Ethnobotanical Study of Medicinal Plants on Arthritis Used by Chaoshan in Guangdong, China

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Abstract

Ethnopharmacological relevance: An ethnobotanical survey was conducted to collect information of medicinal plants on Arthritis relating to anti-inflammatory and Analgesia effect by Chaoshan-Shantou People living in Guangdong.

Aim of the study: This investigation was to document valuable knowledge represented as Chaoshan herbal medicine.

Materials and methods: Information was obtained from interviews and by reviewing studies of Chaoshan and Cantonese reported in the literature.

Results: Our data covered 86 species belonging to 82 genera in 52 families. In the search of the PubMed database, there are 28 herbs that have been studied, which have the most anti-inflammatory effects of the herb, followed by analgesia.

Conclusions: Due to the rapid disappearance of urbanization and industrialization of traditional culture and natural resources, indicating that the recorded information may be lost forever. Therefore, there is an urgent need to record the value of Chaoshan medicinal knowledge and encourage the transfer to the next generation.

Keywords: Chaoshan herbal medicine; Arthritis; Anti-inflammation; Analgesia

Introduction

The chronic and acute inflammation can lead to serious organs and tissues damage. Arthritis refers to occur in the human body joint and surrounding tissue inflammatory diseases, points to dozens. There are more than 100 million Chinese patients with arthritis and increasing in number. Its clinical manifestations are red, swollen, hot, painful, functional disability and joint deformities, which lead to joint disability, affecting the quality of life of patients. The etiology of arthritis is complex, mainly related to inflammation, autoimmune reaction, infection, metabolic disorders, trauma, degenerative diseases and so on. According to the pathogenesis and clinical manifestations, arthritis can be divided into rheumatoid arthritis, rheumatoid arthritis, osteoarthritis, gout arthritis and ankylosing spondylitis, etc.

Non-steroidal anti-inflammatory drugs (non-steroidal anti-inflammatory drugs) are the most commonly used drugs for the treatment of pain caused by inflammatory and degenerative diseases, including reactive arthritis [1-4]. The main mechanism is considered to be the two isoforms of epoxy synthase blockade, namely COX-1 and COX-2.

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COX-2 expression, resulting in a decrease of prostaglandin synthesis. In fact, the therapeutic effect of non-steroidal anti-inflammatory drugs is due to its inhibition of the COX-2 isomerase, in inflamed tissue inducing capacity, and some of the most common side effects of their is, generally with homeostasis and inhibition of COX-1 isomerase.

Similarly, tumour necrosis factor alpha (TNF-alpha) in the pathogenesis of rheumatoid arthritis (RA) plays a core role, because it is in arthritis inflammatory and destructive processes vertices. Using anti TNF alpha blocking clinical trials showed, TNF regulation of inflammatory cytokine and chemokines, adhesion molecule expression, resulting in joint leukocyte migration, matrix metalloproteinases (MMPs), and joint destruction, and vascular endothelial growth factor (VEGF) and angiogenesis [5-9]. TNF-alpha gene expression in complex control, and p38 mitogen activated protein kinase pathway controlling translation possible actions on the 3-untranslatedregion [10], and with the 5-untranslated/promoter region contains multiple transcription factor binding sites, including nuclear factor B (NF-xB) and activator protein-1 and nuclear factor of interleukin IL - 6 (IL-6) gene, and activation of T cells [11-13]. NF-xB has recently attracted particular attention because of its ability to regulate macrophage

TNFa production induced in response to lipopolysaccharide (LPS), ultraviolet light, phosphol myristateacetate, or contact with cytokine-activated T cells [14,15].

Chaoshan area is located in the eastern part of Guangdong Province. Complex geographical factors as well as mountains, sea, plain both superior natural conditions, making medicinal plant resources in the eastern region is very rich. Most of them are used based as anti-inflammatory and analgesia herbs. There is an urgent need to record the value of Chaoshan medicinal on anti-inflammation a

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Materials and Methods

Study area

Chaoshan area is located in the eastern part of Guangdong Province, is located approximately east longitude 114’53 – 117’16’, north latitude 22’31’ – 24’15’, The Tropic of cancer through this place. The central region including Shantou, Chaoshou, Jieyang, Shanwei City, a total area of 157720 square kilometers. At the junction of the northeast and Fujian Province, the northwest bordering near Xinghai area, southeast region near the South China Sea. The northeast, northwest mountains, a natural barrier between regions, the main peak of Lantau Peak Phoenix bird bun 1498 meters above sea level, the highest peak in the territory, while the southeast coast is flat, rivers of Chaoshan Plain, west coast is a multistage platform. The climate in this region is a subtropical climate throughout the year, affected by the monsoon, but the coastal and inland areas are slightly different, plenty of sunshine, the annual average temperature is 21 to 22 degrees Celsius, rainfall, the average annual rainfall is 1300 to 2200 mm, relative humidity above 80% soil. Complex and varied types of soil, lateritic red soil, followed by yellow soil, red soil, alluvial, paddy soil, saline soil. Complex geographical factors as well as mountains, sea, plain both superior natural conditions, making plant resources in the eastern region is very rich. According to preliminary statistics there are medicinal plants 228 families, 903 genera, 1599, 73 variants [16].

