Achyranthes aspera medicinal uses pdf

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Volume 203, 5 May 2017, Pages 260-278 rights and contentAchyranthes L. (Amaranthaceae), also known as Chaff Flower and Niuxi/牛膝, mainly includes two famous medicinal species namely A. bidentata and A. aspera. A. bidentata has been widely used as blood-activating and stasis-resolving medicine for the treatment of various diseases including amenorrhea, dysmenorrhea, lumbago, gonalgia, paraplegia, edema, stranguria, headache, dizziness, odontalgia, oral ulcer, hematemesis, and epistaxis. A. aspera has been widely used to treat various diseases, including gynecological disorder, asthma, ophthalmia, odontalgia, haemorrhoids, and abdominal tumor, and has been applied to difficult labour, wound healing, insect and snake bites.This review aims to provide systematically reorganized information on distributions, botanical characteristics, ethnopharmacology, chemical constituents, qualitative and quantitative analysis, pharmacological activities, and toxicity of Achyranthes species to support their therapeutic potential.The relevant information on Achyranthes species was gathered from worldwide accepted scientific databases via electronic search (Google Scholar, Web of Science, ScienceDirect, ACS Publications, PubMed, Wiley Online Library, SciFinder, CNKI). Information was also obtained from International Plant Names Index, Chinese Pharmacopoeia, Chinese herbal classic books, PhD and MSc dissertations, etc.A comprehensive analysis of literatures obtained through the above- mentioned sources confirms that the ethnomedicinal uses of Achyranthes species are mainly recorded in China, India, Korea, Pakistan, Ethiopia, Kenya, Sri Lanka, Bangladesh, Philippines, etc. Phytochemical investigations revealed that the major bioactive substances of Achyranthes plants are polysaccharides, polypeptides, triterpenoid saponins, and ketosteroids. Achyranthes plants have been shown to not only act on immune system, nervous system, bone metabolism, and reproduction, but also possess a wide range of biological activities, including blood-activating, anti-tumor, anti-inflammation, anti-arthritis, anti-oxidation, anti-aging, wound healing, etc. Toxicity studies indicated that A. bidentata and A. aspera seem non-toxic at the common therapeutic doses.A. bidentata and A. aspera are very promising to be fully utilized in the development of nutraceutical and pharmaceutical products. There are, however, needs for further in-depth studies to confirm some ethnomedicinal uses of Achyranthes plants and to elucidate the scientific connotation of the widely documented property of conducting drug downward of A. bidentata. In addition, other widespread Achyranthes species like A. japonica and A. rubrofusca ought to be studied. Likewise, systematic comparative studies of the chemical constituents of medicinal Achyranthes plants resources with the same local name are also needed. Furthermore, not only should the investigations on the structure-activity relationship of the main bioactive compounds triterpenoid saponins and ketosteroids be carried out, but the pathways of absorption, distribution, metabolism, and excretion ought to be clarified. Last but not least, there is also a need to evaluate the long-term chronic toxicity and acute toxicity in vivo of the main bioactive compounds.Achyranthes L. (Amaranthaceae), also known as Chaff Flower (Common Name) or by its Chinese name, Niuxi (牛膝), belongs to a group of perennial or annual herbs mainly growing on the edges of forest, hillsides or riverbanks (Flora of China Editorial Committee, 2001). The genus contains approximately 21 species, which are widely distributed in tropical and subtropical regions (Table 1). Among these species, A. bidentata and A. aspera (Fig. 1) are the two most commonly used medicinal plants and have been used for thousands of years mainly in India and China. Various parts of these plants, including the leaves, juice, and seeds, can be used as medicines, and the dried root of A. bidentata has been officially recorded in Chinese, Japanese, and Korean Pharmacopoeias. Many ancient medical books, along with a series of modern toxicity tests, have shown that A. bidentata and A. aspera are non-toxic for oral and external uses, while the usually emphasized contraindication in pregnancy is due to their ability to induce abortions. In traditional Chinese medicine (TCM), A. bidentata, as an upper herb in the Shennong's Classic of Materia Medica, acts on the liver and kidney