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Research Article

Survey of medicinal plants used for treatment of rheumatism, arthritis and boils in Moro local government area of Kwara State

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Abstract: Inflammation is one of the common symptoms associated with many diseases affecting people worldwide. Plants remain important sources of first-aids and herbal treatments for disease management, particularly among rural population. This study aimed to document medicinal plants used for the treatment of inflammatory conditions, such as rheumatism, arthritis and boils, in Moro Local Government Area, Kwara State. A survey was conducted among residents of six villages: Oloru, Elemere, Gbugudu, Asomu, Malete and Oloko Tuntun to identify the medicinal used for these conditions. Semi structured questionnaire was used to collect information from respondents. Data were obtained from sixty-six (66) respondents. Thirty-eight (38) recipes were documented for rheumatism, twenty-four (24) for arthritis and four (4) for boils, involving a total of fifty-nine (59) plants species belonging to forty (40) families. The Fabaceae, Anacardiaceae and Apocynaceae families were the most represented, while the most frequently utilized plant parts were leaves, followed by roots and stem barks. This survey serves as a compendium of medicinal plants used in the treatment of rheumatism, arthritis and boils in the six villages of Moro Local Government Area of Kwara State.

Keywords: Rheumatism, Arthritis, Boils, Medicinal Plants, Kwara State.

1. Introduction

Inflammation is a part of the complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells or irritants, and it is characterized by redness, swollen joints, joint pain, its stiffness and loss of joint function (Bellik et al., 2013). The symptoms of inflammation is either local or systemic or even both (Epstein et al., 2010). Rheumatism, arthritis and boils among others are grouped as inflammatory diseases (Houzou et al., 2018). Rheumatism is a progressive chronic autoimmune inflammatory disease with variable clinical symptoms, characterized by mild to severe inflammation of any part of the body that can result in pain, swollen, malformations and disability. Kim et al. (2017) reported arthritis as a group of conditions which cause damage to the joints, and usually resulting in pain and stiffness. These diseases affect any age group but it is common in the elderly people. Moreover, exposure to wet and cold conditions aggravate the pain (Çevik et al., 2015). Boil sometimes known as a furuncle is a painful inflammatory condition characterized by swollen, pimple-like sores, which contains are full of pus (Kulakov et al., 2022).

Medicinal plants constituted effective valuable resources for both traditional and modern medicine. These plants have shown to possess genuine utility and about 80% of rural population depends on plants for primary health care (Akinyemi, 2005). The search for plant-based therapies is gaining attention globally due to emergence of drug resistance phenomenon in conventional medicines. In Africa, medicinal plants have been used in the treatment and management of many diseases (Boadu & Asase, 2017) including: flu, hepatitis, diabetes, jaundice, common cold and sickle cell anaemia (Idu et al., 2005). In Nigeria, there is a historic usage of medicinal plants for the treatment of many diseases (Akinyemi, 2005). Many rural communities still depend

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on traditional medicines for their common day ailments due to lack of access to modern health care services as most of these people formed the link in the trade of medicinal plants (Zahoor et al., 2017). In many urban populace, traditional medicines still enjoy patronage as alternatives to modern medicines, especially where prescription drugs have failed. This situation kept Ethnomedicine relevant till date and birthed the shift in paradigm towards the use of medicinal plants (Tongshuwar et al., 2020).

One of the measures of preserving the knowledge of medicinal plants is through documentation. Documentation of medicinal plants therefore includes measures to safeguard loss of useful information about plants from going into extinction and saving them for future generation (Lawal et al., 2014). The use of medicinal plants in trado-medical systems in many cultures have been subject of investigations in recent times. This is preserved by documenting the indigenous knowledge of health-care system and to provide necessary clues for further scientific investigations. Studies on medicinal plants in rural areas and communities are important for documentation and generation of indigenous knowledge on the medicinal use of plants, as well as identification of new botanicals of pharmacological significance (Mukaila et al., 2021). Documentation of medicinal plants can take various forms, including community or family history books, periodicals such as newspapers, journals, indexes and material medica, national medicinal plant database and ethnobotanical or ethnopharmacological surveys conducted using semi- structure questionnaires (Anyaoku et al., 2015). Amongst these, ethnobotanical and ethnopharmacological survey are considered one of the most authentic approaches to documenting medicinal plants knowledge. (Salihu et al., 2015). These approaches serve as rich sources of valuable information transmitted through generations. Therefore, this study adopted an ethnobotanical survey to document medicinal plants used for the treatment of inflammatory conditions - rheumatism, arthritis and boils- in selected communities in Moro Local Government, Kwara State.

2. Materials and methods

2.1. Study area

The survey was carried out from April– December, 2022 in six villages: Oloru, Elemere, Gbugudu, Asomu, Malete and Oloko Tuntun, in Moro Local Government Area of Kwara State, Nigeria. Moro is a Local Government Area in Kwara State It has an area of 3,272 km2 and a population of 108,792 according to 2006 population census (Population, 2006-2016).

2.2. Data collection

The use of semi-structured questionnaire via oral interview in "Yoruba language" was adopted to obtain relevant data and translated to English language in writing by the interviewee. The respondents were: herb sellers, traditional medicine practitioners, native healers, community leaders and elderly women mothers in the communities. The questionnaire was divided into three sections. Section one focused on the demographic information of the respondents, such as age, sex, religion, nationality, and level of education. Section two captured medicinal plants used for the treatment of inflammatory diseases and included questions such as; frequency of treatment, accompanying side effects and duration of treatment. Section three centered on plant parts used for treatment, plant availability, local name of plants, local name of ailments rheumatism (aromolegun), arthritis (eje dudu), boil (eewo or segede), as well as the recipes, methods of preparation and mode of administration.

2.3. Plant sample collection and identification

Fresh plant specimens were collected at the time of the survey. The plants were identified at the Forest Herbarium Ibadan (FHI) in Ibadan, Oyo State, Nigeria. Samples were pressed, poisoned and mounted in accordance to conventional herbarium practices. Preserved specimens were deposited in the Plant and Environmental Biology Departmental Herbarium, Kwara State University Malete.

2.4. Data analysis

Microsoft Office Excel (version: 14.0.4760.1000 32-bit) was used for descriptive analyses of the respondents' demographic data and the recorded plant usages.

