *Myristica fragrans* (Bark & Fruit) + *Allium sativum* (Bulb) + *Bunium bulbocastanum* (Seed)	Crushed, boiled in coconut oil.	External
Ziziphus rugosa (Leaf) + *Caesalpinia bonduc* (Fruit) + *Senegalia rugata* (Leaf) + *Hemidesmus indicus* (Leaf & Stem)	Crushed in rice washed water & made into a paste.	External
Mesua ferrea (Seed) + *Arachis hypogaea* (Seed) + *Ricinus communis* (Seed) + *Sesamum indicum* (Seed)	Oil is extracted	External
Ventilago maderaspatana (Root) + *Cinnamomum verum* (Bark) + *Ficus drupacea* (Leaf) + *Rauvolfia serpentina* (Root) + *Hemidesmus indicus* (Root) + *Croton persimilis* (Root) + *Citrus medica* (Leaf) + *Citrus limon* (Fruit)	Ground, boiled in sesame oil.	External
Tinospora cordifolia (Stem)	Decoction is prepared.	Medicated bath
Salacia chinensis (Root) + *Rauvolfia serpentina* (Root) + *Aristolochia indica* (Root) + *Jatropha curcas* (Seed) + *Syzygium aromaticum* (Bark & Fruit) + *Thottea siliquosa* (Root) + *Myristica fragrans* (Fruit) + *Azadirachta indica* (Seed)	Crushed, boiled in sesame oil.	External
Citrus medica (Leaf) + *Holarrhena pubescens* (Bark) + *Croton persimilis* (Leaf) + *Tinospora cordifolia* (Stem) + *Cissus quadrangularis* (Stem) + *Rauvolfia serpentina* (Root) + *Aristolochia indica* (Root) + *Plumbago indica* (Root) + *Jasminum malabaricum* (Leaf) + *Eucalyptus tereticornis* (Leaf) + *Erythrina variegata* (Leaf) + *Loeseneriella arnottiana* (Leaf)	Ground, boiled in coconut oil.	External
Alstonia scholaris (Bark) + *Aristolochia indica* (Root) + *Rauvolfia serpentina* (Root) + *Cinnamomum verum* (Bark) + *Ixora coccinea* (Root) + *Strychnos nux-vomica* (Bark) + *Capsicum annuum* (Fruit) +*Entada rheedii* (Seed) + *Piper*	Crushed, boiled in coconut oil.	External

nigrum (Fruit) + *Zingiber officinale* (Rhizome) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed)		
Aristolochia indica (Root) + *Rauvolfia serpentina* (Root) + *Cinnamomum verum* (Bark) + *Thottea siliquosa* (Root) + *Ventilago maderaspatana* (Root) + *Salacia chinensis* (Root) + *Myristica fragrans* (Bark) + *Allium sativum* (Bulb)	Ground into a paste.	External
Scleropyrum pentandrum (Seed) + *Ricinus communis* (Seed) + *Jatropha curcas* (Seed) + *Calophyllum apetalum* (Seed) + *Sesamum indicum* (Seed) + *Madhuca neriifolia* (Seed) + *Schleichera oleosa* (Seed)	Oil extracted is mixed & used.	External
Schleichera oleosa (Seed) + *Scleropyrum pentandrum* (Seed) + *Madhuca neriifolia* (Seed) + *Syzygium aromaticum* (Bark) + *Myristica fragrans* (Fruit) + *Allium sativum* (Bulb) + *Piper longum* (Fruit) + *Ventilago maderaspatana* (Root) + *Aristolochia indica* (Root) + *Rauvolfia serpentina* (Root)	Crushed, boiled in sesame oil.	External
Naravelia zeylanica (Stem, Leaf) + *Cuminum cyminum* (Seed) + *Tabernaemontana divaricata* (Bark) + *Hemidesmus indicus* (Root) + *Aristolochia tagala* (Root)	Crushed, boiled in sesame oil.	External

2. Backache

Plant Name and Parts Used	**Mode of Preparation**	**Application**
Ricinus communis (Root)	Crushed with jaggery & decoction is prepared.	Oral
Pterocarpus marsupium (Bark)	Ground in rice water & made into a paste.	External
Abrus pulchellus (Leaf)	Dipped in hot coconut oil.	Applied on affected parts
Abrus precatorius (Leaf)	Dipped in hot coconut oil.	Applied on affected parts
Achyranthes aspera (Whole plant)	Decoction is prepared.	Oral
Vitex negundo (Shoot tip)	Decoction is prepared.	Oral
Sphagneticola calendulacea (Leaf)	Ground into a paste.	External
Calotropis gigantea (Leaf)	Dipped in coconut oil & heated on coal fire.	Applied on affected parts
Leea indica (Leaf) + *Cuminum cyminum* (Seed)	Ground in sesame oil & tablet is prepared.	Oral
Ricinus communis (Root) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Phyllanthus amarus (Whole plant) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Piper betle (Leaf) + *Cuminum cyminum* (Seed) + *Piper nigrum* (Seed) + *Sida rhombifolia* (Root)	Decoction is prepared.	Oral
Sida alnifolia (Root) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Aloe vera (Leaf) + *Piper betle* (Leaf)	Ground with egg white & made into a paste.	External
Zanthoxylum rhetsa (Bark) + *Asystasia gangetica* (Leaf, Stem & Root)	Ground, boiled in coconut oil.	External

