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ANALGESIC AND ANTI-INFLAMMATORY HERBS: A POTENTIAL SOURCE OF MODERN MEDICINE

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ABSTRACT

In recent time, scientific investigations of medicinal plants using indigenous medical systems has attracted a lot of attention globally. Nature has bestowed our planet with an enormous wealth of medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents for the prevention and cure of diseases and ailments. Inflammation is complex biological response of vascular tissue due to different harmful stimuli and pain is discomfort signals result of actual or potential injury to the body may associate with inflammation. Inflammation with pain is associated with different diseases like rheumatism, encephalitis, pneumonia, oesophagitis, cancer, heart problems, fibrosis etc. Nonsteroidal anti-inflammatory drugs and opioid analgesic are normally used in the treatment of inflammation and pain but can cause a lot of adverse effect. Therefore herbal drugs can be potential source to replace them. Every year a lot of plants form traditional medicinal system has been screened for their potential anti-inflammatory and analgesic activity but only few of them only included in health care system after clinical research. So this is time to give more emphasis on research work based on natural sources, investigate the active phytoconstituents, use them on specific treatment, find out adverse effect and to work towards tapping their therapeutic utility.

INTRODUCTION: Plants are important and basic of preventive and curative health cares system since immemorial. Disease is as old as mankind and use of indigenous herbal medicine is a very ancient art and an integral part of treatment [1]. Traditional medicinal herbs have served as a potential source of alternative medicine and different healthcare products. Knowledge of herbal medicines has derived from rich traditions of ancient civilizations and scientific heritage. From ancient time Indian, Chinese, Egyptian, Greek, Roman and Syrian medicinal system documented the use of different plant based medicine for different diseases [2].

According to WHO, nearly 75-80% of world population still depends on herbal medicines. Active constituents from plant sources directly used as therapeutic agent and phytoconstituents are also served as lead molecule for the synthesis of various drugs [2, 3]. Folk medicine and their use against diseases in different cultures is a vast traditional knowledge; which is based on the necessities, instinct, observation, trial and error and long experience of ancient/tribal people [4]. Indigenous or herbal medicines confer considerable economic benefits to most rural and poor people. WHO noted that about 25% of modern medicines are descended from plants sources used traditionally and research on traditional medicinal herbal plant leads discovery of 75% of herbal drugs [3].

Over last decades, there has been extensive interest in the use of herbal medicines therefore the research work and screening of plant has been increased gradually. Different inflammatory diseases are major cause of morbidity and mortality [5]. Recent years documented progressive increase in the screening and research of medicinal plant with anti-inflammatory and analgesic activity but only few of them only included in health care system after clinical research [6]. So this is the time for systemic study of plant, isolate the active phytoconstituents, investigate their therapeutic, toxic dose and work towards tapping their therapeutic utility. Therefore this review documented 42 plants from 27 different families which proved useful as analgesic and anti-inflammatory agent; and can be a potential source of medicine in our healthcare system.

Inflammation: Inflammation is a complex response in the vascularized connective tissue occurs due to exogenous and endogenous stimuli. Inflammation is a normal, protective response to tissue injury caused by physical trauma, noxious chemicals or microbiologic agents, which is a part of the host defense. It endeavor to inactivate or destroy foreign organisms, eliminate irritants which is the first phase of tissue repair. Inflammatory process usually subside on completion of healing process but sometimes inflammation turns to severe, which may be far worse than the disease and in extreme cases, it may be fatal also [7, 8, 9]. Inflammatory process is characterized by reoccurrence of several phenomenons like initiation, chemoattraction of inflammatory cells and activation of these cells to release inflammatory mediators.