Ethnobotanical survey

For this study, ethnopharmacologists, pharmacognosists and botanists, translators with medicinal background from the Shantou University Medical college and local people with medicinal background. Information was obtained from interviews and by reviewing studies of Chaoshan and Cantonese reported in the PubMed.

Results

Ethnobotanical survey

Through the investigation, we have found a total of 86 herbs, including 52 families and 82 genera (Table 1). Details of relative number of species per family as medicinal herbs in Chaoshan area are showed in Figure 1. Among Leguminosae accounted for 11, Compositae accounted for 5 and so on. The folk prescription aggregated into the editor, and the Chinese herbal medicine compilation and Chinese Pharmacopoeia contrast found Wikstroemia indica (Linn.) C. A. Mey, Ampelopsis brevipedunculata (Maxim.) Trautv., Bombax malabarica L. and other herbs to the methods used in the treatment of arthritis in both of the books were no record or record dosage and extraction methods are different. Of the 86 plants recorded, for most (37 species)
Use part

Figure 2: Form in which Chao Shan medicinal herbs are used.

The pharmacological effects of herbal medicine reported in the PubMed

Through in PubMed database search we investigate to the herbs in the treatment of arthritis of the research, we found 28 kinds of Chinese herbal medicine has done related pharmacological research. Among them, there are anti-inflammatory effects of 28 species, analgesia, and ease the pain of a total of eight kinds of, and antibacterial, immune regulation and anti-hyperuricemia.

Anti-inflammatory effect

Narendhirakannan found that gynandra L. 150 mg kg / Cleome leaves methanol extract has significant anti-inflammatory activity in adjuvant arthritis rats [17-19] (Table 2). Yang caught sight of the ethanol and ethyl acetate extracts from Radix Toddaliae Asiatica subfraction 4 (SCF4) (Lour.) Skeels (Rutaceae) significantly reduced claus and joint swelling and spleen index is reduced, and reducing cytokines such as TNF-alpha, the concentration of IL-1, IL-6, and cytokines such as IL-10 was significantly higher than that of control group [61]. Matsui compounds of lansamide I, lansiumamide B, and SB-204900 from Clausing lansium (Lour.) Skeels (Rutaceae) markedly decreased histamine release. In addition, lansiumamide B- and SB-204900-treated cells also reduced the protein and/or mRNA levels of TNF-α. The phosphorylation of p38 MAPK was markedly suppressed by SB-204900 [32]. Rodanant was found to be highly effective in the suppression of nitric oxide synthase (iNOS) and TNF-a in LPS-induced RAW 264.7 cells, but did not affect interleukin-6 (IL-6) release or its mRNA expression. It seems related to its up-regulation of the phosphorylation of p65, extracellular signal-regulated kinases 1/2 (ERK1/2) and c-Jun N-terminal kinase (JNK) [55]. Patel found the ethyl acetate (EtOAc) extract of Cassia occidentalis L. (roots) (IC₅₀=21.3 to 43.1 micro g/ mL) and Mimosa pudica (whole plant) (IC₅₀=31.7 to 47.2 micro g/mL) and the dichloromethane (DCM) extract of Leucas cephalototes (whole plant) (IC₅₀=46.8 to 49.3 micro g/mL) exhibited significant anti-inflammatory activity by in vitro inhibition of the production of TNF-alpha, IL-1beta and NO in LPS stimulated RAW 264.7 cells. Furthermore, the five compounds isolated from the ethyl acetate extract of Cassia occidentalis roots were found to suppress LPS-induced IL-1beta, TNF-alpha and NO production in a concentration-dependent manner in these cells at IC₅₀ values ranging from 22.5 to 97.4 micro M. Emodin and chrysophanol were also found active in inhibiting pro-inflammatory cytokines in vivo [56]. Saleem found both aqueous and alcoholic extracts of the leaves Gendarussa vulgaris (G. vulgaris) Nees. showed significant anti-inflammatory property in vivo method that was estimated by human red blood cell membrane stabilisation (HRBC) method and in vivo method was estimated on the carrageenan induced paw oedema. And alcoholic extract at a concentration of 300 mg/mL showed potent activity on comparing with the standard drug diclofenac sodium [57].