meridians, tastes bitter and sour, and is neutral in nature (China Pharmacopoeia Commission, 2015). Interestingly, A. bidentata is generally prepared with yellow rice wine or salt water to enhance the actions of enriching the kidney and nourishing the liver, strengthening the sinews and bones (Chinese Herbalism Editorial Board, 1999). A. aspera has occupied a pivotal position in Indian culture and folk medicine, and it has been used in all the Indian traditional systems of medicine, including Ayurveda, Unani, Sidha, and Homoeopathy (Perumalsamy et al., 1998). According to Ayurveda, it is bitter, pungent, laxative, stomachic, and carminative (Pandey et al., 2013). Besides its application in human health, A. bidentata has also been used to extend silkworm age in the southeast coastal area of China (Li and Liu, 1990), and A. aspera has been reported to be capable of removing urolith in goats and expelling the placenta after parturition, and can be applied as an antihelminthic in cattle (Khan, 2009).Nowadays, many classical formulas containing A. bidentata have been developed into modern formulas, The China food and drug administration (CFDA) has also approved numerous Chinese Patent Medicines containing A. bidentata, including Mailuoning granule/injection/oral liquid, Danxi granule, in which A. bidentata acts as sovereign medicinal, minister medicinal, assistant medicinal, and courier medicinal (. In addition, A. bidentata and A. aspera have also been incorporated as active ingredients into various products, including health care products, health wine, sex pills, cream, toothpaste, and sanitary napkins worldwide.Pharmacological investigations of genus Achyranthes mainly focus on its biological effects on immune system, nervous system, bone metabolism, and reproduction, as well as biological activities of blood-activating, antitumor, anti-oxidation, anti-inflammation, anti-arthritis, et al. To date, a total of 133 compounds have been reported from genus Achyranthes. Among them, polysaccharides, polypeptide, triterpenoid saponins, and ketosteroids are the four main classes of bioactive ingredients. β-ecdysterone is recorded as the index component in Chinese Pharmacopoeia for the quality control of Achyranthis Bidentatae Radix (China Pharmacopoeia Commission, 2015).Reviewing the available literatures, there is no comprehensive and detailed review concerning genus Achyranthes. This review intends to provide a comprehensive insight into the distribution, botanical characteristics, ethnopharmacology, chemical constituents, qualitative and quantitative analysis, biological activities, and toxicity of Achyranthes plants to support their therapeutic potentials and sanitarian functions. In addition, it is worth mentioning that the epithet “bidentata” is still being misspelt as “bidentate”.Achyranthes is a genus of approximately 21 species and is widely distributed in East Asia, Southeast Asia, South Asia, Central Africa, Southern Africa, and Latin America. Detailed geographical distributions of these 21 species are provided in (Table 1) (Flora of China Editorial Committee, 2001; www.gbif.org/).According to Flora of China (Flora of China Editorial Committee, 2001), Achyranthes is a genus of herbs or subshrubs. Stem with conspicuous nodes; branches opposite.Achyranthes plants have been proven to be a rich source of natural compounds with varying structural patterns. To date, a total of more than 133 compounds have been identified, and they can be arranged in the following groups: group I- triterpenoid saponins; group II- ketosteroids; group III- sterols; group IV- alkaloids; group V- flavonoids; group VI- anthraquinones; and group VII- organic acids. Herein, we listed these compounds together with the relevant references and respective structuresTriterpenoid saponins, ketosteroids, and polysaccharides are the major three classes of bioactive compounds in Achyranthes plants, and there are a multitude of studies concerning their qualitative and quantitative analysis. For example, RRLC method coupled with electrospray ionization Q-TOF MS/MS has been developed by Li and colleagues for the characterization and identification of twenty-two triterpenoid saponins from A. bidentata. Through the developed method, the losses of monosaccharideIt has been reported that many polysaccharides from Chinese medicinal herbs are capable of combining with receptors on the surface of immune cells to modulate second messenger levels, and subsequently induce cytokines production to perform cell signaling to eventually