Database Survey of Anti-Inflammatory Plants in South America: A Review

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Abstract: Inflammation is a complex event linked to tissue damage whether by bacteria, physical trauma, chemical, heat or any other phenomenon. This physiological response is coordinated largely by a variety of chemical mediators that are released from the epithelium, the immunocytes and nerves of the lamina propria. However, if the factor that triggers the inflammation persists, the inflammation can become relentless, leading to an intensification of the lesion. The present work is a literature survey of plant extracts from the South American continent that have been reported to show anti-inflammatory activity. This review refers to 63 bacterial families of which the following stood out: Asteraceae, Fabaceae, Euphorbiaceae, Apocynaceae and Celastraceae, with their countries, parts used, types of extract used, model bioassays, organisms tested and their activity.

Keywords: anti-inflammatory activity; leukocytes; medicinal plants; natural products; South American; review
1. Introduction

Inflammation is the response of body to injury and danger. It is the central communication network and regulatory process that senses and controls threat, damage, containment, and healing, which are all critical aspects in the maintenance of the integrity of an organism [1].

This process occurs as a defensive response, which induces profound physiological adaptions triggered in an attempt to limit tissue damage and remove the pathogenic insult. Such mechanisms involve a complex series of events including dilatation of arterioles, venules and capillaries with increased vascular permeability, exudation of fluids, including plasma proteins, and leukocyte migration into the inflammatory area [2].

In response to injury or infection, the specialized cells of the first line, leukocytes (neutrophils and eosinophils polymorphonuclear-PMNs) migrate to the damaged regions with the aim of neutralizing and eliminating these harmful stimuli [3]. The mechanism of inflammation is attributed, in part, to release of reactive oxygen species (ROS) from activated neutrophils and macrophages [4]. ROS propagate inflammation by stimulating release of cytokines, such as interleukin-1, tumor necrosis factor-α, and interferon-γ, which stimulate recruitment of additional neutrophils and macrophages. Thus free radicals are important mediators that provoke or sustain inflammatory processes and, consequently, their neutralization by antioxidants and radical scavengers can attenuate inflammation [5,6].

A complex network of mediators, including cytokines and lipids, produced by endothelial cells, epithelial cells and tissue infiltrating leukocytes, characterizes the early phases of inflammation [7].

The clinical features of inflammation were described some 2000 years ago listed as the cardinal signs of inflammation: rubor (redness), tumor (swelling), heat (hyperthermia) and pain [8].

The combined action of the molecules attracts and activates leukocytes to the reactive site, promotes angiogenesis and tissue remodeling [7]. If this sequence of steps is rigorously followed, the acute inflammation will resolve without causing excessive damage to tissue, returning to homeostasis [3].

However, there are several clinical conditions where inflammation becomes chronic with excessive production of macrophage-derived mediators may lead to collateral damage to normal cells, which results in diseases, including atherosclerosis, bowel disease, rheumatoid arthritis glomerulonephritis, and septic shock [9].

Therefore, the classical anti-inflammatory agents glucocorticoids and non-steroidal anti-inflammatory drugs (NSAIDs) can only alleviate symptoms without, however, altering the course of the disease [3].

The current anti-inflammatory therapy aims to control the cardinal signs of inflammation, antagonizing or blocking key pro-inflammatory mediators that are released at the beginning of an acute inflammatory response [3]. NSAIDs typically relieve inflammation and associated pain by inhibiting cyclooxygenase enzymes involved in the production of prostaglandins. These enzymes exist in two isoforms (COX-1 and COX-2) coded by distinct genes on different chromosomes [10]. Compounds that inhibit COX enzymes could therefore be considered to be potential anti-inflammatory drugs. However, many of the commonly used anti-inflammatory agents are becoming less acceptable due to serious adverse reactions such as gastric intolerance, bone marrow depression and water and salt retention, resulting from prolonged use [11].

Within this context, it is of fundamental importance to search for substances that can promote the resolution of inflammation, thus, homeostatic and modulatory, efficient and tolerated by the body [3].
Plants are an important source of biologically active natural products and are considered a promising avenue for the discovery of new drugs due to easy access and relatively low cost, since they naturally grow in relative abundance [12,13]. The development of standardized herbal medicines with proven efficacy and safety of use is an important source for increasing the access of people to medicines and to offer new therapeutic options [14].

So, can cite examples of plants with scientifically proven anti-inflammatory activity: Annona muricata, Glycine max, Orthosiphon stamineus, Caulerpa racemosa and Oenothera speciosa used in folk medicine [15–19].

Therefore, extracts or isolated compounds from natural products seems to be a promising strategy for developing anti-inflammatory drugs in search of a better therapeutic and quality of life for the patient [20].