Chen’s results showed that the ethanol extract of S. octophylla has significant dose-dependent anti-inflammatory and anti-oxidative activities. And its five different polar fractions especially the CHCl₃ fraction significantly inhibited the abdominal writhing induced by acetic acid and ear edema induced by xylene, also increased pain threshold in hot plate test in 120 min and reduced ticking times in formalin test. The ethanol extract of S. octophylla and the CHCl₃ fraction demonstrated an anti-RA effect in a dose-dependent manner. The levels of TNF-a, IL-1β and IL-6 in ethanol extract (600 mg/kg) and CHCl₃ fraction (300 mg/kg) groups were significantly lower than those of the model group [58]. Yang had isolated Nine new with anolides from the leaves of Datura metel L. All isolates were evaluated for in vitro anti-inflammatory potential using LPS-stimulated RAW 264.7 murine macrophages. Among them, compounds daturafolosides A, daturafolosides B, baimantouluoside B, 12-deoxyxyparamonolide exhibited significant inhibition of nitrite production. Compounds daturafolosides C, daturafolosides D, daturafolosides F, and daturafolosides...
| NO. | Latin name                        | Family        | Local name            | Part use                | From of administration       | Medicinal use                              |
|-----|----------------------------------|---------------|-----------------------|-------------------------|----------------------------|--------------------------------------------|
| 1   | Alangium chinense (Lour.) Rehd   | Acanthaceae   | Ba jiao feng          | Root, Leaf, Flower      | Vinum, Soup                 | RA, traumatic injury                       |
| 2   | Murraya paniculata (L.) Jack    | Rutaceae      | Jiuxiang              | Root, Leaf              | Vinum, Soup                 | Traumatic injury, RA, localized anesthesia |
| 3   | Wikstroemia indica (Linn.) C. A. Mey | Thymelaeaceae | Liao ge wang          | Root, Leaf              | Soup, Compress              | RA, Traumatic injury, Injury bleeding      |
| 4   | Killyinga brevifolia Rottb       | Cyperaceae    | San jia cao           | Whole plant             | Vinum, Decoction            | RA, Traumatic injury                       |
| 5   | Smilax glabra Roxb               | Liliaceae     | Tu fu ling            | Root, Stem              | Soup                        | RA                                         |
| 6   | Ampelopsis brevipedunculata (Maxim.) Trauv. | Vitaceae | Da hao shan pu tao    | Root, Stem, Leaf        | Decoction                   | RA, Traumatic injury                       |
| 7   | Waltheria americana L.           | Sterculiaceae | He ta cao             | Root, Whole plant       | Decoction                   | Relieve pain and inflammation              |
| 8   | Toddalia asiatica (L.) Lam.      | Rutaceae      | Fei long zhang xue    | Root, Leaf              | Vinum, Decoction            | RA, Traumatic injury                       |
| 9   | Ipomoea pescaperae (L.) Sweet.   | Convolvulaceae | Ma an teng            | Whole plant             | Vinum, Decoction, Soup      | Rheumatic pain, Knee joint pain            |
| 10  | Bombax malabarica L.             | Bombacaceae   | Mu mian               | Root, Stem, Bark        | Decoction, Vinum            | Traumatic injury                           |
| 11  | Ficus simplicissima Lour.        | Moraceae      | Wu zhi mao tao        | Root, Stem              | Decoction                   | RA, Traumatic injury                       |
| 12  | Impatiens balsamina L.           | Balsaminaceae | Feng xian hua         | Flower                  | Decoction drink by liquor   | RA                                         |
| 13  | Gendarussa vulgaris Nees.        | Acanthaceae   | Wu gu huang teng      | Whole plant             | Decoction                   | Fracture, Sprain and contusion, RA         |
| 14  | Ficus pandurata Hance.           | Moraceae      | Niu ni shu            | Root, Leaf              | Decoction drink by liquor   | RA, Traumatic injury                       |
| 15  | Adenosma glutinosum (L.) Druce   | Scrophulariaceae | Mao she               | Whole plant             | Decoction, compress        | RA, Traumatic injury                       |
| 16  | Callicarpa lourei Hook. et Arn   | Verbenaceae   | Chang ye zi zhu cao   | Root, Stem              | Decoction                   | RA, Traumatic injury                       |
| 17  | Sauures chinensis (Lour.) Bai    | Sauuraceae    | Shui lao               | Root, Stem              | Decoction                   | Diuretic swelling                         |
| 18  | Lysimachia fortunei Maxim.       | Primulaceae   | Shui pu yin           | Whole plant             | Decoction                   | RA, Traumatic injury                       |
| 19  | Pholidota chinensis Lindl        | Orchidaceae   | Shi xian tao           | Bulb                    | Soup                        | RA                                         |
| 20  | Humata tyermani S. Moore.        | Davalliaceae  | Shi qiu yin           | Rhizome                 | Decoction                   | RA, Urticaria                              |
| 21  | Lycoris radiate (L.) Herit. Herb | Amaryllidaceae | Shi suan               | Bulb                    | Compress                    | RA                                         |
| 22  | Phymatopsis hastata (thunb.) Kitag | Polypodiaceae | Long she hao           | Whole plant             | Vinum                       | Osteomyelitis                              |