Redness, increased temperature, swelling, pain, and loss of function are the classical sign of inflammation [10].Inflammation can be provoked by a wide variety of noxious agents, foreign materials, toxins, infections, frostbite, chemicals, pathogens, antibodies, necrosis, blunt, immune reaction and physical injuries [11]. Different inflammatory mediators such as histamine, serotonin, kinins (bradykinin), neuropeptides, eicosanoids (prostaglandins and leukotriene B4, C4, D4, E4), nitric oxide, biological oxidants, platelet activating factors, tumor narcosis factor, oxygen metabolites, complement proteins,

cytokines, adhesion factors, and digestive enzymes are plays important role in pathogenesis of inflammation [12, 13]. Different cells like neutrophils, eosinophils, monocytes, lymphocytes, basophils, mast cells, connective tissue fibroblasts, resident macrophages and lymphocytes are also involved in pathogenesis of inflammation [14].

Types of Inflammation: Inflammation is generally divided into two types i) acute inflammation and ii) chronic inflammation. Inflammatory reactions arbitrate by different mechanisms and occur in phases like [13];

- Acute phase - temporary local vasodilation and increased capillary permeability
- Delayed, sub-acute phase - infiltration of leukocytes and phagocytic cells
- Chronic proliferative phase - tissue deterioration and fibrosis

Acute inflammation is initial response of the body to risk factors like an infection or trauma etc., this is non-specific and first line of defense of the body against danger [15]. Main features of acute inflammation include a) accumulation of fluid and plasma at the affected site, b) intravascular activation of platelets, c) polymorpho-nuclear neutrophils as inflammatory cells [16]. When the risk factors lengthen and are not removed, acute inflammation will then turns and extend to chronic inflammation. It occurs for a longer duration and associated with the presence of macrophages, lymphocytes, blood cell proliferation, fibrosis and tissue necrosis. The macrophages produce a wide number of biologically active products which leads to tissue destruction and fibrosis characteristics of chronic inflammation [17, 18].

Inflammatory Diseases: Abnormalities related with inflammation comprise a large, officially distinct group of disorders which trigger a vast variety of human diseases. The immune system is often involved with inflammatory disorders. Autoimmune disease, allergic reactions and some myopathies are common type of inflammatory disease. Cancer, atherosclerosis and ischaemic heart disease are some common non-immune diseases with etiological origins in inflammatory processes [6]. **Table 1** listed some of the acute and chronic inflammatory disorder.

TABLE 1: SOME OF THE COMMON TYPES OF INFLAMMATORY DISEASE [8, 12, 19, 20]

NAME OF THE DISEASES	EXPLANATION
Allergy	Inflammatory cytokines induce autoimmune reactions associated with inflammation
Appendicitis	Inflammation of vermiform appendix or appendiceal inflammation is associated with obstruction
Arthritis	Bacterial and viral infections, immune complex results inflammation of joints results destroy of joint cartilage and synovial fluid
Asthma	Respiratory disease due to allergy results smooth muscle hyperplasia, excess mucus, inflammation
Bacillary angiomatosis	Disease of skin of immunocompromised individual characterized by reddish elevated lesion often surrounded by scaly ring and inflammation
Cancer	Unlimited growth of tissue associated with inflammation
Cellulitis	Infection causes subcutaneous inflammation of connective tissue
Cholecystitis	Inflammation in gallbladder
Colitis	Bacterial infections, ulcer causes inflammation in colon
Congestive heart failure, stoke, heart attach	Common heart diseases associated with inflammation.
Cystitis	Inflammation in urinary bladder
Dermatomyositis	Polymyositis with involvement of skin marked by reddish erythematous eruptions and inflammation