In the course of our continuing search for bioactive natural products from plants, we have published reviews of extracts and compounds derived from plants with the following potential activities: inhibitors of mammary, uterine cervical and ovarian neoplasia [21–23]; inhibitors of HMG CoA reductase, angiotensina-converting enzyme and the enzyme acetylcholinesterase [24–26]; with central analgesic activity [27]; employed in prevention of osteoporosis [28]; for the treatment of Parkinson’s disease [29]; anticonvulsant and anxiety disorders [30,31]; giardicidal [33]; antileptotrophic [34]; hypoglycemic [35] and anti-inflammatory activities [36,37]; for the treatment of malaria [38]; with antinociceptive effects on HIV-1 Protease [42]. Our group has also reviewed the medicinal and poisonous plants of the Northeastern region of Brazil [43,44], among other review articles [45–54]. So in this work, we reviewed the literature related to anti-inflammatory activity of the plants from South American countries.

2. Results and Discussion

It was possible in this review to list 175 species of medicinal plants with anti-inflammatory activity. Those species are distributed in 63 families of which the following stood out: Asteraceae, Fabaceae, Euphorbiaceae, Apocynaceae and Celastraceae with 37, 17, 11, 6 and 6 species, respectively, studied so far (Table 1).

The effectiveness of the plant extracts was dependent on the type of extract used, the model of inflammation induction and the organism tested. Thus, it was possible to classify the extracts as strongly active, active, weakly active, inactive and equivocal.

Different species of Proustia genus have been frequently used as antiinflammatory and analgesic to treat gout and rheumatic illnesses, however, there is little information about their efficacy and acute toxicity [55]. This genus accumulates sesquiterpene α-isocedrene derivatives that are typical for the subtribus Nassauviinae of the family Asteraceae [56], and a guaianolide β-D-glucopyranoside has been previously isolated from Proustia ilicifolia [57].

According to Delporte et al. (2005) [55] in the assays carried out per os crude methanol extract (GME), hexane extract (HE) and methanol extract (ME) exhibited the strongest analgesic activities similar to the reference drug (SN). In relation to the results obtained in per os anti-inflammatory studies, ME showed the strongest effect, and was similar to the reference drug (SN); HE did not present significant antiinflammatory activity. The antiinflammatory activity have been attributed the presence of compounds with a similar mechanism for both activities, as for example inhibition of the synthesis of prostaglandin E₂ (PGE₂). By the activation of the cyclo-oxygenase enzyme, the level of
PGE\(_2\) increases markedly, and its production provokes inflammation and pain [58]. Therefore, we assume that some active metabolites of these extracts could inhibit cyclooxygenase activity.

For arachidonic acid (AA) and phorbol 12-myristate 13-acetate (TPA) induced oedema, GME showed significant effect only against AA assay and on the contrary, HE and ME presented important activities only against TPA and dichloromethane extract (DCE) was active in both AA and TPA models. The action’s mechanism of the GME can be explained by inhibition of cyclooxygenase enzymes while the HE and ME may act by inhibiting the synthesis of leukotrienes. Since the DCE in addition to inhibiting the synthesis of leukotrienes may act by blocking production of PGE\(_2\) [59].

GME did not show acute toxicity per os up to the maxim dose of 2 g/kg and the weight of the mice had a normal variation after the seven days of observation. Common side effects such as, mild diarrhea, loss of weight and depression were not recorded. It is important to carry out toxicological studies in other animal species in order to demonstrate its lack of toxicity [59].

*Ageratum conyzoides* (Asteraceae), known commonly as “mentrasto”, has been used in Brazilian folk medicine to treat various ailments (metrorrhagia, fevers, dermatitis, inflammation, rheumatism, diarrhea and diuretics). A large number of pharmacological activities (anti-inflammatory, antipyretic, analgesic) have been attributed to the essential oil of *Ageratum conyzoides* [60]. The flowers and leaves are used in the form of an infusion for their analgesic and antiinflammatory properties. Literature data indicate its efficacy in alleviating pain caused by human arthritis [61] or induced experimentally [62].

The hydroalcoholic extract (HAE) of the leaves from *A. conyzoides* was active in both the on subacute (cotton pellet-induced granuloma) and chronic (formaldehyde-induced arthritis) models of inflammation in rats. The weights of cotton pellets were significantly reduced in (38%) after treatment with crude extract of *A. conyzoides* (250 mg/kg, p. o.) and possibly this effect is related to inhibition of neutrophil migration. Exame macroscopic gastric mucosa did not reveal any tissue damage associated with treatment, which is a collateral effect of many antiinflammatory drugs, including aspirin and related compounds [63,64], this result would be explained by an inhibition of the biosynthesis of prostanoids by cyclooxygenase [65].

Literature review reports indicate the presence of pyrrolizidine alkaloids in *A. conyzoides* plants [66,67]. These are known to be hepatotoxic, and to cause lung cancer and variety of other ailments [68]. There was investigated possible hematological and biochemical alteration in animal blood samples following after sub-acute and chronic treatment with the HAE of the plant. To evaluate liver function, serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvic transaminase (SGPT) levels of plasma were measured. It was observed that during the sub-acute treatment, no significant alteration in serum levels of SGOT and SGPT, however during the chronic treatment with HAE (500 mg/kg body wt.) the value of SGPT (108.5726.6 U/l) showed a statistically significant difference (\(p < 0.05\)) to control group (155.6739.6 U/l), reduced significantly [65].