| 23  | Clerodendron japonicum (Thunb.)  | Verbenaceae   | Long chuang hua       | Root, Leaf              | Hot compress                | RA, Lumbar muscle strain, Traumatic injury |
| 24  | Selaginella uncinata (Desv.)     | Selaginellaceae | Long ling cao         | Whole plant             | Vinum                       | RA, Traumatic injury                       |
| 25  | Bidens pilosa L.                 | Compositae    | Si fang ku gu jing    | Whole plant             | Soup                        | Antiinflammatory, Antiinflammatory         |
| 26  | Chloranthus henryi Hemsii        | Chloranthaceae | Si kuai wa             | Root, Whole plant       | Decoction                   | RA, Traumatic injury                       |
| 27  | Siegesbeckia glabrescens Makino. | Compositae    | Mu jing cao            | Whole plant             | Decoction                   | RA, Limbs anestheisa                      |
| 28  | Cleome gynandra L.               | Capparidaceae | Bai hua chou cao      | Seed or Whole plant     | Compress                    | RA                                         |
| 29  | Acanthopanax trifoliatus (L.) Merr. | Araliaceae    | Bai le                | Root, Leaf              | Decoction                   | RA                                         |
| 30  | Pterospermum heterophyllum Hance | Sterculiaceae | Ban feng he            | Root stem               | Decoction, Vinum            | RA, Lumbar muscle strain traumatic injury, RA, Bronchitis |
| 31  | Eupatorium chinense L.           | Compositae    | Duo xu gong           | Root, Leaf              | Decoction, add salt         | RA, Bronchitis                              |
| 32  | Millettia dielsana Harms ex Diels | Leguminosae   | Xue feng gen           | Root rattan             | Decoction and vinum         | RA, Traumatic injury, Limbs anestheisa     |
| 33  | Inula capa DC.                   | Compositae    | Chong tian bai        | Root, Whole plant       | Soup                        | Rheumatism edema, Traumatic injury         |
| 34  | Artocarpus hypargyrae Hance      | Moraceae      | Hong sheng             | Root                    | Decoction or soak in Liquor | RA                                         |
| 35  | Ardisia gigantifoliae Stapf.     | Myrsinaceae   | Zou ma tai             | Root, Leaf, Whole plant | Decoction                   | RA, Traumatic injury                       |
| 36  | Cunninghamia lanceolata (Lamb.)  | Taxodiaceae   | Sang                   | Root, Bark, Fruit, Wood | Decoction                   | RA, Traumatic injury                       |
| 37  | Xanthium Sibircum Patr. Ex Widd. | Compositae    | Can ger zi             | Fruit, Whole plant      | Decoction                   | RA                                         |
| 38  | Mogmania philippinensis (Merr. et Rolfe) Li | Leguminosae | Ding di gen            | Root, Leaf              | Decoction                   | Lumbar muscle strain, Traumatic injury     |
| 39  | Ganoderma lucidum (Leyss. ex Fr.) Karst. | Polypoaceae   | Ling zhi               | Sporocarp               | Tincture                    | RA, Bronchitis                              |
| 40  | Rhynchosia volubilis Lour.       | Leguminosae   | Ji zai mu zhongen      | Whole plant             | Soup                        | RA, Llumbar muscle strain                  |
| 41  | Paederia scandens (Lour.) Merr.   | Rubiaceae     | Ji shi leng            | Whole plant             | Vinum                       | RA                                         |
| No. | Plant Name                          | Family         | Part(s) Used                      | Preparation Method         | Condition(s)                  |
|-----|-------------------------------------|----------------|-----------------------------------|----------------------------|------------------------------|
| 42  | Abrus cantoniensis Hance.           | Leguminosae    | Wild fruit, root                  | Decoction                  | RA                           |
| 43  | Achyranthes aspera L.              | Amaranthaceae  | Flower, root                      | Decoction and drink by Liquor | RA                           |
| 44  | Liquidambar formosana Hance        | Hamamelidaceae | Leaf, stem                        | Decoction                  | RA                           |
| 45  | Aralia chinensis L.                | Araliaceae     | Root                              | Decoction, soak in liquor   | RA, Traumatic injury         |
| 46  | Zanthoxylum aevicinna (Lam.)DC.     | Rutaceae       | Root, leaf                        | Decoction                  | RA, Traumatic injury         |
| 47  | Desmodium caudatum (Thumb.)DC.     | Leguminosina   | Root                              | Vinum                      | RA                           |
| 48  | Glecroma longituba(Nakai) Kupr.    | Labiateae      | Whole plant                       | Drink by liquor             | RA, Fracture                 |
| 49  | Rubus parvifolius L.               | Rosaceae       | Root, leaf                        | Alcohol extraction         | Antiinflammatory, Analgesic, Insecticide |
| 50  | Podocarpus macrophyllus (Thumb.) D. Don | Podocarpaceae | Wu hong plant                     | Fire with liquor Compress   | RA, Traumatic injury, Fracture |
| 51  | Salix babylonica L.                | Salicaceae     | Branch Root, Bark, Fibril         | Decoction                  | RA                           |