Encephalitis	Viral infections in results brain inflammation
Endocarditis	Inflammation of lining of the heart and heart valves
Fibrosis	Condition marked by increase in intestinal fibrous tissue in response to inflammation or direct toxic insult to the liver
Gastritis	Alcohol abuse, *Helicobacter pylori* infection and gastric acid reflux causes inflammation in mucous membrane of stomach
Goodpasture syndrome	Autoimmune disorder of basement membranes of kidney glomeruli and lung alveoli
Hepatitis	Injury to the liver connected with an influx of acute or chronic inflammatory cells due to viral infection
Infectious rhinitis	Viral infection of respiratory tract also known as common cold
Insulitis	Inflammatory or autoimmune disease in islets of Langerhans results destruction of beta cells of pancreas
Leprosy	Chronic disease caused by *Mycobacterium leprae* characterized by formation of nodules on body surface.
Mediterranean fever	febrile disorder of unknown cause characterized by attacks of fever accompanied by inflammation in Mediterranean region
Meningitis	Inflammation in meninges especially in pia mater and in arachnoids due bacterial and viral infections in meninges
Oesophagitis	Inflammation and pain due to gastric acid reflux, fungal infections in esophagus
Osteomyelitis	Inflammatory disease of bone due to bacterial infection causes death and separation of tissue.
Pancreatitis	Inflammation in pancreas results pancreatic insufficiency
Pericarditis	infections in cardiac pericardium tissue
Pleurisy	Bacterial and viral infections in pleura results inflammation with fever, cough, painful and difficult respiration
Pneumonia	Disease of lungs characterized inflammation due to infection or irritant
Pneumonia	Disease of lung with inflammation and consolidation due to infection or irritants
Proctitis	Ulcerative colitis associated with inflammation in rectum and anus
Pyelonephritis	Mainly bacterial infection causes inflammation in parenchyma of kidney and the lining of its renal pelvis
Rheumatic fever	Acute, recurrent disease characterized by fever, swelling and pain around joints, inflammation in pericardium layer of heart
Stenosis	Associated with narrowing or constriction of the diameter of body orifice due to inflammation, like aortic, mitral, pulmonary, spinal, subaortic stenosis
Sunburn	UV radiation causes allergic condition and inflammation in skin
Syphilis	Sexual transmitted diseases caused by *Treponema pallidum*
Thyroiditis	Encompasses a diverse group of disorders characterized by thyroid gland inflammation and pain
Tuberculosis	Infection of lungs caused by *Mycobacterium tuberculosis* characterized by fever, cough, inflammation, difficulty in breathing
Ureteritis	Inflammation in uterus develop as one component of urinary tract infections

Pain: Pain is a subjective, multidimensional and unpleasant experience allied with actual or potential tissue damage comprising sensory (e.g., intensity, duration, location), affective (e.g., unpleasantness, emotional, motivational), and cognitive (e.g., awareness of the implications, fear, anxiety) components [21]. Pain has both sensory (somatic) and psychological (affective) mechanism. However, pain is more than a sensation or the physical alertness; it also includes perception, the subjective interpretation of the discomfort [10, 21].

The pain reaction is transmitted over the reflex arc by sensory fibers in the dorsal horn of the spinal cord and by synapsing motor neurons in the anterior horn. Due to harmful stimulus anatomic pattern of sensory and motor neurons move quickly, nerve impulses alerting the individual to move away from such stimuli are simultaneously sent along efferent nerve fibers from the brain [10]. Bradykinin, histamine, prostaglandins are major mediators of pain. Different types of pain include [10, 22, 24, 25]:

1. **Somatic pain**: caused by the activation of pain receptors in either the body surface or musculoskeletal tissues, which may be caused by a combination of factors likes abnormalities, inflammation, repetitive trauma, excessive activity, vigorous stretching and contractions due to paralysis.

2. **Visceral pain**: associated with the damage of internal organs and is most common form of pain, this is result by the activation of pain receptors in the chest, abdomen or pelvic areas.

3. **Neuropathic pain:** caused by injury or malfunction to the spinal cord and peripheral nerves associated with burning, tingling, shooting, stinging, pins and needles sensation.

4. **Acute pain:** results from tissue damage or injury, but usually goes away as the injury heals or the cause of the pain is removed. It is short lasting and usually manifests in ways that can be easily described and observed.

5. **Chronic pain:** pain lasting for more than three months and more subjective, treating chronic pain possess a great challenge for physicians as it has ability to change the function and quality of life.

Synthetic Analgesic and Anti-Inflammatory Drugs: Non steroidal anti-inflammatory drugs (NSAIDs) are commonly used to reduce inflammation, pain and fever. NSAIDs inhibit cyclo-oxygenase (COX) enzyme results inhibition of prostaglandin synthesis. NSAIDs are usually consider as mild analgesics and particularly effective when inflammation has results sensitization of pain receptors to normally painless mechanical or chemical stimuli [12].