*Artemisia* copa Phil. (Compositae), commonly known as “copa-copa”, is a small and much branched bush with a height of 30–60 cm that grows in the northwest of Argentina and in the north of Chile. The plant is regularly sold in local markets and herb health stores and the infusion of the aerial parts are used in popular medicine as antitussive, digestive, for lowering fever, for pulmonary diseases, and hypertension [69]. The leaves, macerated in alcohol, are also used locally to rub on rheumatic pains [70].
Anti-inflammatory activity of ethanol and dichloromethane extracts were analyzed in models of carrageenan-induced paw edema in rats and the ear edema induced by 12-0-tetradecanoylphorbol-13 acetate (TPA) and arachidonic acid (AA) in mice. Antiinflammatory activity was observed in both extracts that showed antinflammatory activity in the TPA (88 and 54%), and the ethanolic extract showed a 37% inhibition in AA test. The results suggested that A. copa was able to prevent the production of proinflammatory mediators specially those related with cyclooxygenase (CO) and Lipoxygenase (LO) pathway. A. copa has no analgesic effect on the central nervous system that would contribute to its peripheral analgesic effect [71].

*Bauhinia tarapotensis* Benth. (Leguminosae) is a small tree growing in Ecuador (South America), where it is commonly known as “pata de vaca”. The plant leaves are traditionally used for their anti-inflammatory and decongestant properties [72], whereas the bark is employed as antidiarrhoal remedy [73]. Previous study on the methanol extract of *B. tarapotensis* leaves revealed antioxidant and radical scavenger properties, due to the presence of different antioxidant principles, such as cyclohexenone, lignans, and phenylethanoids derivatives [74].

The topical anti-inflammatory activity was evaluated as inhibition of the croton oil-induced ear edema in mice [75]. Five extracts of the leaves significantly inhibited the croton oil-induced ear edema in mice, among which the chloroform extract was the most active. The main anti-inflammatory principles of *B. tarapotensis* leaves are triterpenic acids of ursane and oleanane series. The antiphlogistic activity of mixtures constituted of two ursane and oleanane isomers with different hydroxylation pattern, in the ratio 2:1, is comparable to that of indomethacin [76].

*Croton pullei* (Euphorbiaceae) is a liana that grows above other trees, distributed in tropical areas with vast distribution in the Amazon forest [77]. In the folk medicine, several plants of the *Croton* genus have been used with therapeutic purposes in pathologies that involve painful and inflammatory diseases which justify this work [78].

Anti-inflammatory activity was tested in two models that assess inflammatory processes such as edema and leukocyte migration. The crude methanol extract significantly reduced by 72% the ear edema by croton-oil induced, as also was a dose-dependent reduction of leukocyte migration to the peritoneum after induction with carrageenan. The mechanism of action has not yet elucidated [78].

*Maytenus ilicifolia* Mart. ex. Reiss (Celastraceae), popularly called “espinheira-santa” due to the appearance of its leaves and its therapeutic properties, is utilized in popular medicine in cases of inflammation and gastric ulcer [79–81].

This study evaluated the anti-inflammatory activity, antinociceptive and antiulcer of ethyl acetate and hexane extracts of *Maytenus ilicifolia* [82].

In the model of paw edema induced by carrageenan was observed that there was no significant difference in inflammatory response between indomethacin and the extracts evaluated. The result of hexane extract showed the anti-inflammatory potential of terpenes whereas for ethylacetate extract the anti-inflammatory response has been attributed to flavonoids, which act by reducing the formation of pro-inflammatory mediators as prostaglandins, leukotrienes, reactive oxygen species and nitric oxide [82]. According to Oliveira *et al.* (1991) [83], both acute and chronic administration of this species did not induce any apparent toxicity.
Table 1. Extracts of plants with anti-inflammatory activity studied in South America.