| 52  | Uarzia criniter Desv.              | Leguminosina   | Whole plant                       | Fumigant                   | Bronchitis, RA, Traumatic injury |
| 53  | Urena procumbens L.                | Malvaceae      | Whole plant                       | Soup                       | RA, Traumatic injury         |
| 54  | Solanum indicum L.                 | Solanaceae     | Root                              | Soup                       | RA, Traumatic injury         |
| 55  | Celastra orbiculatus Thunb.        | Celastraceae   | Root                              | Vinum                      | RA, Traumatic injury         |
| 56  | Oxalis cornillata L.               | Oxalidaceae    | Root                              | Vinum                      | Traumatic injury, RA         |
| 57  | Drynaria fortune (kunze)J.Smith     | Polyopodiacea  | Wu shi bu                         | Rhezome, Vinum, Decoction  | Traumatic injury, Fracture, RA |
| 58  | Cymbopogon citrates (DC.)Stapf.    | Gramineae      | Xiang mao                         | Whole plant, Compress      | Pain from rheumatism         |
| 59  | Datura metel L.                    | Solanaceae     | Yang jing hua, Flower, Leaf, Seed | Vinum, Soup                | Chronic bronchitis, RA       |
| 60  | Schefflera octophylla (Lour.) Harms | Araliaceae     | Ya jao mu                         | Bark,Leaf,Root             | VINUM, RA, Sciatica, Traumatic injury |
| 61  | Milletia speciosa champ.           | Leguminosina   | Dao diao jin zhong               | Root, Decoction            | RA, Lumbar muscle strain, Chronic bronchitis, Traumatic injury |
| 62  | Clerodendrum fragrans Vent.        | Verbenaceae    | Leaf, Root                        | Soup, Decoction            | RA, Sprain and Contusion     |
| 63  | Cassis mordedokes Planch var. subintegra Gagnep. | Vitaceae     | Feng teng tou                     | Root, Decoction, Compress  | RA, Lumbar muscle strain     |
| 64  | Morus alba L.                      | Moraceae       | Sang bai pi                       | Branch                     | Rheumatism edema, Joint pain |
| 65  | Clausena iawsian (Lour.) Skeels.   | Rutaceae       | Huang shu pi                      | Root, Decoction            | Root treat rheumatic arthritis, |
| 66  | Gymnema sylvestre(Reitz.) schult.  | Asclepiadaceae | Gua xue zai leng                  | Stem, Leaf, Root           | RA, Traumatic injury         |
| 67  | Desmodium pulchellum(L.) Benth.    | Leguminosina   | Pai qian cao                      | Whole plant                | RA                           |
| 68  | Hedera nepalensis K.Koch var.      | Araliaceae     | Chang chun teng                    | stem, Whole plant          | Fumigant and washing         |
| 69  | Pratia nummularia A. Brown. et Aschers. | Campanulaceae | Tong cu yi dai cao                | Whole plant, Decoction     | RA, Traumatic injury         |
| 70  | Ranunculus sceleratus L.           | Ranunculaceae  | Jia qin cai                        | Whole plant                | RA                           |
| 71  | Desmos chinensis Lour.             | Annonacae      | Jia yin zhua                      | Root, Whole plant          | RA, Traumatic injury         |
| 72  | Stephania longa Lour.              | Menispermacae  | Li bi teng                        | Whole plant, Decoction     | RA, Sciatica                |
| 73  | Cassia occidentalis L.             | Leguminosina   | Wang jiang nan                    | Whole plant                | RA, Traumatic injury         |
| 74  | Lycopodium cemum L.               | Lycopodiaceae  | Lu jiao mao                       | Whole plant                | RA, Traumatic injury         |
| 75  | Desmodium triquetrum(L.) DC.       | Leguminosina   | Hu lu cha                         | Whole plant                | Decoction                   |
| 76  | Melastoma candidum D.Don.          | Melastomatetaceae | Yin zhi pu bi                   | Root, Leaf, Decoction       | Migraine, RA, Traumatic injury |
| 77  | Caesalpinia minax Hance            | Leguminosina   | La ba ci                          | Root, Stem, Leaf, Decoction| RA, Traumatic injury fracture |
| 78  | Cocculus sarmentosus (Lour.) Diels | Menispermacae  | Yi dou jin                        | Root, Decoction            | RA, Sciatica                |
| 79  | Pistia stratiotes L.               | Araceae        | Fan pin                           | Leaf, Decoction            | Rheumatism Edema, RA         |
| 80  | Mirabilis jalapa L.                | Nyctaginaceae  | Gu shou hua gen                   | Root, Leaf, Decoction      | Acute arthritis             |
| 81  | Basella rubra L.                   | Basellaceae    | Pu ten gcai                       | Whole plant                | RA, Fracture, Traumatic injury |
| 82  | Berchemia lineata DC.              | Rhamnaceae     | Shu ru gen                        | Root, Decoction            | RA, Bronchitis, RA           |
| 83  | Smilax china L.                    | Liliaceae      | Hao ke ci                         | Rhizome, Vinum, Decoction  | RA, Traumatic injury, Cancer |
| 84  | Ficus microcarpa L. f.             | Moraceae       | Rong shu                          | Root, Aerial root, Soup, Sirup | RA, Bronchitis, RA           |
| 85  | Malvastrum coromandelianum (L.) Garcke | Malvaceae | Sai kui                           | Whole plant                | RA, Traumatic injury         |
| 86  | Cinnamonum partenexylon (Jack) Nees | Lauraceae      | Zhang shu                         | Root, Stem, Leaf, Bark     | Decoction                   |