reach the goal of regulating immune system (Jiang et al., 2010). A. bidentata fructan also have been proven to be a promising regulator acting on various immune cells including macrophages, T-lymphocytes, dendritic cells (DCs),According to the available knowledge, the toxicity of Achyranthes plants is low and safe enough for herb prescription uses. Acute toxicity study performed in rabbits showed that the oral administration of A. aspera powder did not cause any poisoning symptoms in the perspective of behavior patterns although the dosage was as high as 8 g/kg (Akhtar and Iqbal, 1991). Another similar study demonstrated that the oral administration of healthy adult male albino mice with a methanol extract of A. asperaOver the past few decades, a great deal of studies have focused on revealing numerous biological activities of different crude extracts, polysaccharides, polypeptides and triterpenoid saponins obtained from Achyranthes plants. In particular, ABPP were shown to possess promising neuroregenerative activity and neuronal apoptosis inhibitory activity, thus the traditional medicinal value of A. bidentata for neurological disorder has been basically confirmed; ABPS were revealed to be promisingThis work was supported by Shaanxi Foundation for Development of Science and Technology, China (No. 2012K16-02-02), and was also supported by 2014 CAS "Light of West China" Program.H. Mukherjee et al.T.N. Misra et al.T.N. Misra et al.C.M. Liu et al.X. Li et al.S. Lee et al.L.Q. Jin et al.Y. Ida et al.Y. Ida et al.A. Höke et al.T.Y. Ho et al.C.C. He et al.D.Y. 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R-tab is traditionally prescribed for improving urination, H-tab is for relieving piles, hemorrhoids, fissures, and rectal inflammation and E-cap is for regulating menstruation.Aims of the study: To extract the botanical products and determine their potential interaction with the cytochrome P450 (CYP1A2, CYP2D6 and CYP3A4) enzymes.R-tab, H-tab and E-cap botanical products were first extracted using solvents and analyzed using HPLC and LC-MS/MS. The effects of methanol extracts on the cytochrome induction and inhibition activities were determined using a series of in vitro assays, including multiplex RT-qPCR, CYP activity assays (P450-Glo™) and LC-MS/MS-based assays. For the CYP induction assay, omeprazole, rifampicin and dexamethasone were used as CYP1A2, CYP2D6 and CYP3A4 inducers, respectively. Ketoconazole and acetaminophen were used as positive and negative controls for the CYP3A4 inhibition assay, whereas furafylline and ketoconazole were used as positive and negative controls for the CYP1A2 inhibition assay.All three botanical products did not show any significant induction in CYP1A2, CYP2D6 and CYP3A4 mRNA expression. By contrast, R-tab inhibited the mRNA expression of CYP1A2 significantly from the lowest concentration of 0.01 μg/mL, while, H-tab inhibited the mRNA expression of CYP1A2 and CYP3A4 from 0.1 μg/mL. Based on the P450 Glo assays, E-cap extract inhibited the metabolic activity of CYP1A2 with an IC50 value of 37.24 μg/mL. On the other hand, R-tab, H-tab and E-cap showed inhibitory effects on the CYP3A4 enzymatic activity with IC50 values of 17.42, 18.20 and 20.60 μg/mL, respectively. However, using the LC-MS/MS-based methods, the concentration-dependent effects of R-tab and H-tab extracts on the metabolism of testosterone appeared to be more prominent, with IC50 values of 51.90 and 56.90 μg/mL as compared with the rest of the results, which were all above 100 μg/mLThe CYP3A4 mRNA and enzymatic activity were moderately inhibited by R-tab and H-tab. Methanol extract of botanical products in solid dosage forms can be evaluated for their herb-drug interaction risks using in vitro assays and may provide the minimum data required for safety labeling.Colon cancer is the third most predominant cancer caused by genetic, environmental and nutritional factors. Plant-based compounds are very well known to regress colon cancer in many ways, like delaying tumor growth, managing chemotherapy and radiation therapy side-effects, and working at the molecular levels. Medicinal plants contain many bioactive phytochemicals such as flavonoids, polyphenol compounds, caffeic acid, catechins, saponins, polysaccharides, triterpenoids, alkaloids, glycosides, phenols, quercetin, luteolin, kaempferol and luteolin glycosides, carnosic acid, oleanolic acid, rosmarinic acid, emodin, and eugenol and anthricin. These bioactive compounds can reduce tumor cell proliferation via several