3. Results

3.1. Demographic data of respondents

The results of the demographic data of respondents were presented in Table 1. Eighty-five (85) respondents comprising: traditional medicine practitioners, herb sellers and village elders were identified based their indigenous ethnomedicinal knowledge and interviewed on medicinal plants that are useful for the treatment of various inflammatory diseases. Only 66 of the respondents entertained the interview request. These respondents were mainly traditional medicine

practitioners (41.24 %) and herb sellers (25.04 %). Most of the herb sellers were women while the traditional medicine practitioners were mostly men. Forty-one percentage (41%) of them claimed to have experience in the treatment of rheumatism and arthritis which are rampant among middle to aged people within the study areas. The interpretation of the respondents' data gave insight into the age, sex, religion, sources of knowledge acquisition. More than fifty percentages of the respondents were within age 51-60 years, while youth (31-50) constituted the remaining percentage. The respondents and the interviewer communicate in Yoruba language; therefore, no interpreter was needed. Overall, 61.40% of the respondents were male and 61.80 % of the respondents practice Islamic religion. In addition, large percentage of respondents inherited the knowledge, others acquired the skill through apprenticeship and only 1.88% of respondents had tertiary education.

3.2. Plants information

The ethnobotanical survey gave a total of 59 plants species belonging to 40 families. Data on the botanical names of plants, local names (Yoruba), parts used, modes of herb preparations are presented on Table 2, while information on number of plants, frequency of mention and families are presented in Table 3. Occurrence of various plant parts is represented in Figure 1. Figure 2 presents plant species distribution according to families. Sixty-six (66) recipes were obtained, majority of which were involved in the treatment of rheumatism. The most common method of preparation was decoction while other methods included infusion, powder and paste. Oral and topical massaging constituted major mode of administration. Fabaceae family had highest frequency of mention, followed by Anacardiaceae, Apocynaceae and others. Securidaca longepedunculata Fresen came top most mentioned species followed by Argemone mexicana Beta Gay and Dysphania ambrosioides (L.) Mosyakin and Clemants.

4. Discussion

Medicinal plants including both herb and trees have been reported in the management and treatment of inflammatory diseases. A study by Singh et al. (2020) revealed the use of a number of medicinal plants against several inflammatory indicators. People often preferred medicinal plants therapies because of their affordability, accessibility, and potency. Terminalia avicennioides Guill. & Perr. is a widely used medicinal plant in North-West Nigeria to manage arthritis (Salihu et al., 2018). Zouhri et al. (2023) documented Moroccan medicinal plants used in the treatment of inflammation. In this survey, the herbal recipes gathered were discovered to be poly- herbals as the recipes contained more than one herb/plant. It is believed that poly-herbs are more effective than mono-herbs recipes as the result of synergetic effect of the former. This is perceived as holistic approach to treatment of these conditions. This corroborates the report of Yazbek et al. (2019) which submitted that combination of many plant species in traditional medicine provides a synergistic approach to the treatment of diseases because each plant adds differently to the recipes' medicinal efficacy.

Table 1: Demographic data of respondents

Parameter	Respondent	Percentage (%)
Category	Herb sellers	25.04
	Traditional medicine practitioners	41.24
	Community leaders	26.27
	Mothers	7.45
Age (years)	31-50	12.19
	51-60	55.95
	>60	31.86
Sex	Male	61.40
	Female	38.60
Educational level	None	13.55
	Primary	62.04
	Secondary	22.53
	Tertiary	1.88
Religion	Christianity	26.44
	Islam	61.80
	Traditionalist	11.76
Source of knowledge	Ancestral (Inherited)	52.69
	Training	19.22
	Ancestral and Training	28.09

In this study, ethnobotanical survey of medicinal plants commonly used for the treatment of rheumatism, arthritis and boils was carried out conducted in six villages: Oloru, Elemere, Gbugudu, Asomu, Malete and Oloko Tuntun, of Moro Local Government Area of Kwara State. The predominant occupations in the villages are crop farming, petty traders and artisanship. Few people in the study areas have average education and involve in high skill jobs, while other are predominately farmers and local traders. The common language spoken by the residents of the study areas is Yoruba. Therefore, information such as plant local names, preparation, mode of administration on medicinal plants were gathered in Yoruba language. A total 59 plants species belonging to 40 plant families were obtained in the course of the

Table 2: Enumeration of Plants used in the Treatment of Rheumatism, Arthritis and Boils in the Study Area

S/No	Botanical name	Yoruba name	Common name	Part used	Disease Condition	Recipe/Preparation	Administration
1	Vernonia amygdalina	Ewuro	Bitter leaf	Leaf	Arthritis	Grind leaf and add palm kernel oil	Rubbing on the affected part
2	*Calotropis procera*	Bombomu	Giant milkweed	Stem Bark	Rheumatism	Dry and grind into powder	Incision
3	*Argemone Mexicana*	Mafowo kan omo mi	Mexican prickly poppy	Leaf	Rheumatism	Grind and add shea butter	Rubbing
4	*Dysphania ambrosioides*	Orungo/Arunpale	Jesuit's tea/ Mexican-tea	Leaf	Rheumatism	Grind the leaf add shea butter	Rubbing
5	*Argemone Mexicana*	Mafowo kan omo mi	Mexican prickly poppy	Leaf	Rheumatism	Grind the leaf, add palm oil	Rubbing
6	*Vitellaria paradoxa*	Emi	Shea butter tree	Fruit	Rheumatism	Grind the fruit of the plant with hot pepper and add shear butter	Rubbing
7	*Securidaca longepedunculata*	Ipeta	Violet tree	Root Bark	Arthritis	Grind the bark of the root of the plant	Drinking
8	*Securidaca longepedunculata Anogeissus leiocarpus*	Ipeta Ayin	Violet tree African birch	Root Root	Rheumatism	Cook the root of the plant into decoction	Drinking and bathing
9	*Detarium microcarpum Irvingia gabonensis Spondia mombin*	Ogbogbo Ooro Iyeye	Tallow tree Wild mango Yellow mombin	Stem bark Stem bark Stem bark	Arthritis	Decoction	Drinking
10	*Dysphania ambrosioides*	Orungo	Jesuit's tea/ Mexican-tea	Leaf	Arthritis	Grinding and mixing with shear butter and kerosene	Rubbing
11	*Terminalia avicennioides* *Anogeissus leiocarpus Nauclea diderrichii Securidaca longepedunculata*	Idi Ayin Egbesi Ipeta	Bambara African birch African peach Violet tree	Root Root Root Root	Rheumatism	Cook them all together for concoction	Drinking and bathing
12	*Nicotiana tabacum* *Abutilon mauritianum*	Taba Lofuru/furu	Tobacco African Mallow	Leaf Leaf	Rheumatism	Cook the leave into concoction	Bathing
13	*Abrus precatorius* *Allium cepa*	Omisinmisin Alubosa	Crab's eye/Cat's eye Bulb onion/ common onion	Leaf Bulb	Boils	Grind them add camphor and shea butter	Rubbing
14	*Dysphania ambrosioides*	Orungo	Jesuit's tea/ Mexican-tea	Leaf	Rheumatism	Grind the leaf and add shear butter	Rubbing
15	*Argemone Mexicana*	Mafowo kan omo mi	Mexican prickly poppy	Leaf	Rheumatism	Extract of the constituent from the leaf add palm oil	licking and apply on the part
16	*Maytenus senegalensis Morinda lucida*	Sepolowon Oruwo	Spike thorn Brimstone tree	Leaf Leaf	Arthritis	Extract water from the leave	Drinking
17	*Argemone Mexicana*	Mafowo kan omo mi	Mexican prickly poppy	Leaf	Arthritis	Grind the leaf and add shear butter	Rubbing
18	*Dysphania ambrosioides*	Orungo	Jesuit's tea/ Mexican-tea	Leaf	Arthritis	Grind the leave and add shear butter	Rubbing
19	*Cassia occidentalis* *Anacardium occidentalis* *Azadrachta indica*	Rere Kasu Dongoyaro/Khacia	Coffee senna Cashew tree Neem tree	Leaf Leaf Leaf	Arthritis	Boiling the plant leaves into concoction	Drinking and bathing