Table 1: Medicinal plants used by Chaoshan.

Note: RA: Rheumatic Arthritis, Traumatic injury
B presented moderate inhibitory activities with values of IC₅₀ at 59.0, 52.8, 71.2, and 53.1 µM, while the rest compounds displayed weak suppressive effect. In addition, they found Compounds dmetelins A, dmetelins D, 7α,27-dihydroxy-1-oxo-witha-2,5,24-trienolide isolated from the leaves of Datura metel L. (Solanaceae) also showed significant inhibitory activities on lipopolysaccharide (LPS)-induced nitric oxide (NO) production in RAW264.7 cells, and compounds dmetelins B and dmetelins C showed moderate inhibitory activities with IC₅₀ values of 17.8, 11.6, 14.9, 33.3 and 28.6 µM, respectively.

### Analgesia

Kariuki HN’s experiment in 2013 showed, in the early phase of the formalin test, the 100 mg/kg dose showed no significant antinociceptive activity while the 200 mg/kg showed significant (p<0.01) antinociceptive activity. The 100 mg/kg dose showed highly significant antinociceptive activity (p<0.001) in the late phase of the formalin test while the 200 mg/kg dose showed no significant antinociceptive activity. A reduction in carragenin induced acute inflammation paw oedema was significant (p<0.01) following administration of 100 mg/kg dose but not with the 200 mg/kg dose. The study therefore lends support to the anecdotal evidence for use of *T. asiatica* in the management of painful and inflammatory conditions [23]. Oku H’s results showed 1,4-naphthoquinone sodium salts, sodium 3-hydroxide-2[(sodium-3-hydroxy-1,4-dioxo-2-naphthyl)ethyl]naphthalene-1,4-dione (impatienolate) and sodium 2-hydroxide-3-(2-hydroxyethyl)naphthalene-1,4-dione (balsamolinate) isolated from the corolla of Impatiens balsamina L exhibited Significant cyclooxygenase-2 (COX-2) inhibitory activities [24]. Muthuraman A’s study showed that rats administered the hydroalcoholic extract of *Acorus calamus* could increase the levels of superoxide anion, total calcium and myeloperoxidase activity significantly in chronic constriction injury of sciatic nerve induced thermal, radiant, mechanical hyperalgesia and thermal, chemical, tactile alldynia. Moreover, HAE-AC attenuated chronic constriction injury induced by development of painful behavioural, biochemical and histological changes in a dose dependent manner similar to that of pregabalin serving as positive control [64]. Khunakornvichaya A found oral administration of M. alba stem extract (56 and 560 mg/kg) significantly attenuated joint pain as indicated by a significant (p<0.05) increase in the values of percent weight borne on the operated hind limb for the OA-induced groups that received M. alba stem extract at 56 and 560 mg/kg when compared to those of the vehicle-treated OA-induced group. Moreover, a significant improvement in the Mankin score was also observed in rats treated with 560 mg/kg M. alba stem extract, which was in agreement with its pain-relieving effect. The results showed that M. alba stem extract exhibited an anti-nociceptive effect as well as cartilage protection in the ACLT-induced rat model of OA47. Ma KJ found oral administration of Desmodium caudatum (Thunb.) DC significantly and dose-dependently inhibited the writhing responses in mice, increased reaction time in mice in the hot-plate test. Furthermore, no death was observed when mice were orally administered DCE up to 40 g/kg [42]. Khedr AI did a molecule docking with compounds 3b-acetoxy-11amethoxy-olean-12-ene, ficupanduratin A, stigmastane-3,6-dione isolated from *Ficus pandurata* that exhibited good affinity towards the CB2 receptor, with displacement values of 69.7, 62.5 and 86.5%, respectively [44]. Chen’s results showed that the ethanol extract of *Schefflera octophylla* has significant dose-dependent antinociceptive activities. And its five different polar fractions especially the CHCl₃ fraction significantly inhibited the abdominal writhing induced by acetic acid and ear edema induced by xylene, also increased pain threshold in hot plate test in 120