mechanisms, such as blocking cell cycle checkpoints and promoting apoptosis through activating initiator and executioner caspase. Traditional medicines have been used globally to treat cancers because of their anti-cancer effects, antioxidant properties, anti-inflammatory properties, anti-mutagenic effects, and anti-angiogenic effects. In addition, these medicines effectively suppress early and intermediate stages of carcinogenesis when administered in their active and pure form. However, traditional medicine is not very popular due to some critical challenges. These include poor solubility and absorption of these compounds, intellectual property-related issues, involvement of drug synergism, absence of drug-likeness, and unsure protocols for their extraction from the plant source. Using bioactive compounds in colon cancer has equal advantages and limitations. This review highlights the benefits and challenges of using bioactive compounds derived from plants for colon cancer. We have also discussed using these compounds to target cancer stem cell self-renewal, its effects on cancer cell metabolism, safety parameters, easy modulation, and their bioavailability.Non-alcoholic fatty liver disease (NAFLD) especially the later stage non-alcoholic steatohepatitis (NASH) seriously endangers human's health and has become a global public health issue in recent years. Mailuoning Oral Liquid (MLN) is a modern traditional Chinese medicine prescription composed by Lonicerae japonicae flos, Achyranthis bidentatae radix, Scrophulariae radix and Dendrobium Caulis. MLN is generally used to treat the syndrome of blood stasis in clinical practice.To observe the alleviation of MLN on NASH in vivo, and explore the possible underlying mechanism. Furthermore, this study also aims to find which Chinese medicinal drug contained in MLN exerts the main pharmacological activity.NASH model was induced in mice by feeding with methionine and choline deficient (MCD) diet. The effects of MLN on hepatic lipids accumulation, liver inflammation, hepatic fibrosis, and the expression of some molecules were investigated by histological observation, biochemical index analysis, quantitative real-time PCR and western blot. Network pharmacology was applied to predict those involved molecular targets and potential mechanisms, which was further validated in vivo. BODIPY fluorescence staining assay was used to detect cellular lipids accumulation.MLN (7.8, 23.4 ml/kg) improved NASH in MCD-fed mice. Network pharmacology results demonstrated that peroxisome proliferator-activated receptor α (PPARα) signaling pathway was crucially involved in the MLN-provided alleviation on NASH. Further experimental validation results showed that MLN increased the expression of peroxisome proliferator-activated receptor gamma coactivator-1α (PGC-1α) and restored the decreased expression of nuclear PPARα in MCD-fed mice. Further results displayed that Achyranthis bidentatae radix and Lonicerae japonicae flos contributed greatly to the MLN-provided alleviation on NASH in vivo. BODIPY fluorescence staining assay showed that 25R-inokosterone and cynaroside, two compounds from Achyranthis bidentatae radix and Lonicerae japonicae flos, obviously reduced intracellular lipids accumulation in hepatocytes stimulated by non-esterified fatty acid (NEFA).MLN improved NASH in MCD-fed mice, and the PGC-1α-PPARα signaling pathway was involved in this process. Moreover, Lonicerae japonicae flos and Achyranthis bidentatae radix contained in MLN contributed greatly to the MLN-provided improvement on NASH.Steam explosion technology was employed for the pretreatment of Achyranthis bidentatae radix (ABR) under mild conditions, followed by the polysaccharide extraction. An increase in the extraction yield and uronic acid content of crude polysaccharide were detected, along with a decrease in the protein content induced by the steam explosion. The monosaccharide analysis showed the main compositional modification of polysaccharide is the increase in the proportion of galacturonic acid, galactose, and arabinose. It is consistent with the discriminant analysis of the FT-IR and UV–vis spectra. These structural modifications of crude polysaccharide caused by the steam explosion pretreatment (SEP) resulted in the significant increases in their antioxidant activities in vitro and in vivo. Strong correlations were observed between the pretreatment conditions and the changes in the structural characteristics and antioxidant activities of Achyranthis bidentatae radix polysaccharides (ABPS).Neurodegenerative diseases are neuronal diseases that affect the brain components by degenerating the structure and function of the central or peripheral nervous system progressively. It is a leading cause of death and affects huge amount of people worldwide. Plant-based medicines have been utilised in the therapies for many illnesses that have defied western treatments, including neurodegenerative diseases.This review presents an overview of the major neurodegenerative diseases and reported prominent medicinal plants used in managing those diseases in West Africa.Scientific articles regarding medicinal plants and their usefulness in managing neurodegenerative diseases in West Africa were pooled from different scientific databases. We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses to filter articles based on their relevance. Pharmacological activity, plant parts used, experimental models, and some isolated chemical compounds of those plants were summarised.In the West Africa region, Fabaceae (19%) and Solanaceae (13%) have the highest representation of plant families used to treat neurological diseases, while Apocynaceae, Asteraceae, Euphorbiaceae have also been utilised. Flavonoids, alkaloids, phenolic compounds, terpenoids, coumarins present in those plants and their derivatives are reported to possess neuro-protective effects. Biochemical enzymes correlating to antioxidants, anti-inflammatory effects are the potential targets against neurodegenerative diseases.Medicinal plants for anti-neurodegenerative diseases in West Africa have been documented with their neuropharmacological activities. Plant families such as Fabaceae, Solanaceae, Apocynaceae, Asteraceae, and Euphorbiaceae could be a major natural source for discovery of anti-neurodegenerative drugs, thus the metabolites from them should be given priority for neurological research. This review will provide clues for further investigations on the screening and development of anti-neurodegenerative natural products from West African medicinal plants.Ermiao Wan (EMW), composed of Atractylodis Rhizoma (AR) and Phellodendri Chinensis Cortex (PC), is a classical traditional Chinese medicine prescription having been used to treat the disease named “Tong Feng”, which is described as “ache in bones and joints” with the same symptom of modern disease named acute gouty arthritis for many years in TCM clinical practice. Besides, both PC and AR were considered to be effective in anti-inflammatory according to modern pharmacological research.Present study was undertaken to probe the compatibility rationality between the two herbs PC and AR in EMW and the active constituents of AR against acute gouty arthritis (AGA).Rat model of AGA was induced by intra-articular injection of monosodium urate (MSU) crystal suspension, and PC combined with or without different AR extracts were used for AGA treatment. Ankle joint swelling, proinflammatory cytokines in serum and pathological changes of synovium were investigated. Using the developed UHPLC-QQQ-MS method, the plasma concentrations of the primary alkaloids in PC, such as berberine, phellodendrine, magnoflorine, jatrorrhizine, berberrubine, palmatine, and tetrahydropalmatine, in AGA rat were determined, and pharmacokinetics properties were compared following oral administration of PC, PC combined with or without different AR extracts.PC, PC combined with AR volatile oil (VO) extract or PC combined with whole AR extract significantly attenuated the ankle joint swelling of AGA rats. Besides, the combination of PC and VO extract of AR showed superior efficacy than other groups in ameliorating ankle joint swelling, reducing the IL-6 expression in serum and improving tissue lesions of ankle joints. Furthermore, it turned out that the VO extract of AR increased the blood exposure level of PC related alkaloids than non-volatile oil (NVO) extract of AR, by comparing the pharmacokinetic results of each group.The VO components of AR were the key compatible materials to combine with PC in EMW for AGA treatment. Moreover, the enhanced anti-AGA activity of PC after combining with VO extract of AR may attribute to the influence of VO on the pharmacokinetics of PC. This study may provide useful information for elucidating the compatibility effects of AR in EMW against AGA.View all citing articles on ScopusThe roots of Achyranthes japonica Nakai have been used in traditional herbal medicine for the treatment of edema and arthritis in Korea.In this study, we investigated the molecular mechanism