20	*Carica papaya*	Ibepe/Isegun	Papaya/pawpaw tree	Root	Arthritis	Boiling the root add potash	Drinking
21	*Argemone mexicana*	Mafowo kan omo mi	Mexican prickly poppy	Leaf Leaf	Arthritis	Boil the leaves	Drinking
	Dysphania ambrosioides	Orungo	Jesuit's tea/ Mexican-tea				
22	*Nauclea diderrichii*	Egbesi	African peach	Leaf	Rheumatism	Boil the leaves	Drinking
	Securidaca longepedunculata	Ipeta	Violet tree	Leaf			
23	*Annona senegalensis*	Abo	African custard-apple	Leaf	Rheumatism	Boiling the plant leaves into concoction	Drinking and bathing
	Chasmanthera dependens	Atoo	Chasmanthera	Leaf			
24	*Argemone mexicana*	Mafowo kan omo mi	Mexican prickly poppy	Leaf	Rheumatism	Extract water from the leaves by boiling	Drinking
	Vernonia amygdalina	Ewuro	Bitter leaf				
25	*Cassia occidentalis*	Rere	Coffee senna	Leaf Leaf	Rheumatism	Grinding the leaves and add shear butter	Rubbing
	Dysphania ambrosioides	Orungo /Arunpale	Jesuit's tea/ Mexican-tea				
26	*Pericopsis laxiflora*	Sedun/Ayan	Satin tree	Root	Rheumatism	Cook the stem of the plant and add potash	Drinking
27	*Dysphania ambrosioides*	Orungo	Jesuit's tea/ Mexican-tea	Leaf	Rheumatism	Grind and add shear butter	Rubbing
		Mafowo kan omo mi	Mexican prickly poppy	Leaf			
	Argemone Mexicana						
28	*Nauclea diderrichii*	Egbesi	African peach	Leaf Leaf	Rheumatism	Boiling of the leaves	Drinking
	Securidaca longepedunculata	Ipeta	Violet tree				
29	*Chasmanthera dependens*	Atoo	Chasmanthera	Root	Rheumatism	Grind the root of the plant with the bone marrow of cow	Rubbing
30	*Dysphania ambrosioides*	Orungo /Arunpale	Jesuit's tea/ Mexican-tea	Leaf	Rheumatism	Grind with shear butter	Rubbing
31	*Vigna unguiculata*	Ewa	Cowpea	Seed	Boils	Cooked beans and add to potash	Place on the affected part
32	*Euphorbia hirta*	Ewonle	Asthma weed	Leaf	Arthritis	After sun-drying, grind the leaves and add kerosene	Rubbing
33	*Vernonia frondosa*	Akesun	-	Stem bark	Arthritis	Dry and grind into powder	Drink with water
34	*Dysphania ambrosioides*	Orungo	Jesuit's tea/ Mexican-tea	Leaf Stem bark	Rheumatism	Dry and grind them together add shea butter	
	Erythrophleum suaveolens	Erun-obo/obo	Ordeal tree/red- water tree				
35	*Argemone mexicana*	Mafowo kan omo mi	Mexican prickly poppy	Leaf	Arthritis	Grind the leaves and add shear butter	Rubbing
	Vernonia amygdalina	Ewuro	Bitter leaf	Leaf			
36	*Securidaca longepedunculata*	Ipeta	Violet tree	Leaf	Arthritis	Boil the leaves for concoction	Drinking
	Bryophyllum pinnatum	Odundun		Leaf			