### Table 2: The pharmacological effects of herbal medicine.

| Latin                    | Pharmacological Action                        | Reference       |
|--------------------------|----------------------------------------------|-----------------|
| Cleome gynandra L.       | Anti-inflammatory                             | [17-19]         |
| Pterospermum heterophyllum Hance. | Anti-inflammatory                        | [20]            |
| Eupatorium chinense L.   | Anti-inflammatory                             | [21]            |
| Toddalia asiatica (L.) Lam. | Anti-inflammatory, Analgesia, Anti-bacterial   | [22,23]         |
| Impatiens balsamina L.   | Antibacterial, Analgesia                      | [24]            |
| Mirabilis jalapa L.      | Antibacterial                                 | [25,26]         |
| Waltheria americana L.   | Analgesia                                     | [27]            |
| Smilax china L.          | Anti-inflammatory, Urictotelic, Analgesia      | [28-30]         |
| Clausena lancea (Lour.) Skeels. | Anti-inflammatory, Analgesia                | [31-33]         |
| Achyranthes aspera L.    | Immunomodulatory effects                      | [34]            |
| Abrus cantonensis Hance. | Immunomodulatory effects                      | [35]            |
| Ranunculus sceleratus L. | Anti-inflammatory                             | [36]            |
| Murraya paniculata(L.) Jack | Anti-bacterial, Anti-inflammatory              | [37]            |
| Caesalpinia minax Hance  | Anti-inflammatory                             | [38,39]         |
| Ganoderma lucidum (Leyss. ex Fr.) Karst. | Immunomodulatory effects | [40]            |
| Ipomoea pescaprae (L.) Sweet.     | Analgesic                                    | [41]            |
| Desmodium caudatum (Thunb.,DC.) | Anti-inflammatory, Analgesia             | [42]            |
| Celastrus orbiculatus Thunb.    | Anti-inflammatory                           | [43]            |
| Ficus pandurata Hance.    | Anti-inflammatory                             | [44]            |
| Basella rubra L.          | Immunomodulatory effects                      | [45]            |
| Morus alba L.             | Antibacterial, Immunomodulatory effects, Urictotelic | [46-48]        |
| Saururus chinensis (Lour.) Baill | Anti-inflammatory                           | [49-52]        |
| Bidens pilosa L.          | Anti-inflammatory, Antibacterial              | [53,54]         |
| Smilax glabra Roxb        | Anti-inflammatory                             | [55]            |
| Cassia occidentalis L.    | Anti-inflammatory                             | [56]            |
| Gendarussa vulgaris Nees. | Anti-inflammatory                             | [57]            |
| Schefflera octophylla (Lour.) Harms | Analgesia, Anti-inflammatory             | [58]            |
| Datura metel L.           | Anti-inflammatory, Antifungal                | [59,60]         |
min and reduced ticking times in formalin test [58]. The antiinflammatory effects of the methanolic extract and two fractions obtained from aerial parts of *Ipomoea pes-caprae* (L.) Sweet. exhibited considerable antinociceptive activity against two classical models of pain in mice. Methanolic extract presented a calculated ID₅₀ value of 33.8 mg/kg, i.p. against writhing test and also inhibited both phases of pain (neurogenic and inflammatory) of the formalin test with ID₅₀ of 37.7 and 12.5 mg/kg, i.p. for the first and second phase, respectively [41].