However, for severe or chronic malignant pain, opioids analgesics are the drugs of choice[8]. The greatest drawback in the available potent synthetic analgesic and anti-inflammatory drugs lies in their adverse effect, toxicity and reappearance of symptoms after discontinuation. **Table 2** tabulated adverse or toxic effect of some of the commonly available modern drugs used for treatment of pain and inflammation.

TABLE 2: SOME OF THE COMMONLY USED ANALGESIC AND ANTI-INFLAMMATORY DRUGS AND THEIR ADVERSE EFFECT [8, 10, 20]:

DRUGS	ADVERSE EFFECTS
Nonsteroidal anti-inflammatory drugs:	
Acetaminophen	skin eruptions, gastric upset or bleeding, urticaria, hemolytic anemia, pancytopenia, jaundice, hepatotoxicity, hepatic necrosis due to overdose
Aspirin	nausea, vomiting, epigastric distress, peptic ulcer, tinnitus, allergic and anaphylactic reactions, increased risk of Reye's syndrome in children, respiratory alkalosis, hyperventilation
Ibuprofen	nausea, dizziness, somnolence, dyspepsia, gastric or duodenal ulcer, gastrointestinal (GI) bleeding, head ach, tinnitus
Indomethacin	nausea, constipation gastric or duodenal ulcer formation, GI bleeding hematologic changes
Piroxicam	nausea, vomiting, diarrhea, drowsiness, gastric or duodenal ulcer, GI bleeding
Diclofenac sodium	nausea, vomiting, gastric or duodenal ulcer, GI bleeding
ketoprofen	dizziness, visual disturbances nausea, constipation, vomiting diarrhea, gastric or duodenal ulcer formation, GI bleeding
Ketorolac	dyspepsia, nausea, GI pain, GI bleeding and/or perforation of the stomach or intestines pain at injection site drowsiness
Mefenamic acid	dizziness, tiredness, nausea, dyspepsia, rash constipation, bleeding, diarrhea, hemolytic anemia
Naproxen	dizziness, visual Dizziness, visual nausea, vomiting, gastric or duodenal ulcer, GI bleeding
Sulindac	nausea, vomiting, diarrhea, constipation,, gastric or duodenal ulcer, GI bleeding
Valdecoxib	headache, nausea, dyspepsia, abdominal pain, anemia
Celecoxib and Rofecoxib	headache, dizziness, somnolence, insomnia, dyspepsia, rash, fatigue, ophthalmic changes, headache, diarrhea, abdominal pain
Opioid analgesic:	
Fentanyl	sedation, sweating, headache, vertigo, lethargy, confusion, light-headedness, nausea, vomiting, respiratory depression
Methadone	light headedness, dizziness, constipation, respiratory depression, sedation, nausea, vomiting, physical dependence
Morphine sulfate	sedation, hypotension, increased sweating, constipation, dizziness, drowsiness, nausea, vomiting, dry mouth, somnolence, respiratory depression due to acute opioid poisoning, dysphoria
Codeine	sedation, sweating, headache, dizziness, lethargy, confusion, light-headedness
Buprenorphine	light headedness, sedation constipation, dizziness, nausea, vomiting, respiratory depression
Pentazocine	light headedness, sedation, constipation, dizziness, nausea, vomiting, respiratory depression, high doses increase blood pressure and can cause hallucinations, nightmares, dysphoria, tachycardia, dizziness

Herbal Anti-inflammatory Agents: Herbal medicines are the synthesis of remedial experiences and practice of indigenous systems of medicine for over hundreds of years. Despite the tremendous progress in medical research during the past decades, the treatment of many serious diseases including pain and inflammation is still problematic [26]. Currently used anti-inflammatory and analgesic drugs are associated with some severe side effects; therefore there is a need for the development of potent analgesic and anti-inflammatory drugs with fewer side effects [27]. Herbal medicine showed safety, efficacy, cultural acceptability and lesser side effects than the synthetic drugs. The number of chemical compounds, found within the plant kingdom is a part of the physiological functions of living flora and are supposed to have better compatibility with the human body [2]. Different phytoconstituents like alkaloids, flavonoids, xanthone, coumarin, sterols, withaferin-A, andrographolide etc., are also proved effective as analgesic and anti-inflammatory agent [5, 6]. Therefore it is the demand of time to investigate and herbal medicine and uses them in our daily life. **Table 3** tabulated some of the plant reported to demonstrate pain and inflammation reducing properties.