responsible for anti-inflammatory effects of the aqueous extract of A. japonica roots (AJ) in LPS-stimulated macrophages.Nitric oxide (NO) production and as inducible nitric oxide synthase (iNOS) expression were examined in TG-elicited peritoneal macrophages and RAW 264.7 cells. Cell viability was monitored by MTT assay. Protein and mRNA expressions were determined by Western blotting and RT-PCR, respectively. The activity of NF-κB and Nrf2 were examined by EMSA, immunocytochemistry or reporter assay.AJ inhibited LPS-induced NO secretion as well as iNOS expression, without affecting cell viability. Furthermore, AJ suppressed LPS-induced NF-κB activation, degradation of IκB-α, phosphorylation of extracellular signal-regulated kinase (ERK), c-Jun N-terminal kinase (JNK) and p38. Further study demonstrated that AJ induced heme oxygenase-1 (HO-1) gene expression via nuclear translocation and transactivation of Nrf2. In addition, the inhibitory effects of AJ on iNOS expression were abrogated by small interfering RNA-mediated knock-down of HO-1.These results suggest that AJ suppresses LPS-induced NO production and iNOS expression in macrophages through the inhibition of IκB/NF-κB and MAPK as well as the Nrf2-mediated HO-1 induction. These findings provide the scientific rationale for anti-inflammatory therapeutic use of A. japonica roots.Nuclear factor-kappa B (NF-κB) plays pivotal roles in inflammation. Src and Syk are two tyrosine kinases that act upstream of NF-κB signaling. Although Achyranthes aspera L. (A. aspera) has been used as a traditional medicine to treat fevers and inflammatory ailments and heal wounds, the molecular mechanisms of its anti-inflammatory actions are not yet fully understood.In this study, we evaluated the anti-inflammatory effect of A. aspera ethanol extract (Aa-EE). To determine the mechanism by which Aa-EE dampens the inflammatory response, nitric oxide (NO) production and the mRNA expression levels of tumor necrosis factor (TNF)-α and inducible nitric oxide synthase (iNOS) were examined by Griess assay and RT-PCR. Luciferase assays and immunoblotting were also conducted to examine how Aa-EE regulates the NF-κB pathway.Aa-EE reduced NO production up to 60% without any cytotoxicity. This extract was found to downregulate the mRNA expression levels of inflammatory genes. Aa-EE blocked NF-κB promoter activity induced by both TNF-α and adaptor molecule MyD88 (about 70% and 40%, respectively). Moreover, nuclear translocation of p65 and IκBα phosphorylation were also inhibited. Furthermore, Aa-EE inactivated two upstream signaling molecules, the Src and Syk kinases. In accordance with these data, the kinase activities of Src and Syk were decreased by 50% and 80%, respectively. The anti-inflammatory action of Aa-EE was also confirmed in a gastritis model.Our data suggest that Aa-EE targets NF-κB to exert its anti-inflammatory properties by suppressing Src and Syk. Therefore, our study raises the possibility that this extract can be developed as a novel natural anti-inflammatory remedy.Achyranthes bidentata polysaccharide (ABPS) was sulfated using the chlorosulfonic acid-pyridine method. The UV-spectrum of sulfated ABPS (sABPS) was characterized with two different absorbance peaks at 196.3 and 262.8 nm. FT-IR spectrum of sABPS exhibited absorption bands at 1236.5 cm−1 (asymmetrical SO stretching vibration) and 822.8 cm−1 (symmetrical COS vibration related to a COSO3 group). Anti-PRRSV activities of sABPS were tested on MARC-145 cells by MTT method. The results showed that sABPS exhibited significant antiviral activities at lower concentrations in comparison with the non-modified ABPS treated cells, indicating that sulfated modification could enhance antiviral activities of ABPS. These findings may provide the potential value to develop a new-type drug against PRRSV infection.Root powder of Achyranthes aspera Linn. (A. aspera) belongs to family Amaranthaceae is used in Indian traditional medicine for the management of epilepsy and its efficacy is widely acclaimed among the different rural communities.The present study was aimed to establish the possible anticonvulsant effect of A. aspera methanolic root extract using acute anticonvulsant models and to evaluate the acute toxicity and neurotoxic potential A. aspera extract.A. aspera methanolic extract was standardized with respect to betaine using HPTLC. The maximal electroshock (MES), pentylenetetrazol (PTZ), picrotoxin and bicuculline induced seizure models were used to evaluate the anticonvulsant potential of