			Life plant/miracle leaf				
37	*Annona senegalensis*	Abo	African custard- apple	Leaf	Rheumatism	Boil the leaf	Drinking
38	*Khaya senegalensis*	Oganwo Sapo	African mahogany	Stem bark	Arthritis	Prepare decoction with fermented corn pap water	Drink a small cup thrice daily and reduced to a cup per day after a month
	Anthocleista djalonensis	Iru	Cabbage tree	Root			
	Parkia biglobosa	Asofeyeje	African locust bean	Stem bark			
	Rauvolfia vomitoria		Poison devil- pepper	Root			
39	*Spondia mombin*	Iyeye	Yellow mombin	Seed	Boils	Grind dried seeds and mix with kernel oil	Rub the affected place twice daily
	Gossypium barbadense	Owu	Sea Island, Egyptian cotton	Seed			
40	*Phyllanthus amarus*	Eyin olobe Mafowo kan	gale of the wind/ pick-a-back	Whole plant	Arthritis	Bring all to boil with fermented corn pap water	Drinking
	Argemone Mexicana	omo mi	Mexican prickly poppy	Leaf			
41	*Parquetina nigrescens*	Ogbo	African parquetina	Leaf	Rheumatism	Squeeze leaves using corn pap fermented water	Drink a small cup of fresh preparation
	Vernonia amygdalina	Ewuro	Bitter leaf	Leaf			
42	*Musa paradisiaca*	Ogede agbagba	French plantain	Leaf	Rheumatism	Pound and soak in dry gin	Drink a shot twice daily
	Vernonia amygdalina	Ewuro	Bitter leaf	Leaf			
43	*Acacia nilotica*	Boonii	Gum arabic tree	Seed	Rheumatism	Soak dry seeds in dry gin	Drink a shot twice daily
	Xylopia aetiopica	Eru/Eru alamo	Spice tree/Africa pepper	Seed			
44	*Momordica charantia*	Ejinrin Ewuro	Bitter-melon	Leaf	Rheumatism	Squeeze leaves using water	Drink a small cup thrice daily
	Vernonia amygdalina	Oruwo	Bitter lemon	Leaf			
	Morinda lucida		Brimstone tree				
45	Cocos nucifera Citrus aurantifolia	Agbon Osanwewe	Coconut palm Lime	Juice Juice	Rheumatism	Make powder of dry plantain (1 measure) and mix in equal vol. of coconut water and citrus juice in a 5 litres container	Drink a small cup twice daily
	Musa paradisiaca	Ogede Agbagba	French plantain	Fruit (unripe)			
46	*Kigelia africana*	Pandoro	Sausage tree	Fruit Root	Rheumatism	Slice and soak in dry gin	Drink a shot twice daily
	Jatropha curcas	Lapalapa funfun	Physic nut				
47	*Biophantum petersianum*	Patanmo	African sensitive plant	Aerial Part	Arthritis	Decoction	Drink a small cup twice daily
	Abrus precatorius	Ominsinmisin	Crab's/cat's eye	Aerial Part			
48	*Securidaca longepedunculata*	Ipeta	Violet tree	Root	Arthritis	Grind and add shea butter	Rub at affected part
	Citrus aurantifolia	Osanwewe	Lime	Root			
49	*Securidaca longepedunculata*	*Ipeta* Agbalumo/	Violet tree Star apple	Root Root	Rheumatism	Decoction	Drinking
	Chrysophyllum albidum	*Baka*					
50	*Detarium macrocarpum*	Ogbogbo	Tallow tree Wild mango	Stem Bark	Arthritis	Boil the plant part together	Drinking
	Irvingia gabonensis	Ooro	Yellow mombin	Stem Bark			
	Spondia mombin	Iyeye		Stem Bark			
51	*Adenopus breviflorus*	Tagiri Orogbo	Christmas melon Bitter	Fruit Fruit	Arthritis	Grind the christmas melon and the bitter Kola together mixed with black soap	Bathing
	Garcinia kola		kola				

52	*Asystasia gangetica*	Abesukale	Chinese violet	Leaf	Rheumatism	Grind them together into concoction	Drinking
	Xylopia aethiopica	Eru/Eru alamo	Spice tree/Africa pepper	Root			
53	Securidaca longepedunculata Citrus aurantifolia	Ipeta Oronbowewe	Violet tree Star apple	Stem bark Juice	Rheumatism	Soaking	Drinking
54	*Securidaca longepedunculata* *Chrysophyllum albidum* Citrus aurantifolia	Ipeta Agbalumo/ Baka Oronbo wewe	Violet tree Star Apple Lime	Root Root Fruit	Rheumatism	Boil all the plant parts	Drinking
55	*Erythrophleum suaveolens*	Obo	Ordeal tree/red- water tree	Stem Bark	Rheumatism	Grinding	Rub at affected part
56	*Opuntia spp.*	Ewon agogo/ oro agogo	Succulent dilleni	Root Root	Rheumatism	Burn all the plant part together and add with native black soap (ose dudu)	Bathing
	Calotropis procera *Evolvulus alsinoides* *Spondia mombin*	Bomubomu Efunle Iyeye	Apple of Sodom Dwarf morning- glory Yellow mombin	Root Stem Stem bark			
57	*Spondia mombin*	Iyeye	Yellow mombin	Stem bark	Rheumatism	Decoction	Drinking
58	Citrus aurantifolia *Piper guineensis Allium sativum*	Oronbo wewe Iyere Alubosa ayu	Lime Guinea pepper Garlic	Juice Seeds Bulbs	Arthritis	Soak seeds of *Piper guineensis* and bulbs of *Allium sativum* in lime juice	Drinking
59	*Abrus precatorius* *Allium sativum*	Omisinmisin Alubosa ayu	Crab's/cat's eye Garlic	Seeds Bulbs	Boils	Grind them together and add shea butter	Apply on the affected part
60	*Xylopia aethiopica* *Annona senegalensis*	Eru/Eru alamo Anbo	Spice tree/Africa pepper African custard- apple	Fruit Leaf	Rheumatism	Decoction	Drinking
61	*Nicotiana tabacum* *Abutilon mauritianum*	Taba Lofuru/furu	Tobbaco Country Mallow/ African Mallow	Leaf Leaf	Arthritis	Decoction	Drinking
62	*Plumbago zeylanica* *Securidaca longepedunculata* *Olax subscorpioidea*	Inabi/inabiri Ipeta Ifon	Doctor bush/wild leadwort Violet tree Upper volta	Root Root Root	Rheumatism	Decoction	Drinking
63	*Erythrophleum suaveolens*	Obo	Ordeal tree/red- water tree	Root	Arthritis	Decoction	Drinking
64	*Securidaca longepedunculata*	Ipeta	Violet tree	Root	Rheumatism	Grind them together and add shea butter	Rubbing
65	*Gloriosa superb* *Picralima nitida*	Ayanakaku Abere/ Epakun	Climbing Lily Akuamma	Fruit Fruit	Rheumatism	Decoction	Drinking
66	*Bryophyllum pinnatum* *Cassia occidentalis*	Odundun Rere	Life plant/miracle leaf Coffe senna	Leaf Leaf	Arthritis	Decoction	Drinking