TABLE 3: SOME OF PLANT SOURCE WITH ANALGESIC AND ANTI-INFLAMMATORY ACTIVITY [26-64]:

PLANT NAME	TRADITIONAL USES	PART USED	TYPE OF EXTRACT	EXPERIMENTAL MODELS
Albizia lebbeck Family: Leguminosae	Barks and leaves are used to relief tooth ache, diseases of the gum, allergic disorders and bronchial asthma	Bark	Cold extraction of mixture of Petroleum ether, ethyl acetate and methanol	Acetic acid induced writhing, radiant heat tail flick method
Annona squamosa Family: Annonaceae	Used to stop diarrhea, dysentery and used as a cold remedy, insecticide, expectorant, tonic	Bark	Petroleum ether	Acetic acid induced writhing test, carrageenan induced paw oedema
Artemisia absinthium Family: Compositae	Used as tonic, stomachic, febrifuge, gastric pain, antihelmintic	Seed, stem	Methanol extract	Tail immersion method, carrageenan induced paw edema
Bauhinia racemosa Family: Caesalpiniaceae	Bark, root, flower used in hemorrhoids, cough, diarrhea, menorrhagia, skin diseases, sore throat	Stem bark	Methanol extract	Acetic acid induced writhing, carrageenan induced paw oedema
Carissa carandas Family: Apocynaceae	Used as stomachic, antihelmintic, antiscorbutic and useful in treatment of scabies, pruritus, intestinal worms, sour, fever	Root, fruit	Ethanolic extract	Eddy's hot plate, carrageenan induced rat paw edema, analgesy meter induced pain, cotton pellet induced granuloma
Cassia sieberiana Family: Caesalpiniaceae	Traditional medicine to treat pain and Inflammation	Root	Aqueous extract	Acid induced writhing, carrageenan induced paw edema
Cussonia paniculata Family: Araliaceae	Widely used against pain, inflammation, infections	Bark	Aqueous extract	Formalin test, carrageenan and histamine induced edema
Daphne retusa Family: Thymelaeaceae	Act as detumescence and acesodyne	Bark,	Ethanol extract and different fractions (pet. Ether, methylene	Carrageenan induced paw oedema, ear oedema, acetic acid induced writhing, hot