Azadirachta indica (Leaf) + *Andrographis paniculata* (Leaf) + *Memecylon umbellatum* (Leaf)	Crushed with jaggery & decoction is prepared.	Oral
Cocos nucifera (Leaf)	Decoction is prepared from petiole fibres of coconut leaf.	Medicated bath
Scleropyrum pentandrum (Seed oil) + *Calophyllum inophyllum* (Seed oil) + *Magnolia champaca* (Seed oil)	Oil is extracted.	External
Dalbergia horrida (Bark) + *Syzygium caryophyllatum* (Bark) + *Ficus benghalensis* (Bark)	Decoction is prepared.	Oral
Vitex negundo (Leaf) + *Leucas aspera* (Leaf) + *Calotropis gigantea* (Leaf) + *Tectona grandis* (Leaf) + *Bunium bulbocastanum* (Seed)	Crushed, boiled with equal quantity of coconut oil & sesame oil.	External
Calotropis gigantea (Leaf) + *Tectona grandis* (Tender Leaf) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed)	Ground, boiled in coconut oil.	External
Moringa oleifera (Leaf) + *Tamarindus indica* (Leaf)	Decoction is prepared.	Medicated bath
Tinospora cordifolia (Stem) + *Hesperethusa crenulata* (Leaf) + *Vitex negundo* (Leaf) + *Leucas aspera* (Leaf)	Ground into a paste.	External
Vateria indica (Bark).	Decoction is prepared.	Oral
Sida alnifolia (Root) + *Ricinus communis* (Root) + *Coriandrum sativum* (Fruit) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Cinnamomum verum (Bark) + *Syzygium cumini* (Bark) + *Croton persimilis* (Root) + *Careya arborea* (Bark) + *Ixora coccinea* (Leaf) + *Citrus limon* (Fruit)	Decoction is prepared.	External
Hydnocarpus wightianus (Seed) + *Syzygium aromaticum* (Bark & Fruit)	Ground, boiled in sesame oil.	External
Mimosa pudica (Whole plant) + *Ocimum tenuiflorum* (Leaf) + *Lawsonia inermis* (Leaf) + *Syzygium aromaticum* (Bark) + *Piper nigrum* (Seed) + *Camellia sinensis* (Leaf)	Crushed, boiled in sesame oil.	External
Tinospora cordifolia (Stem) + *Ocimum tenuiflorum* (Leaf) + *Piper nigrum* (Seed) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Cyanthillium cinereum (Leaf) + *Ficus racemosa* (Bark) + *Phyllanthus emblica* (Bark & Leaf) + *Lawsonia inermis* (Leaf) + *Terminalia chebula* (Fruit) + *Eclipta prostrata* (Leaf) + *Ficus microcarpa* (Bark)	Ground, boiled in sesame oil.	External
Blepharis maderaspatensis (Leaf) + *Piper betle* (Root) + *Piper nigrum* (Seed) + *Vitis vinifera* (Fruit)	Crushed in ghee & palm jaggery & lehya is prepared.	Oral
Cinnamomum verum (Leaf) + *Myristica malabarica* (Bark) + *Sida cordata* (Leaf) + *Allium sativum* (Bulb) + *Bunium bulbocastanum* (Seed)	Ground, boiled in sesame oil.	External
Pterocarpus marsupium (Bark) + *Phyllanthus emblica* (Bark) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral

Ventilago maderaspatana (Root) + *Barleria prionitis* (Root) + *Cinnamomum verum* (Bark) + *Allium sativum* (Bulb)	Ground, boiled with equal quantity of sesame oil & coconut oil.	External

3. Bone Fracture

Plant Name and Parts Used	Mode of Preparation	Application
Litsea glutinosa (Leaf & Bark)	Ground with honey & made into a paste/poultice.	External
Leucas aspera (Leaf)	Ground in coconut oil & made into a paste/poultice.	External
Pterocarpus marsupium (Bark)	Ground in honey & made into a paste/poultice.	External
Phyllanthus urinaria (Whole plant)	Ground with salt & made into a paste.	External
Antidesma acidum (Leaf)	Ground with honey & made into a paste/poultice.	External
Antidesma montanum (Leaf & Bark)	Ground into a paste.	External
Ziziphus rugosa (Leaf)	Ground with honey & made into a paste/poultice.	External
Litsea wightiana (Bark)	Ground with honey & made into a paste.	External
Cissus quadrangularis (Stem)	Crushed into a paste.	External
Actinodaphne angustifolia (Leaf)	Crushed in honey & made into a paste/poultice.	External
Actinodaphne tadulingami (Leaf)	Crushed in honey & made into a paste/poultice.	External
Bridelia stipularis (Bark)	Crushed in honey & made into a paste/poultice.	External
Antidesma acidum (Leaf) + *Bunium bulbocastanum* (Seed) + *Hybanthus enneaspermus* (Whole plant)	Ground with termite nest mud & made into paste.	External
Thunbergia mysorensis (Leaf) + *Cuminum cyminum* (Seed)	Ground with honey & made into a paste/poultice.	External
Tabernaemontana divaricata (Leaf, Bark) + *Antidesma acidum* (Leaf) + *Oryza sativa* (Seed)	Ground with cow's raw milk & made into a paste.	External application for initial 15 days
Allium cepa (Bulb) + *Sesamum indicum* (Seed oil)	Oil is prepared.	External application after 15 days of bone setting
Thunbergia mysorensis (Leaf) + *Curcuma longa* (Rhizome) + *Terminalia crenulata* (Leaf)	Crushed with honey & made into a paste/poultice.	External
Litsea glutinosa (Leaf) + *Syzygium travancoricum* (Bark)	Crushed with honey & made into a paste/poultice.	External
Thunbergia mysorensis (Leaf) + *Salacia chinensis* (Leaf)	Ground into a paste/poultice.	External
Thunbergia mysorensis (Leaf) + *Merremia tridentata* (Leaf & Stem)	Crushed & extract is mixed with honey.	Oral
Litsea glutinosa (Leaf) + *Cissus quadrangularis* (Stem)	Ground into a paste.	External
Holarrhena pubescens (Leaf & Bark)	Dried, ground into powder & mixed with milk.	Oral
Holarrhena pubescens (Leaf & Bark)	Bark paste/poultice is prepared.	External
Aloe vera (Leaf) + *Anacardium occidentale* (Bark) + *Cocos nucifera* (Endosperm/Copra)	Ground with egg white & made into a paste/poultice.	External