| Family and Botanical name | Country | Part used | Type of extract | Model assay/way of route | Organism tested | Activity | Ref. |
|---------------------------|---------|-----------|-----------------|--------------------------|-----------------|----------|------|
| Acanthaceae               |         |           |                 |                          |                 |          |      |
| Justicia pectoralis var.  | Brazil  | Dried leaf| Hydro-alcoholic | Carrageenan-induced pedal| Rat             | Active   | [84] |
| n. stenophylla            |         |           | ext             | edema/Intragastric       |                 |          |      |
|                           | Brazil  | Dried leaf| Hexane-acetone  | Dextran-induced pedal     | Rat             | Inactive | [84] |
|                           |         |           |                 | edema/Intragastric       |                 |          |      |
| Agavaceae                 |         |           |                 |                          |                 |          |      |
| Cordyline dracaenoides    | Brazil  | Dried rhizome| EtOH-H₂O (50%) | Carrageenan-induced pedal| Rat             | Active   | [85] |
|                           |         |           | ext             | edema/IP                  |                 |          |      |
| Alismataceae              |         |           |                 |                          |                 |          |      |
| Echinodorus grandiflorus  | Brazil  | Dried rhizome| MeOH ext       | Carrageenan-induced pedal| Mouse           | Active   | [86] |
|                           |         |           |                 | edema/Intragastric        |                 |          |      |
|                           | Brazil  | Dried rhizome| MeOH ext       | Carrageenan-induced pedal| Rat             | Active   | [86] |
|                           |         |           |                 | edema/Intragastric        |                 |          |      |
| Amaranthaceae             |         |           |                 |                          |                 |          |      |
| Alternanthera brasiliana  | Brazil  | Dried leaf| H₂O ext         | Carrageenan-induced pedal| Rat             | Inactive | [87] |
|                           |         |           |                 | edema/Route not given     |                 |          |      |
| Pfaffia glomerata         | Brazil  | Dried root| EtOH (60%) ext  | Acetic acid-induced pedal | Mouse           | Active   | [88] |
|                           |         |           |                 | edema/Intragastric        |                 |          |      |
|                           | Brazil  | Dried root| EtOH (60%) ext  | Acetic acid-induced pedal | Mouse           | Active   | [88] |
|                           |         |           |                 | edema/IP                  |                 |          |      |
| Pfaffia iresinoides       | Brazil  | Dried root| Saponin fraction| Carrageenan-induced pleurisy| Rat             | Active   | [89] |
|                           |         |           |                 | pleurisy/Intragastric     |                 |          |      |
|                           | Brazil  | Dried root| H₂O ext         | Carrageenan-induced pleurisy| Rat             | Active   | [89] |
|                           |         |           |                 | pleurisy/Intragastric     |                 |          |      |
|                           | Brazil  | Dried root| H₂O ext         | Cotton pellet granuloma   | Rat             | Inactive | [89] |
|                           |         |           |                 | /Intragastric             |                 |          |      |
|                           | Brazil  | Dried root| Saponin fraction| Cotton pellet granuloma  | Rat             | Active   | [89] |
|                           |         |           |                 | /Intragastric             |                 |          |      |
| Plant Species          | Country | Part Used         | Extraction Method | Model/Condition                                      | Species/Condition   | Activity | Ref. |
|------------------------|---------|-------------------|-------------------|-----------------------------------------------------|---------------------|----------|------|
| Pfaffia paniculata     | Brazil  | Dried root        | EtOH (20%) ext    | Carrageenan-induced pedal edema/IP                  | Mouse               | Active   | [90] |
|                        | Brazil  | Dried root        | EtOH (60%) ext    | Carrageenan-induced pedal edema/IP                  | Rat                 | Active   | [91] |
| Pfaffia stenophylla    | Brazil  | Dried root        | EtOH (20%) ext    | Carrageenan-induced pedal edema/IP                  | Mouse               | Active   | [90] |
| Anacardiaceae          |         |                   |                   |                                                     |                     |          |      |
| Anacardium occidentale | Brazil  | Dried bark        | Shell             | Carrageenan-induced pedal edema/Gastric intubation  | Rat                 | Active   | [92] |
|                        | Brazil  | Dried bark        | Shell             | Dextran-induced pedal edema/Gastric intubation      | Rat                 | Inactive | [92] |
|                        | Brazil  | Dried bark        | Shell             | Cotton pellet granuloma/IP                          | Rat                 | Active   | [92] |
|                        | Brazil  | Dried bark        | Shell             | Dextran-induced pedal edema/IP                      | Rat                 | Active   | [92] |
|                        | Brazil  | Dried bark        | Shell             | Carrageenan-induced pedal edema/IP                  | Rat                 | Active   | [92] |