		Stem	chloride, ethyl acetate and n-butanol)	plate test
Desmodium triflorum Family: Fabaceae	Used as a remedy for dysmenorrheal, muscle spasms, cough, asthma, diarrhea, dysentery, convulsions, pain	Whole plant	Methanol extract	*Λ*-carrageenan induced paw edema, acetic acid induced writhing, determination of antioxidant enzymes, interleukin-1*β* , tumor necrosis factor and nitric oxide
Diospyros variegata Family: Ebenaceae	Use in relieving fevers and inflammation	Stem	Hexane extract	Acetic acid induced writhing, formalin test, tail flick method, arachidonic acid and ethyl phenylpropiolate induced rat ear edema
Garcinia hanburyi Family: Guttiferae	Used to treat constipation, edema, bleeding	Gum resin	Ethyl acetate extract	Ethyl phenylpropiolate induced ear edema
Gloriosa supberba Family: Liliaceae	Used in rheumatism, worm infections, leprosy, ulcer, sores, tumor	Aerial part	Hydroalcoholic extract (50% v/v)	Acid induced writhing, eddy's hot plate method, carrageen induced paw edema, cotton wool granuloma model
Glycine tomentella Family: Leguminosae	Treating degenerative disease, joint pain, joint pain	Root	Aqueous extract	Acetic acid induced writhing, carrageenan induced paw edema, formalin test
Heracleum persicum Family: Apiaceae	Purposed to reduce swelling, aid digestion and is used as tonic and aphrodisiac	Fruit	Hydroalcoholic extract	Acetic acid induced writhing, carrageenan induced paw edema
Hypericum canariense Family: Clusiaceae	Used in fibromyalgia, arthritis, muscular pain and fatigue, inflammatory and painful conditions	Aerial part	Infusion, methanol extract and fractions (aqueous, butanol and chloroform fractions)	Acetic acid induced writhing, tail flick test, tetradecanoylphorbol acetate induced ear inflammation model
Hypericum glandulosum Family: Clusiaceae	Used in arthritis, muscular pain and inflammatory and painful conditions	Aerial part	Infusion, methanol extract and fractions (aqueous, butanol and chloroform fractions)	Acetic acid induced writhing, tail flick test, tetradecanoylphorbol acetate induced ear inflammation model
Lactuca sativa Family: Compositae	Plant seeds are used for reliving pain, osteodynia	Seed	Methanol/petroleum ether (70/30 v/v) extract	Formaline test, carrageenan induced inflammation model
Lactuca scariola Family: Compositae	Used as a diuretic, antispasmodic, sedative	Seed, stem	Methanol extract	Tail immersion method, carrageenan induced paw oedema
Lantana trifolia Family: Verbenaceae	Folk medicine use as pain relievers	Leaf	Ethanol extract	Carrageenan, serotonin and histamine induced paw edema, acetic acid induced writhing, tail flick
Leonurus sibiricus Family: Lamiaceae	Plant is used in the treatment of painful menstruation, post-partum bleeding, oedema	Aerial part	Methanol extract	Acetic acid induced writhing, carrageenan induced paw edema

Ligularia fischeri Family: Asteraceae	Seed oil for sprain and rheumatism	Leaf	Ethanol extract	Formalin test, acetic acid induced writhing, hot plate method, carrageenan and arachidonic acid induced edema
Mahonia oiwakensis Family: Berberidaceae	Used as bitter tonic	Root	Ethanol extract	Acetic acid induced writhing, formalin test. Λ-carrageenan-induced paw oedema model
Margaritaria discoidea Family: Euphorbiaceae	Barks are used to relief toothache, post-partum pains, relieve stomach and kidney disease, inflammation	Stem bark	Water extract	Carrageenan and histamine induced paw oedema, acetic acid induced writhing, formalin test.
Melia toosendan Family: Meliaceae	Herbal medicine in the treatment of stomachache and many acute or chronic inflammations, as well as ascariasis.	Fruit	Ethanol extract	Acetic acid induced vascular permeability and λ-carrageenan induced hind paw edema, acetic acid induced writhing and hot plate tests
Memecylon edule Family: Melastomataceae	In menorrhagia and heavy manstruration, and washing of eyes	Leaf	Hexane, ethyl acetate, methanol and 50% methanol fractions	Interleukin production, ethylphenylpropiolate induced ear edema and the writhing test
Microstylis wallichii Family: Orchidaceae	Useful in haematemesis, fever, vitiated condition of *pitta* and *vata*, dipsia, burning sensation	Tuber	Ethanolic extract (50% v/v)	Carrageenan and cotton palate induced granuloma, pain by analgesy meter
Newbouldia laevis Family: Bignoniaceae	Used in earache, sore feet, chest pain, epilepsy, febrifuge, wound and stomach ache	Flower	Ethanolic extract	Formalin test, acetic acid induced writhing
Pergularia daemia Family: Apocynaceae	Used as antihelmintic, laxative, antipyretic and expectorant, and is also used to treat infantile diarrhoea and malarial intermittent fevers, inflammation	Root	Ethanolic extract	Eddy's hot plate, carrageenan induced rat paw edema
Pfaffia glomerata Family: Amaranthaceae	Used in fever and reduce inflammation	Root	Hydroalcoholic extract	Carrageenan induced paw oedema, granulomatous tissue assay, writhing test, hot plate test
Phyllanthus debilis Family: Phyllanthaceae	Used in sinusitis, it is a rich source of vitamin c	Whole plant	Petroleum ether extract	Carrageenan induced hind paw edema, chronic granuloma pouch model, tail flick model
Pogostemon cablin Family: Lamiaceae	Used in cold, nausea, diarrhea, headache and fever	Aerial part, leaf	Methanol extract	Acetic acid induced Writhing, formalin test, carr-induced edema test, antioxidant study, tissue cox-2 and tnf-α determination
Rheedia longifolia Family: Clusiaceae	Different plant from *rheedia* species used to treat inflammation, pain and infections	Leaf	Aqueous extract	Acetic acid induced writhing, tail flic method, hyperalgesia and pleurisy induced by lipopolysaccharide
Rivea hypocrateriformis Family: Convolvulaceae	Leave juice in rheumatic pain and skin disease of hair scalp	Leaf	Ethanol extract	Tail flick models, carrageenan induced inflammation