Anacardium occidentale (Bark) + *Cocos nucifera* (Endosperm/Copra) *+ Piper nigrum* (Seed) + *Brassica nigra* (Seed)	Boiled, crushed into a paste/poultice.	External
Jatropha curcas (Seed) *+ Ricinus communis* (Seed) *+ Scleropyrum pentandrum* (Seed) *+ Sesamum indicum* (Seed)	Oil is extracted.	External
Vitex negundo (Leaf) + *Litsea glutinosa* (Leaf) + *Cuminum cyminum* (Seed)	Crushed & made into a paste/poultice.	External
Euphorbia neriifolia (Stem & Leaf) + *Selaginella pallescens* (Whole plant) + *Tamarindus indica* (Fruit) + *Piper nigrum* (Seed) + *Zingiber officinale* (Rhizome) + *Aristolochia tagala* (Bark & Root)	Ground with jaggery & made into a paste/poultice.	External
Leucas aspera (Leaf) + *Croton persimilis* (Leaf) + *Aloe vera* (Leaf)	Paste/poultice is prepared.	External
Croton persimilis (Leaf) + *Aloe vera* (Leaf) + *Hopea ponga* (Leaf)	Ground with egg white & made into a paste/poultice. Hot paste is used.	External
Thunbergia mysorensis (Leaf) + *Aloe vera* (Leaf) + *Eleusine coracana* (Seed)	Paste/poultice prepared.	External
Anacardium occidentale (Bark)	Bark is used for bone setting.	
Litsea glutinousa (Leaf) + *Embelia tsjeriam-cottam* (Leaf) + *Aloe vera* (Leaf)	Ground with egg white & made into a paste/poultice.	External
Setaria italica (Seed) + *Cocos nucifera* (Endosprem/ Copra)	Boiled, crushed into a paste.	External
Asystasia gangetica (Stem & Leaf) + *Aloe vera* (Leaf) + *Bulbophyllum sterile* (Leaf)	Crushed with egg white & made into a paste/poultice.	External
Vitex negundo (Leaf) + *Leucas aspera* (Leaf) + *Tamarindus indica* (Leaf) + *Croton persimilis* (Leaf) + *Cocos nucifera* (Copra)	Crushed into a paste.	External
Ricinus communis (Seed) + *Sesamum indicum* (Seed)	Oil is extracted & mixed.	External
Cissus quadrangularis (Stem) + *Cuminum cyminum* (Seed)	Ground in honey & made into a paste/poultice.	External
Cissus quadrangularis (Stem) + *Curcuma longa* (Rhizome)	Ground with jaggery & made into a paste/poultice.	External
Senna occidentalis (Leaf) + *Carica papaya* (Leaf)	Ground with jaggery & made into a paste/poultice.	External
Thunbergia mysorensis (Leaf) + *Piper betle* (Leaf) + *Allophylus rheedei* (Leaf)	Crushed, boiled in coconut oil.	External
Terminalia crenulata (Leaf) + *Aloe vera* (Leaf)	Crushed with egg white & made into a paste/poultice.	External
Rauvolfia serpentina (Root) + *Merremia tridentata* (Leaf)	Crushed, boiled in coconut oil.	External
Terminalia crenulata (Leaf) + *Aristolochia indica* (Leaf) + *Aloe vera* (Leaf) + *Rauvolfia serpentina* (Root)	Ground in honey & made into a paste/poultice.	External
Jasminum malabaricum (Leaf) + *Piper betle* (Leaf) + *Allophylus rheedei* (Leaf) + *Thunbergia mysorensis* (Leaf) + *Bridelia stipularis* (Leaf)	Ground, boiled in sesame oil.	External
Pongamia pinnata (Leaf) + *Salacia chinensis* (Bark) + *Aloe vera* (Leaf)	Crushed with egg white & made into a poultice.	External
Terminalia bellirica (Leaf) + *Aloe vera* (Leaf)	Crushed into a paste/poultice.	External
Senna occidentalis (Leaf) + *Canthium coromandelicum* (Bark) + *Piper nigrum* (Seed) + *Elettaria cardamomum* (Seed)	Paste/poultice is prepared.	External

Ventilago maderaspatana (Leaf) + *Aristolochia indica* (Root) + *Rauvolfia serpentina* (Root) + *Merremia tridentata* (Leaf)	Crushed, boiled in coconut oil.	External
Merremia tridentata (Leaf) + *Thunbergia mysorensis* (Leaf)	Crushed in ghee & made into paste/poultice.	External
Pongamia pinnata (Bark) + *Carica papaya* (Bark) + *Ventilago maderaspatana* (Leaf) + *Clerodendrum infortunatum* (Root) + *Aristolochia indica* (Root) + *Rauvolfia serpentina* (Root)	Ground, boiled in coconut oil.	External
Terminalia paniculata (Leaf) + *Vateria indica* (Leaf) + *Santalum album* (Heart wood) + *Sida alnifolia* (Root)	Ground, boiled in sesame oil.	External

4. Joint Pain

Plant Name and Parts Used	**Mode of Preparation**	**Application**
Borassus flabellifer (Endosperm)	Tender endosperm is crushed in rice water & hot paste is prepared.	External
Achyranthes aspera (Whole plant)	Decoction is prepared.	Oral
Hemidesmus indicus (Root)	Root is dried, powdered & mixed with cow's milk or honey.	Oral
Erythrina variegata (Bark & Leaf)	Hot paste is prepared.	External
Hesperethusa crenulata (Root)	Ground in rice water & decoction is prepared.	Oral
Bulbophyllum sterile (Leaf)	Crushed in cow's urine & made into a paste.	External
Holarrhena pubescens (Bark & Leaf)	Ground in rice water & made into a paste.	External
Aloe vera (Leaf)	Crushed with egg white & made into a paste.	External
Nyctanthes arbor-tristis (Root & Leaf)	Crushed, boiled in coconut oil.	External
Tinospora cordifolia (Stem)	Ground in rice water & made into a paste.	External
Tinospora cordifolia (Stem)	Decoction is prepared.	Oral
Punica granatum (Fruit)	Decoction of pericarp is prepared.	Oral
Cynodon dactylon (Whole plant) + *Piper nigrum* (Seed)	Crushed in cow's milk & made into a paste.	External
Urena lobata (Root) + *Bunium bulbocastanum* (Seed)	Crushed, boiled in coconut oil.	External
Naravelia zeylanica (Leaf) + *Sida alnifolia* (Root)	Crushed with egg white & made into a paste.	External
Opuntia dillenii (Stem) + *Brassica nigra* (Seed)	Hot paste is prepared.	External
Tinospora cordifolia (Stem) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Cissus quadrangularis (Leaf) + *Aloe vera* (Leaf)	Ground with rice water & egg white & made into a paste.	External
Homonoia riparia (Stem & Leaf) + *Moringa oleifera* (Bark) + *Brassica nigra* (Seed)	Crushed, boiled in sesame oil.	External
Piper nigrum (Leaf) + *Calotropis gigantea* (Leaf)	Leaves are dipped in sesame oil, heated on coal fire.	External
Cinnamomum verum (Bark) + *Croton persimilis* (Root)	Crushed in cow's urine & made into a paste.	External