study. Total of sixty- six (66) recipes/preparation were mentioned; thirty-eight (38) recipes/preparations were accredited to rheumatism, twenty-four (24) to arthritis and four (4) to boils. Different parts of plants such as leaves, root, bark, fruits, seeds and stem bark and root bark were mentioned in the management of each disease condition. The leave dominated as plant part commonly used, followed by root and stem bark. This could be attributed to the relative availability of leaves for most part of the year, however its collection is posing threat to plant conservation. Securidaca longepedunculata (11) had the highest mention, followed by Argemone mexicana (9) and Dysphania ambrosioides (9), respectively. Previous ethnobotanical surveys juxtaposed the native use of medicinal plants in the treatment of inflammatory disease which corroborated the aim of this study. Azadirachta indica, Allium cepa, Khaya senegalensis, Parkia biglobosa, Vitellaria paradoxa, Anogeissus leiocarpus were reported from the ethnobotanical survey of medicinal plants used for management of inflammatory diseases in Ringim Local Government, Jigawa State, Nigeria (Anas & Abdulrahman, 2021). Kaur et al. (2012) reported the use of plants such as Acteae racemosa and Zingiber officinale in the management of rheumatism. Jiofack et al. (2010) stated the use of medicinal plants in the treatment of rheumatism to include Alchornea floribunda leaves, stem and Zingiber officinale leaves, seeds and stem. Omonike et al. (2010) investigated medicinal plants used in treatment of inflammatory diseases in Ogun State of Nigeria. The use of Aframomum melegueta in the treatment of rheumatism had also been reported by Lindiwe et al. (2023). The spice is mixed with other herbs for the treatment of body pains and rheumatism. Harish et al. (2010) reported that any part of Ocimum basilicum L. including the seed boiled with mustard oil relieved joint pain after two to four days of application. This ethnobotanical survey has documented various recipes and mode of administrations implicated in the treatment of inflammatory conditions; rheumatism, arthritis and boils. The anti-inflammatory potentials of the plants recorded in this study may be attributed to the presence of bioactive compounds.

Many of the respondents stated rheumatism and arthritis could affect people of any age but it is mostly common to the elderly age group and cold weather aggravated the pain. This claim is in line with the study of Çevik et al. (2015) who reported that, although these diseases affect any age group, it is more common in elderly people, adding that exposure to wet and cold aggravate the pain. Report of this study showed the youth are not interested in the indigenous practices including knowledge on medicinal plants.

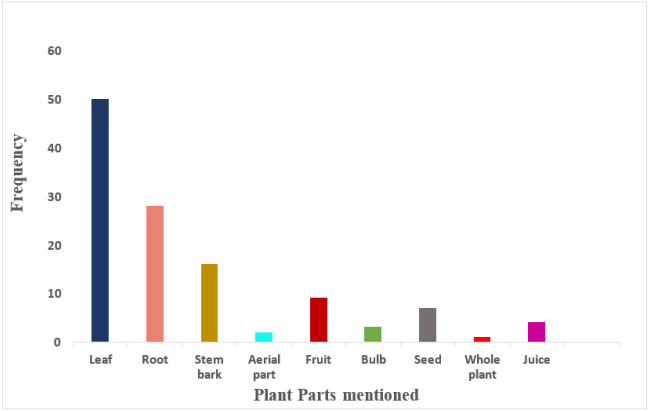

Figure 1: Occurrence of various plant parts mentioned

The youth age constituted the least category (12.19 %) of respondents in this survey. In fact, the aged respondents confirmed their children are not as interested in the practice as they showed interest while growing up to acquire the knowledge from their parents. This could be due to the notion that the knowledge and use of herbal medicine is associated with supernatural powers, and that some of the herbal preparations and therapy have to be supported with rituals and chanting of incantations. Moreso, it could be due to advancement in technology gaining the youth attention. Some respondents expounded on the belief that medicinal plants can only be harvested at specific times of the day, while some need to be harvested with incantations.

Table 3: List of medicinal plants documented from the study

S/No	Botanical name	Family	Frequency of citation
1.	*Khaya senegalensis* (Desr.) A. Juss.	Meliaceae	1
2.	*Anthocleista djalonensis* A. Chey	Loganiaceae	1
3.	*Parkia biglobosa (Jacq.)* G.Don	Fabaceae	1
4.	*Rauvolfia vomitoria* Afzel	Apocynaceae	1
5.	*Spondia mombin* L.	Anacardiaceae	5
6.	*Gossypium barbadense* L.	Malvaceae	1
7.	*Phyllanthus amarus* Schumach. & Thonn.	Phyllanthaceae	1
8.	*Argemone mexicana* Beta Gay	Papaveraceae	9
9.	*Parquetina nigrescens* (Afzel.) Bullock	Asclepiadaceae	1
10.	*Vernonia amygdalina* Delile	Asteraceae	6
11.	*Morinda lucida* Benth.	Rubiaceae	2
12.	*Cocos nucifera* Synphyllica Becc.	Arecaceae	1
13.	*Citrus aurantifolia* (Christm.) Swingle	Rutaceae	5
14.	*Musa paradisiacal* .L	Musaceae	2
15.	*Kigelia africana* (Lam.) Benth.	Bignoniaceae	1
16.	*Jatropha curcas* .L	Euphorbiaceae	1

17.	*Biophantum petersianum* Klotzsch.	Oxalidaceae	1
18.	*Abrus precatorius* L.	Fabaceae	3
19.	*Securidaca longepedunculata* Fresen.	Polygalaceae	11
20.	*Anogeissus leiocarpus* (DC.) Guill. & Perr.	Combretaceae	2
21.	*Terminalia avicennioides* Guill. & Perr.	Combretaceae	1
22.	*Nauclea diderrichii* (De Wild.) Merr.	Rubiaceae	3
23.	*Nicotiana tabacum* L.	Solanaceae	2
24.	*Cassia occidentalis* L.	Fabaceae	3
25.	*Anacardium occidentalis* L.	Anacardiaceae	1
26.	*Bryophyllum pinnatum* Lam.	Crassulaceae	2
27.	*Erythrophleum suaveolens* (Guill. & Perr.) Brenan	Fabaceae	3
28.	*Calotropis procera* (Aiton) W.T.Aiton	Apocynaceae	2
29.	*Dysphania ambrosioides* (L.) Mosyakin & Clemants	Amaranthaceae	9
30.	*Vitellaria paradoxa* C.F.Gaertn.	Sapotaceae	1
31.	*Detarium macrocarpum* Juss.	Fabaceae	1
32.	*Irvingia gabonensis*	Irvingiaceae	1
33.	*Spondia mombin* L.	Anacardiaceae	5
34.	*Abutilon mauritianum* (Jacq.) Medik.	Malvaceae	2
35.	*Allium cepa* L.	Amaryllidaceae	1
36.	*Maytenus senegalensis* Lam.	Celastraceae	1
37.	*Azadirachta indica* A. Juss.	Meliaceae	1
38.	*Carica papaya* L.	Caricaeae	1
39.	*Annona senegalensis* Pers.	Annonaceae	3
40.	*Chasmanthera dependens* Hochst.	Menispermaceae	1
41.	*Pericopsis laxiflora* (Benth. ex Baker) Meeuwen	Fabaceae	1
42.	*Vigna unguiculata* L.	Fabaceae	1
43.	*Euphorbia hirta* L.	Euphorbiaceae	1
44.	*Vernonia frondose* O. & H.	Compositae	1
45.	*Acacia nilotica* L.	Fabaceae	1
46.	*Xylopia aetiopica* (Dunal) A. Rich	Annonaceae	2
47.	*Momordica charantia* L.	Cucurbitaceae	1
48.	*Chrysophullum albidum* G. Don.	Sapotaceae	2
49.	*Adenopus breviflorus* Benth.	Cucurbitaceae	1
50.	*Garcinia kola* Heckel	Clusiaceae	1
51.	*Asystasia gangetica* (L.) T.Anderson	Acanthaceae	1
52.	*Opuntia dilleni* (Ker Gawl.) Haw.	Cactaceae	1
53.	*Evolvulus alsinoides* L.	Convolvulaceae	1
54.	*Piper guineensis* Schumach.	Piperaceae	1
55.	*Allium sativum* L.	Alliaceae	2
56.	*Plumbago zeylanica* L.	Plumbaginaceae	1
57.	*Olax subscorpioidea* Oliv.	Olacaceae	1
58.	*Gloriosa superb* L.	Chochicaceae	1
59.	*Picralima nitida* (Stapf) T.Durand & H.Durand	Apocynaceae	1