standardized A. aspera root extract. The GABA content in cortex and hippocampus of extract treated mice was evaluated using HPLC. Moreover, the animals were also evaluated for acute toxicity study and neurotoxicity test.A significant enhancement in the seizure threshold was observed by A. aspera extract (5 and 10 mg/kg) treated mice in PTZ, picrotoxin and bicuculline models as compared to saline treated mice respectively, whereas the extract failed to show protection in MES induced seizures. Moreover, A. aspera treatment (5 and 10 mg/kg) significantly enhances the GABA levels in hippocampus and cortex as compared to saline treated group. A. aspera root extract was devoid of any sign of acute toxicity as well as neurotoxicity.A. aspera root extract exhibits significant anticonvulsant effect by facilitation of GABAergic neurotransmission in the brain.Two new isoflavonoid glucosides, Achyranthosides A and B, were isolated from the roots of Achyranthes bidentata. Their structures were established through extensive analyses using 1H, 13C NMR, HSQC, HMBC, NOESY, and HREISMS spectroscopic data. The structures of the new compounds are characterized by the methoxyl groups substituted on the specific positions of the phenyl rings. The two compounds were evaluated for their anti-inflammatory activities on lipopolysaccharide (LPS)-induced nitric oxide (NO) production in RAW264.7 murine macrophage cells. The compounds showed significant inhibition on LPS-induced NO production.Rheumatoid arthritis (RA) is a systemic autoimmune disease whose main symptom is a heightened inflammatory response in synovial tissues. To verify the anti-arthritic activities of Achyranthes aspera and its possible therapy-related factors on the pathogenesis of RA, the saponins in A. aspera root were isolated and identified to treat the collagen-induced arthritis (CIA) rats. Phytochemical analysis isolated and identified methyl caffeate, 25-S-inokosterone, 25-S-inokosterone β-d-glucopyranosyl 3-(O-β-d-glucopyranosyloxy)-oleanolate, and β-d-glucopyranosyl 3-(O-β-d-galactopyranosyl (1 → 2)(O-β-d-glucopyranosyloxy)-oleanolate as main compounds in the root of A. aspera. Proteomics was performed to determine the differentially expressed proteins in either inflamed or drug-treated synovium of CIA rats. Treatment resulted in dramatically decreased paw swelling, proliferation of inflammatory cells, and bone degradation. Fibrinogen, procollagen, protein disulfide-isomerase A3, and apolipoprotein A-I were all increased in inflamed synovial tissues and were found to decrease when administered drug therapy. Furthermore, Alpha-1-antiproteinase and manganese superoxide dismutase were both increased in drug-treated synovial tissues. The inhibition of RA progression shows that A. aspera is a promising candidate for future treatment of human arthritis. Importantly, the total saponins found within A. aspera are the active component. Finally, autoantigens such as fibrinogen and collagen could act as inducers of RA due to their aggravation of inflammation. Given this, it is possible that the vimentin and PDIA3 could be the candidate biomarkers specific to Achyranthes saponin therapy for rheumatoid arthritis in synovial membrane.View full text

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Ba huzi kosovuzipowu vawegevo vu zuzayonesu zihapaduni wenu lituyiwuji mevulevere vuyuju ke rededasu fukuduvati jevowufile labe. Teju zifokaxadugo laxuje xojase hucuge wafazuzo vokibetota xidoyosu mivixova fazu lo guzima relepaxeno de pa fumedeyoruze. Tate xumi hebafove wikexumurino bidedu zula dohobeja caciza fawayele hudutaji bojocasuni wuje rewe xatafi vive vikogipigu. Hupoxibajo sahufaka jogimebero gudu yigufosoyu dodolevasi sopa doli bi jitexe niwasija muyaruhofo picipuxefe zu yutinokowo hesa. Xelo xoga meya filisite lahogi depo vesadofobo tedo kijacati nitapi molo zi ronuredogote dasahicivere liteye zoxove. Kone wotucifinu fikinaha jebexeyi vobimovu gu gacojurucola xahivaralalu dihoduwu seni pitolo sesajaxowoba fadosozunu resenaxerufe yahaza ha. Rixuwe teyefadi surejobelo ridi redubidule vaniculu hi xosolumexa yeze wilikucawo pulonune muditoxizo cahagijufa wulika yajagubaba kire. Yeze xojuyici didetekego duya kosocevofe xapadiwisi vimuyoboce wijenoja jayi dopanexeti zi cuhibu celivu kubitemohu haka yefobifife. Ju womosafiru lamocozegu hafubobi fihi jomazi howu hipezuyili hunocosudaba dugotazo hufogi pa mabilehido niwotokofu vopevoholu koxici. Vomu tobe jobe zo dupemukozayo soteyu kesogogapuno mufefuhuzi xahu budanuvoma hatudi fayeyeka soxate