Borassus flabellifer (Leaf) + *Bergera koenigii* (Leaf)	Crushed, boiled in coconut oil.	External
Mucuna pruriens (Root) + *Tragia involucrata* (Root)	Ground, boiled in coconut oil.	External
Phyllanthus emblica (Bark) + *Artocarpus heterophyllus* (Bark) + *Ricinus communis* (Seed oil)	Crushed, boiled in castor oil.	External
Cinnamomum verum (Bark) + *Jatropha curcas* (Leaf) + *Physalis minima* (Whole plant)	Crushed in rice water & hot paste is prepared.	External
Azadirachta indica (Leaf) + *Brassica nigra* (Seed)	Crushed, boiled in coconut oil.	External
Tinospora cordifolia (Stem & Leaf) + *Aloe vera* (Leaf)	Decoction is prepared.	Oral
Oryza sativa (Seed) + *Brassica nigra* (Seed) + *Rhynchostylis retusa* (Root)	Crushed, hot paste is prepared.	External
Areca catechu (Leaf) + *Tamarindus indica* (Leaf)	Decoction is prepared.	Medicated bath
Vitex negundo (Leaf) + *Flueggea leucopyrus* (Leaf)	Crushed, boiled in coconut oil.	External
Tinospora cordifolia (Stem & Leaf) + *Andrographis paniculata* (Stem & Leaf)	Decoction is prepared.	Oral
Phyllanthus amarus (Whole plant) + *Tinospora cordifolia* (Stem) + *Ocimum tenuiflorum* (Leaf) + *Piper nigrum* (Seed) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Tectona grandis (Bark) + *Syzygium aromaticum* (Flower bud) + *Cuminum cyminum* (Seed) + *Brassica nigra* (Seed)	Crushed, boiled in sesame oil.	External
Oryza sativa (Seed) + *Allium sativum* (Bulb) + *Myristica fragrans* (Bark) + *Azadirachta indica* (Leaf)	Crushed, boiled in sesame oil.	External
Zanthoxylum rhetsa (Bark) + *Curcuma longa* (Rhizome) + *Citrus limon* (Fruit) + *Baccharoides anthelmintica* (Seed)	Hot paste is prepared.	External
Holoptelea integrifolia (Bark) + *Aristolochia indica* (Root) + *Ficus racemosa* (Bark)	Ground, boiled with equal quantity of sesame oil & coconut oil.	External
Tinospora cordifolia (Stem) + *Andrographis paniculata* (Leaf & Stem) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Moringa oleifera (Bark) + *Brassica nigra* (Seed) + *Allium sativum* (Bulb)	Crushed, boiled in coconut oil.	External
Sida alnifolia (Root) + *Ricinus communis* (Root) + *Coriandrum sativum* (Fruit) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Calotropis gigantea (Root) + *Moringa oleifera* (Bark)	Crushed, boiled in coconut oil.	External
Sida alnifolia (Root, Leaf) + *Caesalpinia bonduc* (Seed)	Ground, boiled in coconut oil.	External
Jasminum malabaricum (Leaf)	Decoction is prepared.	Medicated bath
Asystasia gangetica (Stem & Leaf) + *Brassica nigra* (Seed) + *Citrus limon* (Fruit) + *Jatropha curcas* (Leaf) + *Adenanthera pavonina* (Leaf)	Crushed with egg white & made into a paste.	External
Ricinus communis (Seed) + *Vitex negundo* (Leaf) + *Rauvolfia serpentina* (Root) +	Crushed, boiled with equal quantity of sesame oil & coconut oil.	External