Turmeric (Curcuma longa Linn.) extract (typically 1000mg/day) can decrease arthritis indications, principal pain and inflammatory-related symptoms (Daily et al., 2016). In a similar study, use of Nigella sativa Linn. was showed to improve aggravation and diminish oxidative stress in patients with rheumatoid arthritis (Hadi et al., 2016). Moringa leaves extract has also been shown to have encouraging rheumatoid arthritis pain-relieving effect (Mahdi et al., 2018). Furthermore, oral administration of Curcuma longa Linn. Extract can reduce the effect of inflammatory response in arthritic rats (Nonose et al., 2014).

Reports from many studies shown that medicinal plants contain bioactive compounds that exhibit anti-inflammatory effects, and also as precursors for the synthesis of useful drugs. Singh et al. (2001) reported isolation of (+)-pinitol from Abies pindrow Royle. (Pinaceae) leaves. The isolate at a dose of 2.5-10 mg/kg showed a significant anti-inflammatory effect, the highest dose being comparable to phenylbutazone at a dose of 100 mg/kg. Curcumin from Curcuma longa showed a dose range of 100-200 mg/kg body weight exhibited good anti-inflammatory activity and seemed to have negligible adverse effect on human systems (Kohli et al., 2005). Agnuside and peduncullariside. Iridoid, peduncullariside and iridoid agnuside isolated from the butanol stem bark extract of Vitex peduncularis Wall. Ex Schauer (Verbenaceae) showed preferential inhibition of COX-2, with IC50 values of 0.15 +/- 0.21 mg/ml and 0.026 +/- 0.015 mg/ml respectively, with slight inhibitory effects on COX-1 (Suksamrarn et al., 2002). Sophocarpine from aerial part of Sophora alopecuroides L., Aristopyridinone A isolated from stem bark of Aristolochia manshuriensis Kom. (C.P.) and Escin from Aesculus hippocastanum L., seeds have been reported as anti-inflammatory agents (Xin et al., 2011; Chiu et al., 2012; Gao et al., 2012).

5. Conclusion and recommendation

This ethnobotanical study had documented medicinal plants, part used and recipes among others in the management and treatment of inflammatory conditions in six villages covered by the survey; Oloru, Elemere, Gbugudu, Asomu, Malete and Oloko Tuntun in Moro LGA of Kwara State. This study documented information on the use of medicinal plants in the treatment of inflammatory disorders such as arthritis, rheumatism and boils by the people of selected communities in Moro Local Government Area, Kwara State, Nigeria. This complemented other studies on this subject matter. The implicated medicinal plants