Saraca indica Family: Leguminosae	To treat painful conditions, improves digestion and assimilation, alleviates excessive thirst, to kills infectious agents and in blood disease, inflammation.	Leaf	Chloroform, Methanol, water extract	Formalin test, tail immersion method
Smilax china Family: Liliaceae	It is bitter, acrid, anodyne, anti-inflammatory, digestive and used in dyspepsia, flatulence, colic, skin diseases, and fever.	Bark	Aqueous extract	Carrageenan induced paw edema, hot plate method
Spathodea campanulata Family: Bignoniaceae	Plant is uses as astringent and to relief for painful inflammatory conditions	Leaf	Ethanol extract	Acetic acid induced writhing, tail flick method (cold induced), hot plate models, carrageenan induced oedema
Trichilia connaroides Family: Meliaceae	Used as antihelmintic and used in stomach trouble, wound	Leaf	Chloroform extract	Formaline induced paw edema, acetic acid induced writhing, eddy's hot plate method
Trigonella foenumgraecum Family: Leguminosae	Used for stomach upset, swelling, rheumatism, fever andfor lowering blood sugar, and for softening the stool.	Seed	Water soluble partially purified extract (methanol extract subsequently treated with chloroform and acetone)	Acetic acid induced writhing, carrageenan Induced edema
Verbena tenuisecta Family: Verbenaceae	Folk medicine against diarrhea, gastrointestinal disorders, fever, pain, inflammation	Flower bud	Volatile oil isolated by hydrodistillation	Carrageenan induced paw edema, acetic acid induced writhing, hot plate method
Xanthium strumarium Family: Compositae	Used as anodyne, antirheumatic, appetizer, diaphoretic, diuretic, emollient, laxative and sedative	Fruit	Ethanol extract	Acetic acid induced writhing, croton oil induced ear edema
Xeromphis spinosa Family: Rubiaceae	Used in pain, inflammation, fever and as aphrodisiac, antiemetic, carminative	Bark	Bark is extracted by ether, ethyl acetate and methanol (1:1:1)	Carrageenan induced paw edema
Zizyphus lotus Family: Rhamnaceae	Used in inflammation, stress, tooth pain	Root, bark, leaf	Methanol extract	Carrageenan induced paw edema, tail-flick method

CONCLUSION: Plants have been medicine and food for animals, since animal life emerged. Plants contain a large number of spread of pharmacologically active ingredients and each herb has its own unique combination and properties. A number of plants have been described in Ayurveda and other traditional medicinal system for the management of different diseases according to the perceived needs of the patient and based upon the individual herb's constituents. Diseases with pain and inflammation are a widespread and required more attention. Review of herbal medicine used by different medicinal system and tribal/ethnic people in pain and inflammation is essentially quite important in the face of treatment. A large number of people these days are looking for herbal remedies and relief for their ailments. The cause for this is the quest for a natural and safe way to treat disease. Therefore, our efforts should be directed towards the review of medicinal plant, screening of activity, isolation

and characterization of the active principles and elucidation of the relationship between structure and activity, that can aimed at towards clinical relevance.

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