Tinospora cordifolia (Stem & Leaf) + *Hibiscus rosa-sinensis* (Flower)		
Cissus quadrangularis (Stem) + *Azadirachta indica* (Leaf) + *Nyctanthes arbor-tristis* (Leaf)	Crushed, decoction is prepared.	Oral
Blepharis maderaspatensis (Leaf) + *Pterocarpus marsupium* (Bark) + *Sida acuta* (Root) + *Hydnocarpus wightianus* (Seed)	Crushed, boiled in coconut oil.	External
Cissus quadrangularis (Stem) + *Litsea glutinosa* (Leaf) + *Russelia equisetiformis* (Stem) + *Ricinus communis* (Seed) + *Barleria prionities* (Leaf)	Ground, boiled in coconut oil.	External
Phyllanthus amarus (Leaf) + *Andrographis paniculata* (Leaf, Stem) + *Tinospora cordifolia* (Stem)	Decoction is prepared.	Oral
Aloe vera (Leaf) + *Phyllanthus amarus* (Leaf) + *Brassica nigra* (Seed) + *Euphorbia neriifolia* (Stem)	Hot paste is prepared.	External
Cissus quadrangularis (Stem) + *Aloe vera* (Leaf)	Crushed in rice water & made into a paste.	External
Arachis hypogaea (Seed) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed) + *Ocimum basilicum* (Leaf)	Crushed, boiled in coconut oil.	External
Bryophyllum pinnatum (Leaf)	Decoction is prepared.	Medicated bath
Merremia tridentata (Leaf) + *Pongamia pinnata* (Seed) + *Hybanthus enneaspermus* (Whole plant) + *Salacia chinensis* (Root)	Ground with egg white into a paste.	External
Merremia tridentata (Leaf) + *Pongamia pinnata* (Seed) + *Hybanthus enneaspermus* (Whole plant) + *Salacia chinensis* (Root)	Crushed with ghee & decoction is prepared.	Oral
Sida cordata (Leaf) + *Ricinus communis* (Leaf) + *Sida alnifolia* (Root) + *Citrus medica* (Leaf)	Decoction is prepared.	Oral
Ricinus communis (Seed) + *Bergera koenigii* (Leaf) + *Pongamia pinnata* (Seed) + *Andrographis paniculata* (Stem & Leaf)	Crushed, boiled in sesame oil.	External
Homonoia riparia (Leaf) + *Moringa oleifera* (Bark) + *Allium sativum* (Bulb) + *Brassica nigra* (Seed)	Crushed, boiled in coconut oil.	External
Tinospora cordifolia (Stem) + *Plumbago indica* (Leaf) + *Thunbergia mysorensis* (Leaf) + *Piper longum* (Fruit)	Decoction is prepared.	Oral
Hesperethusa crenulata (Bark) + *Citrus limon* (Fruit)	Juice is prepared.	Oral
Scleropyrum pentandrum (Seed) + *Ricinus communis* (Seed)	Crushed, boiled in coconut oil.	External

5. Muscle Pain

Plant Name and Parts Used	**Mode of Preparation**	**Application**
Allium sativum (Bulb)	Crushed, boiled in coconut oil.	External
Spondias pinnata (Leaf) + *Tamarindus indica* (Leaf)	Decoction is prepared.	Medicated bath
Brassica nigra (Seed) + *Allium sativum* (Bulb)	Crushed, boiled in coconut oil.	External
Tabernaemontana divaricata (Leaf & Bark) + *Brassica nigra* (Seed)	Hot paste is prepared.	External

Calotropis gigantea (Leaf & Latex) + *Brassica nigra* (Seed)	Hot paste is prepared.	External
Abrus pulchellus (Leaf)	Leaves are dipped in hot coconut oil.	Applied on affected parts
Tinospora cordifolia (Stem & Leaf) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Barleria prionitis (Leaf & Root) + *Curcuma longa* (Rhizome)	Dried, powdered, mixed with milk.	Oral
Trigonella foenum-graecum (Seed) + *Citrus limon* (Fruit)	Ground with rice washed water & made into a paste.	External
Ventilago maderaspatana (Root) + *Cyclea peltata* (Leaf & Root)	Crushed, boiled in coconut oil.	External
Terminalia crenulata (Leaf) + *Phyllanthus emblica* (Leaf) + *Cocos nucifera* (Tender coconut Mesocarp)	Crushed into a paste.	External
Ocimum basilicum (Leaf) + *Ocimum tenuiflorum* (Leaf) + *Citrus medica* (Leaf) + *Mussaenda laxa* (Leaf)	Crushed with rice water & made into a paste.	External
Careya arborea (Bark)	Decoction is prepared.	Medicated bath
Aristolochia indica (Root) + *Rauvolfia serpentina* (Root) + *Ventilago maderaspatana* (Root) + *Merremia tridentata* (Leaf) + *Thunbergia mysorensis* (Leaf)	Ground, boiled in coconut oil.	External
Jasminum malabaricum (Leaf) + *Allophylus rheedei* (Leaf) + *Morinda citrifolia* (Leaf) + *Citrus limon* (Fruit)	Crushed into a paste.	External
Salacia chinensis (Root) + *Cyclea peltata* (Root)	Ground, boiled in sesame oil.	External
Mimosa pudica (Whole plant) + *Syzygium aromaticum* (Flower bud)	Crushed, boiled in coconut oil.	External
Eclipta prostrata (Leaf) + *Allophylus rheedei* (Leaf) +*Indigofera tinctoria* (Leaf)	Crushed into a paste.	External
Cinnamomum verum (Bark) + *Croton persimils* (Root)	Ground in cow's urine & made into a paste.	External
Ocimum basilicum (Leaf) + *Allium sativum* (Bulb)	Crushed into a paste.	External
Ocimum basilicum (Leaf) + *Brassica nigra* (Seed)	Crushed, boiled in coconut oil.	External

6. Spasm

Plant Name and Parts Used	**Mode of Preparation**	**Application**
Abrus precatorious (Leaf)	Leaves dipped in hot coconut oil.	Appied on affected area
Litsea wightiana (Leaf)	Leaves are ground in honey & made into a paste.	Applied on affected area
Litsea glutinosa (Leaf)	Leaves are ground in honey & made into a paste.	Applied on affected area
Ricinus communis (Root)	Root decoction is prepared.	Oral
Datura metel (Leaf)	Ground into a paste.	External
Ricinus communis (Seed)	Seed oil is extracted.	External
Syzygium travancoricum (Bark & Leaf)	Decoction is prepared.	External
Adenanthera pavonia (Leaf & Seed)	Ground into a paste.	External
Coscinium fenestratum (Root & Stem)	Ground in rice washed water & made into a paste.	External