**Uricotelic**

Chen studies showed that ethyl acetate fraction from *Smilax china* L. showed a significant anti-hyperuricemic activity in hyperuricemic mice compared with petroleum ether, chloroform, n-butanol and residual ethanol fraction fractions. Caffeic acid, resveratrol, rutin and oxyresveratrol isolated from EAF showed different inhibitory activities on xanthine oxidase in *vitro*, with the IC₅₀ values of 42.60, 37.53, 42.20 and 40.69 µM, respectively, and exhibited competitive or mixed inhibitory actions [28]. Different dosages of astilbin which isolated from the rhizome of *Smilax china* L. (1.25, 2.5, and 5.0 mg/kg) were administered to 10% fructose-induced hyperuricemic rats. In Chen studies, the results demonstrated that astilbin significantly decreased the serum uric acid (Sur) level by increasing the urinary uric acid (Uur) level and fractional excretion of urate (FEUA) but not inhibiting the xanthine oxidase (XOD) activity [65]. The effective substance of *Morus alba* L. could promote the excretion of uric acid through different mechanisms in rats and mice, reduce the concentration of uric acid in the body [66,67].

**Immunomodulatory effects**

Narayan found that PCA feed urethane primed lung tissues showed down regulated expression of pro-inflammatory cytokines IL-1, IL-6 and TNF-α along with TGF, NF-kB and Stat3 while the expression of pro-apoptotic proteins Bax and p53 were enhanced in PCA feed urethane primed lung tissues [34]. In Rubel R’s test *G. lucidum* was able to increase interferon-gamma (IFN-gamma) concentration but reduced CD3(+) and CD8(+) spleen lymphocytes. *In vivo*. Ex-*vivo*. IFN-gamma; and interleukin-10 levels were increased and the tumour necrosis factor-alpha (TNF-alpha) level was reduced by peritoneal macrophages from mice fed with *G. lucidum* [40]. An extract from *Basella rubra* (B. rubra) L polysaccharide in -BRP-4, can generate NO at a concentration of 10 to 100 g/mL. The phagocytic activity of macrophage was enhanced in BRP-4 treated RAW264.7 cells. BRP-4 combined with concanavalin A (Con A) provided obvious promotion and strengthening of the proliferation of the splenocytes [45]. *M. alba* L. fruit extract could stimulated the production of cytokines, nitric oxide (NO) and tumour necrosis factor-α (TNF-α) and tumoricidal properties of macrophages. MFE activated macrophages through the mitogen-activated protein kinase (MAP Kinase) and nuclear factor-kB (NF-kB) signaling pathways downstream of toll-like receptor (TLR) 4. MFE was shown to exhibit cytotoxicity of CT26 cells via the activated macrophages, even though MFE did not directly affect CT26 cells. In a xenograft mouse model, MFE significantly enhanced anti-cancer activity combined with 5-fluorouracil and markedly promoted splenocyte proliferation, natural killer (NK) cell activity, cytotoxic T lymphocyte (CTL) activity and IFN-γ production. Immunoglobulin G (IgG) antibody levels were significantly increased [46].

**Discussion and Conclusion**

The present investigation revealed that Chaoshan in Guangdong are using 86 plant species belonging to 82 genera in 52 families for arthritis. Most species are collected locally. In previous Chaoshan Chinese herbal medicine culture inheritance is survive on “father son” mode of inheritance. However, with the advance of the process of urbanization in the Chaoshan area, many of the older generation Chaoshan herbalist facing no successor predicament, because a new generation of Chaoshan young people unwilling to engage in grass pharmacists job. Also, the fast disappearance of traditional culture and natural resources due to urbanization and industrialization suggests that unrecorded information may be lost forever. Thus, We urgently need document systematically the medical knowledge of Chaoshan.

In relation to plant use, 72 species of the plants recorded in this study were found to be used for treating rheumatic arthritis, part of them used for analgesia, anti-inflammatory. Through the analysis of the results of a search of PubMed database we obtain, reported in the literature of Chinese herbal medicine, more than half have anti-inflammatory effect and analgesic effect of the herbs in the quantity ranks the second. And the clinical treatment of arthritis the method is by non-steroidal anti-inflammatory drugs to relieve inflammation and pain of patients.

In search of the 86 Chaoshan herbs, there are 28 herbs pharmacological studies on treatment of arthritis, indicating that there are still many Chaoshan herbal undetected and research. Chaoshan area is located along the coast, because of climate and diet, the natives are more likely to suffer from arthritis, rheumatoid arthritis. In the struggle to perennial and arthritis, this kind of disease, the Chaoshan area of the ancestors left a number of therapeutic arthritis remedies and herbal knowledge. Through to these knowledges were classified and unified will of Chaoshan area of herbal medicine culture inheritance and development of therapeutic arthritis drugs have very good help.

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