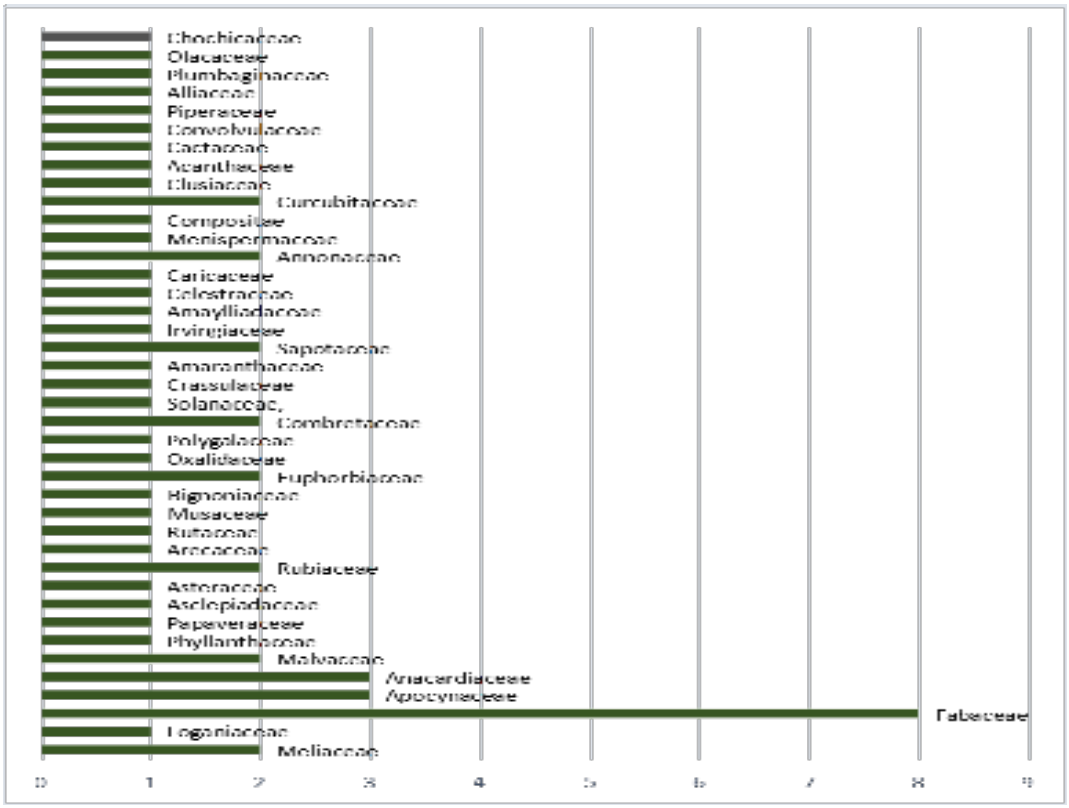

Figure 2: Plant species distribution according to family names

with potential anti-inflammatory properties should be subjected to detail scientific evaluation to establish their anti-inflammatory activities. Moreover, this study revealed indigenous knowledge of medicinal plants is fast declining due to a lack of interest among the younger generations as older generations, who are the custodian of indigenous knowledge, gradually pass away. Deliberate effort should be made to harvest and document indigenous knowledge on medicinal plants in Nigeria. It is suggested that sustainable conservation efforts need to be put in place by the community and government to safeguard endangered medicinal plants. Nigerian higher institutions should encourage students from biological and basic medical sciences departments like botany, biochemistry, pharmacognosy and phytomedicine to undergo internship programmes, academically referred to as industrial training (IT) in renowned herbal centers. This encourages students to acquire foundational knowledge of what traditional medicine entails and its contribution to the primary healthcare delivery. In all, government should establish medicinal plants drug development research institute at the local, state and federal level. This research would significantly contribute to elucidating the essential constituents that foster comprehension and suggest improved interventions for this type of diseases.

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References

Akinyemi, K.O., Oladapo, O., Okwara, C.E., Ibe, C.C., and Fasure, K.A. (2005) Screening of crude extracts of six medicinal plants used in South-West Nigerian unorthodox medicine for anti-methicillin resistant *Staphylococcus aureus* activity. *BMC Complement Altern Med*. DOI: 10.1186/1472-6882-5-6.

Anas, A., and Abdulrahman, M. D. (2021) Ethnomedicinal Survey of Plants used for Management of Inflammatory Diseases in Ringim Local Government, Jigawa State, Nigeria. *Ethnobotany Research and Applications*, 22-47. http://dx.doi.org/10.32859/era.22.47.1- 27.

Anyaoku, E.N., Nwafor-Orizu, O.E., and Eneh, E.A. (2015) Collection and preservation of traditional medical knowledge: Roles for medical libraries in Nigeria. *Journal of Library and Information Sciences* 3(1): 33-43.

Aziz, Z., Yahya, E., Naou, E., Toufik, B., Nora, M., Kamal, E., Hassan, A., Abdelhay, E., and Lhoussain, H. (2023) A review of Moroccan medicinal plants used in the treatment of inflammation. *Not Sci Biol*. *15(1)*, 11414. DOI:10.15835/nsb15111414.

Bellik, Y., Boukraa, L., Alzahrani, H.A., Bakhotmah, B.A., Abdellah, F., Hammoudi, S.M., and Iguer-Ouada, M. (2013) Molecular mechanism underlying anti-inflammatory and anti- allergic activities of phytochemicals: An update. *Molecules*, 18(1). 322- 353.

Boadu, A. A., and Asase, A. (2017) Documentation of herbal medicines used for the treatment and management of human diseases by some communities in southern Ghana. *Evid Based Complement Alternat Med*: 3043061 DOI: http://dx:doi. Org/10.1155/2017/3043061.

Çevik, C., Anil, A., and İşeri, S.Ö. (2015) Effective chronic low back pain and knee pain treatment with acupuncture in geriatric patients. *J Back Musculoskelet Rehabil*. *28(3)*,517-20. DOI: 10.3233/BMR-140550. PMID: 25373741.

Chiu, Y.J., Huang, T.H., Chiu, C.S., Lu, T.C., Chen, Y.W., Peng, W.H. and Chen, C.Y., 2012. Analgesic and antiinflammatory activities of the aqueous extract from *Plectranthus amboinicus* (Lour.) Spreng. both in vitro and in vivo. *Evidence-Based Complementary and Alternative Medicine, 2012(1)*, p.508137.

Chiu, Y.J., Huang, T. H., Chiu, C.S., Lu, T.C., Chen,Y.W., Peng,W.H., and Chen,C.Y. (2012)

Analgesic and anti-inflammatory activities of the aqueous extract from *Plectranthus amboinicus* (Lour.) Spreng. both *in vitro* and *in vivo*. *Evidence-Based Complementary and Alternative Medicine*, http://dx.doi.org/10.1155/2012/508137

Daily, J.W., Yang, M., and Park, S. (2016) Efficacy of Turmeric Extracts and Curcumin for Alleviating the Symptoms of Joint Arthritis: A Systematic Review and Meta-Analysis of Randomized Clinical Trials. *J Med Food*. *19(8),* 717-29.

Epstein, J., Sanderson, I. R., and MacDonald, T. T. (2010) Curcumin as a therapeutic agent: the evidence from *in vitro*, animal and human studies. *British Journal of Nutrition* 103(11), 1545–1557.

Gao, Y., Jiang, W., Dong, C., Li, C., Fu, X., Min, L., Tian, J., Jin, H., and Shen, J. (2012) Anti- inflammatory effects of sophocarpine in LPS-inducedRAW264.7cellsviaNF- kb and MAPKs signaling pathways. *Toxicology In vitro* 26, 1–6.

Hadi, V., Kheirouri, S., Alizadeh, M., and Khabbazi, A. (2016) Hosseini H. Effects of *Nigella sativa* oil extract on inflammatory cytokine response and oxidative stress status in patients with rheumatoid arthritis: a randomized, double-blind, placebo-controlled clinical trial. *Avicenna J Phytomed*. 6(1), 34-43.

Harish, S., Krishna, G., and Baske, P.B. (2010) Plants used in the treatment of joint diseases (rheumatism, arthritis, gout and lumbago) in Mayurbhanj district of Odisha, India. *Report and Opinion 2(9)*, 22-26.

Houzou, P., Fianyo, E., Kakpovi, K., Koffi-Tessio, V.S., Tagbor, K.C., Oniankitan, O., and Mijiyawa, M. (2018). Panorama of inflammatory arthropathies in rheumatologic consultations in Northern Togo. *Med Sante Trop*. *28(3)*, 320-323. DOI: 10.1684/mst.2018.0820. PMID: 30270840.

Idu, M., Timothy, O., Erhabor, J. O., and Obiora, E. J. (2005). Ethnobotanical study of Nnewi Northlocal government area of Anambra State, Nigeria. *Indian J Fundam Appl Life Sci*; *(1),* 199-208.

Jiofack, T., Fokunang, C., Guedje, N., Kemeuze, V., Fongnzossie, E., Nkongmeneck, B.A., Mapongmetsem, P.M., and Tsabang, N. (2010) Ethnobotanical uses of medicinal plants of two ethnoecological regions of Cameroon. *International Journal of Medicine and Medical Sciences 2(3),* 60-79.