|                        | Brazil  | Dried bark        | Isopropanol-H₂O (1:1) ext Shell | Carrageenan-induced pedal edema/IP | Rat | Active | [92] |
| Astronium urundeuva    | Brazil  | Stembark          | EtoAc ext         | Carrageenan-induced pedal edema/Intragastric        | Mouse               | Active   | [93] |
|                        | Brazil  | Dried bark        | Tannin fraction   | Dextran-induced pedal edema/IP                      | Rat                 | Active   | [93] |
|                        | Brazil  | Dried bark        | Tannin fraction   | Carrageenan-induced pedal edema/IP                  | Mouse               | Active   | [93] |
|                        | Brazil  | Dried bark        | Tannin fraction   | Cyclophosphamide-induced hemorrhagic cystitis/IP    | Rat                 | Active   | [93] |
| Species                | Country      | Part                  | Extraction   | Methodology                                      | Animal   | Effect    | Ref. |
|-----------------------|--------------|-----------------------|--------------|-------------------------------------------------|----------|----------|------|
| **Spondias mombin**   | Venezuela    | Dried bark            | EtOH (100%)  | Carrageenan-induced pedal edema/Intragastric     | Rat      | Active   | [94] |
| **Apocynaceae**       |              |                       |              |                                                 |          |          |      |
| **Bonafousia longituba** | Ecuador    | Dried part not specified | EtOH (100%)  | Carrageenan-induced pedal edema/Intragastric     | Mouse    | Active   | [95] |
|                       | Ecuador      | Dried entire plant    | EtOH (100%)  | Carrageenan-induced pedal edema/Intragastric     | Mouse    | Weak     |      |
|                       | Ecuador      | Dried part not specified | CH₂Cl₂       | Carrageenan-induced pedal edema/Intragastric     | Mouse    | Active   | [96] |
|                       | Ecuador      | Dried part not specified | CH₂Cl₂       | Carrageenan-induced pedal edema/Intragastric     | Mouse    | Active   | [96] |
| **Ervatamia coronaria** | Brazil      | Dried stem            | EtOH (95%)   | Carrageenan-induced pedal edema/IP              | Rat      | Active   | [97] |
|                       | Brazil      | Dried stem            | EtOH (95%)   | Carrageenan-induced pedal edema/Intragastric     | Rat      | Active   | [97] |
|                       | Brazil      | Dried stem            | H₂O          | Carrageenan-induced pedal edema/IP              | Rat      | Active   | [97] |
| **Himatanthus sucuuba** | Brazil      | Latex (unspecified part) | Hexane       | Carrageenan-induced pedal edema/Intragastric     | Rat      | Active   | [98] |
| **Mandevilla velutina** | Brazil      | Dried rhizome         | Aqueous-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Mouse    | Active   | [99] |
|                       | Brazil      | Dried rhizome         | Aqueous-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Rat      | Active   | [99] |
|                       | Brazil      | Dried rhizome         | Aqueous-alcoholic ext | 5-HT-induced pedal edema/Intragastric | Rat      | Inactive | [99] |
|                       | Brazil      | Dried rhizome         | Aqueous-alcoholic ext | Carrageenan-induced pedal edema/IP | Rat      | Active   | [99] |
| Location              | Treatment                                | Model                                                                 | Species      | Effect          | Reference |
|-----------------------|------------------------------------------|-----------------------------------------------------------------------|--------------|-----------------|-----------|
| Brazil                | Dried rhizome                            | Aqueous-alcoholic ext                                                | Snake venom-induced pedal edema/Intragastric         | Rat     | Inactive       | [99]      |
| Brazil                | Dried rhizome                            | Aqueous-alcoholic ext                                                | Platelet aggregating factor-acether induced pedal edema/Intragastric | Rat     | Inactive       | [99]      |
| Brazil                | Dried entire plant                       | EtOH (95%) ext                                                       | Arachidonic-acid induced ear edema/Intragastric     | Mouse   | Active         | [100]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Bradykinin-induced pedal edema/Intragastric         | Rat     | Active         | [101]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Carrageenan-induced pedal edema/5-HT-induced pedal edema/Intragastric | Rat     | Active         | [101]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Dextran-induced pedal edema/Intragastric           | Rat     | Active         | [101]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Carrageenan-induced pedal edema/IP                 | Rat     | Active         | [101]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Cellulose sulfate induced rat paw edema/Intragastric | Rat     | Active         | [101]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Platelet aggregating factor-acether induced rat paw edema/Intragastric | Rat     | Active         | [101]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Zymosan induced rat paw edema/Intragastric         | Rat     | Active         | [101]     |
| Brazil                | Frozen rhizome                           | EtOH H₂O (50%) ext                                                   | Bothrops jararaca induced rat paw edema/Intragastric | Rat     | Inactive       | [101]     |
| Brazil                | Dried leaf                               | EtOH (100%) ext                                                      | Carrageenan-induced paw edema/IP                    | Rat     | Active         | [102]     |