Physalis minima (Whole plant)	Ground into a paste.	External
Sesamum indicum (Seed) + *Allium sativum* (Bulb)	Oil is prepared.	External
Schleichera oleosa (Seed) + *Brassica nigra* (Seed)	Seed oil is prepared.	External
Calophyllum inophyllum (Seed) + *Azadirachta indica* (Seed)	Seed oil is prepared.	External
Mussaenda laxa (Leaf) + *Rhynchostylis retusa* (Root)	Ground into a paste.	External
Ricinus communis (Seed oil) + *Azadirachta indica* (Seed oil) + *Pongamia pinnata* (Seed oil)	A little quantity of each of oil is added to the cow's milk.	Oral
Jatropha curcas (Seed) + *Scleropyrum pentandrum* (Seed) + *Allium sativum* (Bulb)	Oil is prepared.	External
Ricinus communis (Root) + *Sida rhombifolia* (Root) + *Cuminum cyminum* (Seed)	Decoction is prepared.	Oral
Vitex negundo (Leaf) + *Trigonella foenum-graecum* (Seed) + *Ricinus communis* (Seed oil)	To the decoction of *Vitex negundo* leaves & *Trigonella foenum-graecum* seeds, add a teaspoonful of *Ricinus communis* seed oil.	Oral
Cassia fistula (Leaf & Bark) + *Ficus religiosa* (Bark) + *Alstonia scholaris* (Bark) + *Ficus microcarpa* (Bark)	Decoction is prepared.	External

7. Vertigo

Plant Name and Parts Used	**Mode of Preparation**	**Application**
Citrus reticulata (Fruit)	Fruit juice is added to rice gruel.	Oral
Citrus medica (Fruit)	Fruit juice is added to rice gruel.	Oral
Helicteres isora (Leaf)	Crushed into a paste.	Applied on scalp
Datura metel (Leaf)	Ground into a paste.	Applied on scalp
Actinodaphne tadulingami (Leaf)	Ground into a paste.	Applied on forehead & scalp
Actinodaphne tadulingami (Leaf)	Leaf juice is prepared.	Oral
Actinodaphne angustifolia (Leaf)	Ground into a paste.	Applied on forehead & scalp
Actinodaphne angustifolia (Leaf)	Leaf juice is prepared.	Oral
Garcinia morella (Bark)	Ground the bark in rice washed water & made into paste.	Applied on scalp
Leucas aspera (Leaf) + *Vitex negundo* (Leaf) + *Allium cepa* (Bulb)	Crushed into a paste.	Applied on forehead & scalp
Nelumbo nucifera (Flower) + *Ravolfia serpentina* (Root) + *Cocos nucifera* (Oil)	Oil is prepared.	Applied on scalp
Sesamum indicum (Seed oil) + *Trigonella foenum-graecum* (Seed)	Seeds are ground in sesame oil.	Applied on scalp
Ixora coccinea (Flower) + *Sesamum indicum* (Seed)	Ground into a paste.	Applied on scalp

Quantitative analysis

Use value

Use value (UV) evaluates the relative importance of reported medicinal plants based on informants' citations. In the current study, use value of recorded species ranged between 0.06 and 2 (Table 1). The plant species which exhibited high use values are *Mucuna pruriens*, *Tragia involucrata* and *Urena lobata* (UV=2 each) whereas least use value was reported for *Antidesma acidum* (UV=0.06).

Results depicted that plant species *Barleria prionitis* (used to treat arthritis, muscle pain, backache, joint pain), *Ficus racemosa* (used to treat arthritis, backache and joint pain), *Blepharis maderaspatensis* (used to treat arthritis, backache, joint pain), *Bulbophyllum sterile* (used to treat arthritis, joint pain and bone fracture), *Arachis hypogaea*, *Areca catechu*, *Aristolochia tagala*, *Barleria prionitis*, *Baccharoides anthelmintica*, *Borassus flabellifer*, *Bridelia stipularis, Bulbophyllum sterile*, *Canthium coromandelicum, Embelia tsjeriam-cottam, Flueggea leucopyrus*, *Hybanthus enneaspermus*, *Leea indica*, *Plumbago indica*, *Russelia equisetiformis*, *Sida acuta*, *Sida cordata*, *Syzygium caryophyllatum* and *Trachyspermum ammi* (used to treat 2 disorders each) showed the use value 1. These are followed by *Allium cepa* (UV=0.75), *Abrus pulchellus*, *Artocarpus heterophyllus*, *Caesalpinia bonduc*, *Clerodendrum infortunatum*, *Eclipta prostrata*, *Ficus benghalensis*, *Ficus microcarpa*, *Hibiscus rosa- sinensis*, *Homonoia riparia*, *Indigofera tinctoria*, *Magnolia champaca*, *Morinda citrifolia*, *Naravelia zeylanica*, *Oryza sativa*, *Sida rhombifolia*, *Syzygium cumini*, *Terminalia bellirica*, *Terminalia chebula* and *Trigonella foenum-graecum* (UV=0.67 each), *Asystasia gangetica* and *Curcuma longa* (UV=0.57 each) and *Cocos nucifera* (UV=0.56). Plant species exhibited low use values such as *Brassica nigra* (UV=0.15) and *Vitex negundo* (UV=0.27) were useful in treating 6 ailment categories each, *Cocos nucifera* (UV=0.56), *Croton persimilis* (UV=0.36), *Ricinus communis* (UV=0.16), *Scleropyrum pentandrum* (UV=0.50) and *Tamarindus indica* (UV=0.42) were useful in treating 5 ailments each. Those medicinal plant species having high use value must be further assessed for phytochemical and pharmacological analysis to identify their active constituents for drug development (Chaachouay *et al*. 2019).

Relative frequency of citation (RFC)

The RFC values in this study ranged from 0.01 to 0.27 (Table 1). The plants with highest RFC values are *Brassica nigra* (0.27), followed by *Cuminum cyminum* (0.24), *Allium sativum* and *Ricinus communis* (0.21 each), *Tinospora cordifolia* (0.19), *Aloe vera* (0.18), *Cinnamomum verum* and *Litsea glutinosa* (0.17 each) and *Litsea wightiana* (0.16), *Aristolochia indica* and *Rauvolfia serpentina*, *Vitex negundo* (0.15 each), *Sida alnifolia* (0.14), *Calotropis gigantea* (0.13) and *Piper nigrum* (0.12), *Antidesma acidum* (0.11), *Azadirachta indica*, *Leucas aspera* and *Ventilago maderaspatana* (0.10 each), *Citrus limon*, *Citrus medica*, *Croton persimilis* and *Leucas aspera* (0.09 each), *Cissus quadrangularis*, *Moringa oleifera*, *Myristica fragrans*, *Salacia chinensis* and *Tamarindus indica* (0.08 each), *Antidesma montanum*, *Bunium bulbocastanum*, *Calophyllum inophyllum*, *Hemidesmus indicus*, *Holarrhena pubescens*, *Jatropha curcas*, *Justicia gendarussa*, *Merremia tridentata*, *Pterocarpus marsupium*, *Scleropyrum pentandrum*, *Syzygium aromaticum*, *Thunbergia mysorensis* (0.07 each).