Kaur, A., Nain, P., and Nain, J. (2012) Herbal plants used in treatment of rheumatoid arthritis: a review. *International Journal of Pharmacy and Pharmaceutical Sciences 4(4)*, 44-57.

Kim, Y., Oh, H.C., Park, J.W., Kim, I.S., Kim, J.Y., Kim, K.C., Chae, D.S., Jo, W.L., and Song J.H. (2017). Diagnosis and Treatment of Inflammatory Joint Disease. *Hip Pelvis, 29(4)*,211- 222. DOI: 10.5371/hp.2017.29.4.211.

Kohli, K., Ali, J., Ansari, M.J., and Raheman, Z. (2005) Curcumin: a natural antiinflammatory agent. *Indian Journal of Pharmacology*, *37(3)*, 141-147.

Kulakov, A.A., Brailovskaya, T.V., Grebnev, G.A., Petrova, T.V., Bagnenko, A.S. (2022) Comparative characteristics of the incidence of facial boils in military personnel and civilians. Stomatologiia (Mosk). 101(3):31-37. DOI: 10.17116/stomat202210103131. PMID: 35640177.

Lawal, I.O., Grierson, D.S., and Afolayan, A.J. (2014) Phytotherapeutic information on plants used for the treatment of tuberculosis in eastern cape province, South Africa. *Evid Based Complement Alternat Med*. DOI: 10.1155/2014/735423.

Lindiwe, S., Timothy, J., and Bi-sek, H. (2023) Traditional perinatal plant knowledge in Sub- Saharan Africa: Comprehensive compilation and secondary analysis. *South African Journal of Botany,* 154, 120-139. https://doi.org/10.1016/j.sajb.2023.01.007.

Mahdi, H.J., Khan, N.A.K., Asmawi, M.Z.B., Mahmud, R., and Murugaiyah, V. (2018) *In vivo* anti-arthritic and anti-nociceptive effects of ethanol extract of *Moringa oleifera* Lam. leaves on complete Freund's adjuvant

(CFA)-induced arthritis in rats. *Integr Med Res*. *7(1)*, 85-94.

Mukaila, Y.O., Oladipo, O.T., Ogunlowo, I., Ajao, A.A., and Sabiu, S. (2021). Which Plants for What Ailments: A Quantitative Analysis of Medicinal Ethnobotany of Ile-Ife, Osun State, Southwestern Nigeria. *Evid Based Complement Alternat Med*. 2021, DOI: 10.1155/2021/5711547.

Nonose. N., Pereira, J.A., Machado, P.R., Rodrigues, M.R., Sato, D.T., and Martinez, C.A. (2014). Oral administration of curcumin (*Curcuma longa*) can attenuate the neutrophil inflammatory response in zymosan-induced arthritis in rats. *Acta Cir Bras*. *29(11),* 727- 34.

Omonike, O. O., Adebayo, A. G., and Edith O. A. (2010). Ethnobotanical Survey of Plants used in Treatment of Inflammatory Diseases in Ogun State of Nigeria. *European Journal of Scientific Research*. *(43)2*, 183-191. Population "2006-2016" National Bureau of Statistics. "Post Offices- with map of LGA". NIPOST Retrieved August 29, 2023.

Salihu, S. T., Bello, L., Wara, H. S., and Ali, S. (2015) An ethnobotanical survey of antidiabetic plants used by Hausa-Fulani tribes in Sokoto, Northwest Nigeria. *J Ethnopharmacol*ogy *22,* 172:91-9. DOI: 10.1016/j.jep.2015.06.014.

Salihu. T., Olukunle, J.O., Adenubi, O.T, Mbaoji, C., and Zarma, M.H. (2018) Ethnomedicinal plant species commonly used to manage arthritis in North-West Nigeria. *South African J Bot*. 118,33–43.

Singh, R.K., Pandey, B.L., Tripathi, M., and Pandey, V.B. (2001) Anti-inflammatory effect of (+)-pinitol. *Fitoterapia*, *72(2),* 168-170

Singh, S., Singh, T.G., Mahajan, K., and Dhiman, S. (2020). Medicinal plants used against various inflammatory biomarkers for the management of rheumatoid arthritis. *J Pharm Pharmacol*. 72(10), 1306-27.

Suksamrarn, A., Kumpun, S., Kirtikara, K., Yingyongnarongkul, B., and Suksamrarn, S. (2002) Iridoids with anti-inflammatory activity from *Vitex peduncularis*. *Planta Medica*, 68 (01),72-73.

Tongshuwar, G.T., Ojetunde, A.O., Oyegoke, A.F., and Oyegoke, T. (2020) Ethno-Botanical Survey of Plants used in a Rheumatoid Arthritis Treatment: A Case Study of Jos Nigeria. *Medical Science of Ukraine 16 (4),* 35-45.

Xin, W., Zhang, L., Sun, F., Jiang, N., Fan, H., Wang, T., Li, Z., He, J., and Fu, F. (2011). Escin exerts synergisticanti-inflammatory effects with low doses of glucocorticoids *in vivo* and *in vitro*. *Phytomedicine 18* 272–277.

Yazbek, P.B., Matta, P., Passero, L.F., Santos, G.D., Braga, S., Assunção, L., Sauini, T., Cassas, F., Garcia, R.J.F., Honda, S., Barreto, E.H.P., and Rodrigues, E. (2019) Plants utilized as medicines by residents of Quilombo da Fazenda, Núcleo Picinguaba, Ubatuba, São Paulo, Brazil: A participatory survey. *J Ethnopharmacol*. 15, 244:112123. DOI: 10.1016/j.jep.2019.112123.

Zahoor, M., Yousaf, Z., Aqsa, T., Haroon, M., Saleh, N., Aftab, A., Javed, S., Qadeer, M., and Ramazan, H. (2017) An Ethnopharmacological Evaluation of Navapind and Shahpur Virkanin District Sheikupura, Pakistan for their herbal medicines. *J Ethnobiol Ethnomed*. *813*(1), 27. DOI: 10.1186/s13002-017-0151-1. PMID: 28482859; PMCID: PMC5422909.

Zouhri, A., El-Mernissi, Y., El Menyiy, N., Bouddine, T., Mir, N., Aissaoui, K., Hassan, A., Elharrak, A., and Hajji, L. (2023) A review of Moroccan medicinal plants used in the treatment of inflammation. *Notulae Scientia Biologicae 15(1)*, 1-35. OI:10.15835/nsb15111414.