*Peschiera australis* var. *australis*
| Plant Family       | Country | Part      | Extraction | Edema Model             | Species | Route    | Effect     | Reference |
|-------------------|---------|-----------|------------|--------------------------|---------|----------|------------|-----------|
| Peschiera vanheurckii | Peru    | Dried stem bark | EtOH (100%) ext | EPP-induced rat ear oedema/External |         |          | Active     | [103]     |
| Araliaceae        | Uruguay | Dried leaf | EtOH (95%) ext | **/Oral                  |         |          | Active     | [104]     |
| Hedera helix      | Brazil  | Dried fruit | CHCl$_3$ ext | Cotton pellet granuloma/Intragastric |         |          | Active     | [105]     |
| Arecaaceae        | Brazil  | Dried fruit | CHCl$_3$ ext | Carrageenan-induced pedal edema/Intragastric |         |          | Active     | [105]     |
| Aristolochiaceae  | Argentina| Dried root | MeOH ext     | Croton oil-induced edema/External |         |          | Active     | [106]     |
| Aristolochia triangularis | Argentina| Dried root | CH$_2$Cl$_2$ ext | Croton oil-induced edema/External |         |          | Active     | [106]     |
|                    | Argentina| Dried root | H$_2$O ext   | Croton oil-induced edema/External |         |          | Active     | [106]     |
|                    | Argentina| Dried root | H$_2$O ext   | Carrageenan-induced pedal edema/IP |         |          | Active     | [106]     |
|                    | Argentina| Dried root | CH$_2$Cl$_2$ ext | Carrageenan-induced pedal edema/IP |         |          | Active     | [106]     |
|                    | Argentina| Dried root | MeOH ext     | Carrageenan-induced pedal edema/IP |         |          | Active     | [106]     |
| Asclepiadaceae     | Ecuador | Part not specified | CH$_2$Cl$_2$ ext | Carrageenan-induced pedal edema/Intragastric |         |          | Active     | [96]      |
| Plant Family       | Country    | Part of Plant | Extractsolvent      | Test Method                                   | Animal   | Active (Reference) |
|-------------------|------------|---------------|---------------------|-----------------------------------------------|----------|--------------------|
| **Asteraceae**    | Brazil     | Dried inflorescence | H₂O ext            | Carrageenan-induced pedal edema/IP            | Rat      | Active [107]       |
|                   | Brazil     | Dried inflorescence | EtOH (95%) ext     | Carrageenan-induced pedal edema/IP            | Rat      | Active [107]       |
|                   | Brazil     | Dried inflorescence | Hot H₂O ext        | Carrageenan-induced pedal edema/IP            | Rat      | Active [107]       |
|                   | Brazil     | Dried inflorescence | EtOH (95%) ext     | Croton oil ear edema test/External           | Mouse    | Active [107]       |
|                   | Brazil     | Dried inflorescence | H₂O ext            | Croton oil ear edema test/External           | Mouse    | Active [107]       |
|                   | Brazil     | Dried inflorescence | Hot H₂O ext        | Croton oil ear edema test/External           | Mouse    | Active [107]       |
| **Ageratum conyzoides** | Brazil   | Dried leaf     | EtOH (70%) ext     | Formalin-induced pedal edema/Intragastric     | Rat      | Active [62]        |
|                   | Brazil     | Dried leaf     | EtOH (70%) ext     | Cotton pellet granuloma/Intragastric         | Rat      | Active [62]        |
|                   | Brazil     | Dried leaf     | EtOH (70%) ext     | Carrageenan-induced pedal edema/SC           | Rat      | Active [62]        |
|                   | Brazil     | Dried leaf     | Hydro-alcoholic ext| Formalin-induced pedal edema/Intragastric     | Rat      | Active [65]        |
|                   | Brazil     | Dried leaf     | Hydro-alcoholic ext| Cotton pellet granuloma/Intragastric         | Rat      | Active [65]        |
|                   | Brazil     | Dried leaf     | EtOH (70%) ext     | Yeast-induced inflammation of the paw/IP      | Rat      | Active [108]       |
| **Ambrosia tenuifolia** | Argentina | Dried aerial parts | CH₂Cl₂ ext        | Croton oil-induced edema/External            | Mouse    | Active [106]       |
| Country     | Plant Part              | Extractant | Effect              | Species | Active/Inactive | Reference |
|-------------|-------------------------|------------|---------------------|---------|-----------------|-----------|
| Argentina   | Dried aerial parts      | MeOH ext   | Croton oil-induced edema/External | Mouse   | Active          | [106]     |
| Argentina   | Dried aerial parts      | H2O ext    | Croton oil-induced edema/External | Mouse   | Active          | [106]     |
| Argentina   | Dried aerial parts      | MeOH ext   | Carrageenan-induced pedal edema/IP | Mouse   | Inactive        | [106]     |
| Argentina   | Dried aerial parts      | H2O ext    | Carrageenan-induced pedal edema/IP | Mouse   | Active          | [106]     |
| Argentina   | Dried aerial parts      | CH2Cl2 ext | Carrageenan-induced pedal edema/IP | Mouse   | Active          | [106]     |
| **Artemisia copa** | Argentina | Dried entire plant | Hot H2O ext | Carrageenan-induced pedal edema/IP | Rat     | Inactive        | [109]     |
| Argentina   | Dried entire plant      | CH2Cl2 ext | Carrageenan-induced pedal edema/IP | Rat     | Inactive        | [109]     |
| Argentina   | Dried entire plant      | MeOH ext   | Carrageenan-induced pedal edema/IP | Rat     | Inactive        | [109]     |
| Argentina   | Dried aerial parts      | H2O ext    | 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Active          | [71]      |
| Argentina   | Dried aerial parts      | CH2Cl2 ext | 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Active          | [71]      |
| **Baccharis articulata** | Argentina | Dried aerial parts | H2O ext | Carrageenan-induced pedal edema/Intragastric | Rat     | Inactive        | [110]     |
| Argentina   | Dried aerial parts      | H2O ext    | Carrageenan-induced pedal edema/Intragastric | Rat     | Inactive        | [110]     |
| **Baccharis crispa** | Argentina | Dried aerial parts | H2O ext | Carrageenan-induced pedal edema/Intragastric | Rat     | Inactive        | [110]     |
| Plant                | Country  | Part          | Extraction | Method                  | Species          | Route       | Effect     | Reference |
|---------------------|----------|---------------|------------|--------------------------|------------------|-------------|------------|-----------|