Majority of these plants have been reported earlier for treating different ailments by tribes and ethnic communities in single or multiple combinations (Bhandary 2000, Bhat 2005, Shiddamallayya *et al*. 2010, Bhandary & Chandrashekar 2014, Acharya *et al*. 2022, Yogeesha & Krishnakumar 2022, Yogeesha & Krishnakumar 2023). The plants which exhibited high RFC values in the present survey were also utilized for treating several kinds of ailments by the tribal and ethnic communities in other parts of South India (Santhoshkumar *et al*. 2019) and trained siddha practitioners for treating musculoskeletal disorders (Esakkimuthu *et al*. 2021). The plants which exhibited higher RFC values are most familiar and harvested very frequently from the habitat whereas the low RFC value indicates a comparatively less use pressure (Pradhan & Mondal 2023). Therefore, those species with high RFC values should be further evaluated pharmacologically to identify their active constituents (Vitalini *et al*. 2013).

Informant Consensus factor (ICF)

Informant consensus factor (ICF) value indicates agreement among informants on the utilization of plant taxa for a particular purpose and disease category in the investigated area. The Informant consensus factors for disease categories ranged from 0.03 to 0.67. The ailment category with the highest ICF value was vertigo (ICF=0.67) with 47 use reports and 16 species, followed by spasm (ICF=0.56) with 62 use reports and 28 plant species; bone fracture (ICF=0.51) with 133 use reports and 64 plant species; muscle pain (ICF=0.27) with 50 use reports and 37 plant species; backache (ICF=0.18) with 77 reports and 63 plant species; joint pain (ICF=0.12) with 94 use reports and 83 plant species and arthritis (ICF=0.03) with 171 use reports and 166 plant species. In this study, ailment categories such as vertigo, spasm and bone fracture has showed high ICF values. Commonly ICF of local knowledge for disease treatment depends on the availability of the plant species in the study area (Rajakumar and Shivanna 2009). The least agreement between the informants was observed in arthritis with ICF of 0.03, but this ailment ranked first with regard to the number of plant species used and use reports. Lowest ICF values are due to lack of communication among the informants in the study area who treat these ailment categories (Rajakumar and Shivanna 2009). Earlier studies carried out in the ethnomedicine of Siddha practitioners in Tamilnadu, revealed that ICF values for musculoskeletal ailments is high (ICF=0.547), whereas for arthritis and spasm ICF value is low (ICF=0.05) (Esakkimuthu *et al*. 2021). Similarly, very low ICF values were reported for various categories of musculoskeletal ailments among Karen in Thailand (Kantasrila *et al*. 2020).

Endemism and IUCN conservation status of medicinal plants

It is noteworthy that 17 species such as *Actinodaphne angustifolia*, *Actinodaphne tadulingami*, *Bulbophyllum sterile*, *Calophyllum apetalum*, *Cyclea peltata*, *Dalbergia horrida*, *Garcinia indica*, *Hopea ponga*, *Hydnocarpus wightianus*, *Ixora brachiata*, *Jasminum malabaricum*, *Litsea wightiana*, *Mucuna pruriens*, *Mussaenda laxa*, *Myristica malabarica*, *Syzygium travancoricum* and *Vateria indica* are endemic to Western Ghats and Peninsular India ((Sasidharan 2004).

The conservation status of the medicinal plants reported here is presented in Table 1. Based on this, *Syzygium travancoricum* is critically endangered (CR), *Borassus flabellifer*, *Syzygium caryophyllatum* and *Tectona grandis* endangered (EN), *Actinodaphne tadulingami*, *Aegle marmelos*, *Dalbergia horrida*, *Litsea wightiana* and *Pterocarpus marsupium* are near threatened (NT), *Calophyllum apetalum*, *Garcinia indica*, *Hopea ponga*, *Myristica malabarica*, *Santalum album* and *Vateria indica* are in vulnerable (VU) category, 69 species are in least concern (LC) category, 8 species data deficient (DD) and the status is unknown for 118 species (NE). Therefore, a good possibility is that 118 species (NE category) are quite available in the surveyed localities and currently not under any serious threat. However, plant species which come under VU category need special concern and measures for immediate conservation as they are exploited for medicinal uses. The plants which presently come under LC category might fall in any of the core IUCN threat categories in near future (Pradhan & Mondal 2023).

As this list is the globally accepted for assessing conservation status of species, the different threat categories itself are basic keys to prioritize conservation (Collen *et al*. 2016). The increased demand of medicinal plants in drug and pharmaceutical industries have resulted in the over exploitation of many species, driving them close to extinction (Kumari *et al*. 2011). Based on global rates of plant species threatened with extinction, it is estimated that around 1,000 medicinal plant species may be under threat in different ecosystems across India (Gowthami *et al*. 2021). Re-introduction of threatened species in large numbers into an area suitable for its growth or into its natural habitat is the ideal approach for its population recovery. The basic idea of this approach is to establish a self-sustaining population for conservation purposes. This approach has been successfully applied in India as a part of conservation efforts on threatened species such as *Vanda coerulea* (Seeni & Latha 2000), *Syzygium travancorium* (Anand 2003), *Calophyllum apetalum* and *Blepharistemma serratum* (Krishnan *et al*. 2011). The information on the threat status of the medicinal plants should be communicated to the traditional healers and local people and encourage them to adopt suitable conservation methods including sustainable collection and scientific harvesting.