| **Baccharis decussata** | Colombia | Dried leaf    | MeOH ext   | **/Route not given       | **               | Active      |            | [111]     |
| **Baccharis incarum**  | Argentina | Dried entire plant | CH₂Cl₂ ext | Carrageenan-induced pedal edema/IP | Rat              | Active      |            | [109]     |
| **Baccharis medullosa** | Argentina | Dried aerial parts | CHCl₃ ext  | Carrageenan-induced pedal edema/IP | Mouse           | Inactive    |            | [112]     |
| **Baccharis rufescens**  | Argentina | Dried aerial parts | Acetone ext | Carrageenan-induced pedal edema/IP | Mouse           | Active      |            | [112]     |
| **Baccharis trimera**   | Uruguay  | Dried aerial parts | CHCl₃ ext  | Carrageenan-induced pedal edema/IP | Mouse           | Active      |            | [112]     |
| Location          | Plant Part                  | Solvent     | Test          | Species   | Activity          | Ref. |
|-------------------|-----------------------------|-------------|---------------|-----------|-------------------|------|
| Uruguay           | Dried aerial parts          | Butanol ext | Arachidonic acid-induced edema in pat paw/IP | Rat       | Equivocal         | [113]|
| Uruguay           | Dried aerial parts          | Butanol ext | C16-PAF-induced edema/IP | Rat       | Weak activity     | [113]|
| Uruguay           | Dried aerial parts          | Butanol ext | Zymosan-induced edema in rat paw/IP | Rat       | Equivocal         | [113]|
| Ecuador           | Dried entire plant          | EtOH (100%) ext | Carrageenan-induced pedal edema/Intragastric | Mouse     | Weak activity     | [95] |
| **Baccharis trinervis** |                            |             |               |           |                   |      |
| Argentina         | Dried aerial parts          | H₂O ext     | Croton oil-induced edema/External | Mouse     | Active            | [106]|
| Argentina         | Dried aerial parts          | CH₂Cl₂ ext  | Croton oil-induced edema/External | Mouse     | Active            | [106]|
| Argentina         | Dried aerial parts          | MeOH ext    | Croton oil-induced edema/External | Mouse     | Active            | [106]|
| Argentina         | Dried aerial parts          | CH₂Cl₂ ext  | Carrageenan-induced pedal edema/IP | Mouse     | Inactive          | [106]|
| Argentina         | Dried aerial parts          | H₂O ext     | Carrageenan-induced pedal edema/IP | Mouse     | Active            | [106]|
| Argentina         | Dried aerial parts          | MeOH ext    | Carrageenan-induced pedal edema/IP | Mouse     | Active            | [106]|
| **Bidens pilosa** | Brazil                      | Dried leaf  | Zymosan-induced pedal edema/IP | Mouse     | Active            | [114]|
| **Bidens subalternans** |                            |             |               |           |                   |      |
| Argentina         | Dried entire plant          | MeOH ext    | Carrageenan-induced pedal edema/IP | Mouse     | Weak activity     | [115]|
| Argentina         | Dried entire plant          | CHCl₃ ext   | Carrageenan-induced pedal edema/IP | Mouse     | Active            | [115]|
| **Centaurea chilensis** |                            |             |               |           |                   |      |
| Chile             | Dried aerial parts          | MeOH ext    | Carrageenan-induced pedal edema/IP/Intragastric | Guinea pig | Active            | [116]|
| Chile             | Dried aerial parts          | CHCl₃ ext   | Carrageenan-induced pedal edema/IP/Intragastric | Guinea pig | Active            | [116]|
| Species                        | Country     | Sample                  | Extractant | Test Model                                          | Route | Animal | Activity | Reference |
|--------------------------------|-------------|-------------------------|------------|-----------------------------------------------------|-------|--------|----------|-----------|
| Chromolaena christieana        | Argentina   | Dried aerial parts      | MeOH ext   | Croton oil-induced edema/External                    | Mouse | Active | [106]    |           |
|                                | Argentina   | Dried aerial parts      | CH₂Cl₂ ext | Croton oil-induced edema/External                    | Mouse | Active | [106]    |           |
|                                | Argentina   | Dried aerial parts      | H₂O ext    | Croton oil-induced edema/External                    | Mouse | Active | [106]    |           |
|                                | Argentina   | Dried aerial parts      | CH₂Cl₂ ext | Carrageenan-induced pedal edema/IP                  | Mouse | Inactive| [106]    |           |
|                                | Argentina   | Dried aerial parts      | H₂O ext    | Carrageenan-induced pedal edema/IP                  | Mouse | Inactive| [106]    |           |
|                                | Argentina   | Dried aerial parts      | MeOH ext   | Carrageenan-induced pedal edema/IP                  | Mouse | Inactive| [106]    |           |
| Conyza bonariensis             | Brazil      | Aerial part essent oil | Essential oil | LPS-induced leukocyte recruitment/Intragastric     | Mouse | Active | [117]    |           |
| Conyza floribunda              | Ecuador     | Dried entire plant      | EtOH (100%) ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Weak activity | [95]    |           |
| Conyza sophiifolia             | Argentina   | Dried aerial parts      | Hexane ext | Paw edema test/Route not given                     | Rat   | Active | [118]    |           |
|                                | Argentina   | Dried aerial parts      | Acetone ext | Paw edema test/Route not given                     | Rat   | Active | [118]    |           |
|                                | Argentina   | Dried aerial parts      | CHCl₃ ext  | Paw edema test/Route not given                     | Rat   | Active | [118]    |           |
| Cynara scolymus                | Brazil      | Fresh leaf              | Infusion   | Dye diffusion assay/Intragastric                    | Mouse | Active | [119]    |           |
| Elephantopus scaber            | Brazil      | Fresh leaf              | Infusion   | Dye diffusion assay/Intragastric                    | Mouse | Active | [119]    |           |
|                                | Brazil      | Dried entire plant      | EtOH-H₂O (50%) ext | Carrageenan-induced pedal edema/Intragastric | Rat | Inactive | [120]    |           |
|                                | Brazil      | Dried entire plant      | Decoction  | Carrageenan-induced pedal edema/Intragastric       | Rat   | Inactive| [120]    |           |
Table 1. Cont.