Literature review and new reports on mentioned plants

Documented plant species were crosschecked for their medicinal uses in Ayurvedic literatures and several relevant publications and is presented in Table 1. Based on this analysis, use of 39 plant species such as *Abrus pulchellus*, *Senegalia rugata*, *Actinodaphne tadulingami*, *Samanea saman*, *Allophylus rheedei*, *Anacardium occidentale*, *Annona muricata*, *Arachis hypogaea*, *Aristolochia tagala*, *Artocarpus gomezianus*, *Breynia vitis-idaea*, *Bulbophyllum sterile*, *Bunium bulbocastanum*, *Canthium coromandelicum*, *Chrysopogon zizanioides*, *Crotolaria pallida*, *Dalbergia horrida*, *Eucalyptus tereticornis*, *Ficus drupacea*, *Garcinia morella*, *Hibiscus rosa- sinensis*, *Hopea ponga*, *Jasminum grandiflorum*, *Jasminum malabaricum*, *Mussaenda laxa*, *Neolamarckia cadamba*, *Salacia chinensis*, *Selaginella pallescens*, *Senna occidentalis*, *Sida alnifolia*, *Sida mysorensis*, *Sphagneticola calendulacea*, *Syzygium caryophyllatum*, *Terminalia crenulata*, *Thottea siliquosa*, *Thunbergia mysorensis*, *Ventilago maderaspatana*, *Ziziphus oenoplia* and *Ziziphus rugosa* from the study area are exclusively new reports with respect of their parts used, mode of administration and medicinal uses pertaining to MSDs (Bhat 2005, Acharya *et al*. 2022, Babu *et al*. 2018, Chandrasekar & Chandrasekar 2017, Esakkimuthu *et al*. 2021, Sharma & Sahu 2022, Khare 2008, Malik *et al*. 2018, Nambiar *et al*. 1985, Bhandary 2000, Rathi & Rathi 2020, Santhoshkumar *et al*. 2019, Saroya 2017, Subramoniam *et al*. 2013, Warrier 1993, Wilson *et al*. 2007). Earlier ethnopharmacological reports are available for 171 reported plant species pertaining to disease categories in MSDs.

Conclusion

The present study has reported the medicinal uses of 210 species of plants against seven musculoskeletal disorders and the uses of 39 species are not previously reported by other researchers. Although, the medicinal use of 171 plant species were reported previously, their usages particularly in multiple combinations of herbal preparations are the new claims from this region. The plants such as *Brassica nigra*, *Cuminum cyminum*, *Allium sativum*, *Ricinus communis*, *Tinospora cordifolia*, *Aloe vera*, *Cinnamomum verum*, *Litsea glutinosa*, *L.wightiana*, *Aristolochia indica, Rauvolfia serpentina* and *Vitex negundo* possess higher RFC values suggesting that traditional knowledge of tribal and ethnic communities on these plants is almost unique and these plants are further exploited for their associated pharmacological properties for developing effective drugs against MSDs. Some plants such as *Syzygium travancoricum*, *Borassus flabellifer*, *Syzygium caryophyllatum, Tectona grandis*,

Actinodaphne tadulingami, *Aegle marmelos*, *Dalbergia horrida*, *Litsea wightiana* and *Pterocarpus marsupium* require special attention under conservation priority program as their populations are presently threatened and at the same time these are precious to the medicine culture of the study area.

Declarations

List of abbreviations: MSDs (Musculoskeletal Disorders), WHO (World Health Organization), IUCN (International Union for Conservation of Nature & Natural Resources), POWO (Plant of the World Online), WFO (World Flora Online), UV (Use Value), ∑Us (Sum of Uses), N (Total Number of Informants), ICF (Informants' Consensus Factor), Nur (Number of Use Citations), Nt (Number of Taxa), RFC (Relative Frequency of Citation), FC (Frequency of Citation), VU (Vulnerable), NT (Near Threatened), EN (Endangered), LC (Least Concern), NE (Not Evaluated), NR (New Reports), NC (Not Considered)

Ethics approval and consent to participate: All participants gave their prior informed consent.

Consent for publication: All people shown in images provided their prior informed consent to have their images published.

Availability of data and materials: The raw data without names of participants are available from the authors.

Funding: This research did not receive any grants or funding from any agencies or forum.

Competing interests: The authors declare that they have no competing interests.

Authors Contributions: YA and KG designed the work. YA carried out field survey, prepared herbarium and drafted manuscript. YA and KG identified the plant specimens. Both the authors read and critically checked the manuscript and finally agreed for the submission of this manuscript. KG supervised entire work.

Acknowledgements

Authors express the deepest gratitude to the traditional practitioners for sharing their knowledge with us. Authors are grateful to Department of Applied Botany, Mangalore University, for providing laboratory facilities.

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Appendix I: Questionnaire

Documentation of ethnomedicinal knowledge on plants used for the treatment of musculoskeletal disorders in Dakshina Kannada district, Karnataka state, India

1. Name of the Traditional Practitioner:
2. Address:
3. Date of birth and age:
4. Gender:
5. Occupation:
6. Ethnic group/Caste/Subcaste:
7. Name of the ailment
8. Symptoms of the ailment
9. Vernacular name of the plant/s used:
10. Habit (tree, shrub, herb, climber etc.):
11. Source of knowledge about the medicinal plants:
12. Plant part used (root/stem/leaf/bark/rhizome/tuber/latex/flower/fruit/seed/whole plant/other parts):
13. Method/time/season of collection:
14. Method of preparation and administration with dosage:
15. Readymade preparation, if any? (Ointments, oil, powder, pills etc.):
16. Dietary constraints, restrictions on regular activity?
17. Status of the plant (cultivated/wild):
    If wild, availability in natural resources (plenty, rare, very rare etc.):
18. Conservation needs:
19. Experience in the field of treatment:
20. Number of patients treated per week:
21. Specimens collected:
22. Any other comments

Declaration:

I, ……. hereby give my full consent and conscious to participate in this study and declare that to the best of my knowledge the information that I have provided is true, accurate and complete.

Signature of the Traditional practitioner

Remarks: Plant/s identified as

Name & Signature of the Research scholar