| Species                        | Origin   | Part                | Extractant          | Activity       | Effect                          |
|-------------------------------|----------|---------------------|---------------------|----------------|---------------------------------|
| *Eremanthus erythropappus*     | Brazil   | Dried aerial parts  | EtOH (95%) ext      | Carrageenan-induced pedal edema/Intragastric | Rat    | Active [121]                   |
| *Eupatorium buniifolium*      | Argentina| Dried aerial parts  | CH₂Cl₂ ext          | 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Active [122]                   |
|                               | Equador  | Dried entire plant  | EtOH (100%) ext     | Carrageenan-induced pedal edema/Intragastric | Mouse   | Active [95]                    |
| *Eupatorium inulaefolium var. suaveolens* | Argentina| Oven dried aerial parts | CH₂Cl₂ ext | Phorbol myristate acetate-induced ear inflammation/External | Mouse   | Active [123]                   |
| *Gochnatia polymorpha*        | Brazil   | Dried leaf          | H₂O ext             | Carrageenan-induced pedal edema/Intragastric | Rat    | Active [124]                   |
|                               | Brazil   | Dried leaf          | EtOH (100%) ext     | Carrageenan-induced pedal edema/Intragastric | Rat    | Active [124]                   |
|                               | Brazil   | Dried leaf          | Butanol ext         | Carrageenan-induced pedal edema/Intragastric | Rat    | Inactive [124]                 |
|                               | Brazil   | Dried leaf          | EtoAc ext           | Carrageenan-induced pedal edema/Intragastric | Rat    | Active [124]                   |
|                               | Brazil   | Dried leaf          | Dichloromethane ext | Carrageenan-induced pedal edema/Intragastric | Rat    | Inactive [124]                 |
| *Laennecia sophiifolia*       | Argentina| Dried aerial parts  | Hexane ext          | Carrageenan-induced pedal edema/IP            | Mouse   | Active [112]                   |
|                               | Argentina| Dried aerial parts  | Acetone ext         | Carrageenan-induced pedal edema/IP            | Mouse   | Active [112]                   |
| *Mikania glomerata*           | Brazil   | Fresh leaf          | Infusion            | Dye diffusion assay/Intragastric              | Mouse   | Active [119]                   |
| Country | Plant Part | Extractant | Effect | Animal | Activity | Reference |
|---------|------------|------------|--------|--------|----------|-----------|
| Brazil  | Dried leaf | EtOH-H₂O (1:1) ext | PAF-induced edema/Histamine-induced edema/SC | Rat | Inactive | [125] |
| Brazil  | Dried leaf | Dichloromethanol | Carrageenan-induced pleurisy/IP | Mouse | Active | [126] |
| Brazil  | Dried leaf | EtOH-H₂O (1:1) ext | Serotonin-induced pleural edema/SC | Rat | Inactive | [125] |
| Mutisia kurtzii | Argentina | Dried entire plant | CH₂Cl₂ ext | Carrageenan-induced pedal edema/IP | Rat | Inactive | [109] |
| Mutisia kurtzii | Argentina | Dried entire plant | MeOH ext **/IP | Carrageenan-induced pedal edema/IP | Rat | Active | [109] |
| Mutisia kurtzii | Argentina | Dried entire plant | Hot H₂O ext | Carrageenan-induced pedal edema/IP | Rat | Active | [109] |
| Neurolaena lobata | Ecuador | Dried entire plant | EtOH (100%) ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Active | [95] |
| Pluchea sagittalis | Argentina | Dried entire plant | Hot H₂O ext | Carrageenan-induced pedal edema/IP | Rat | Active | [123] |
| Pluchea sagittalis | Argentina | Dried entire plant | CH₂Cl₂ ext | Carrageenan-induced pedal edema/IP | Rat | Active | [123] |
| Pluchea sagittalis | Argentina | Oven dried aerial parts | CH₂Cl₂ ext | Phorbol myristate acetate-induced ear inflammation/External | Mouse | Active | [109] |
| Pluchea sagittalis | Argentina | Oven dried aerial parts | CH₂Cl₂ ext | Carrageenan-induced pedal edema/IP | Rat | Active | [109] |
| Pluchea sagittalis | Argentina | Dried entire plant | MeOH ext | Carrageenan-induced pedal edema/IP | Rat | Inactive | [109] |
| Porophyllum ruderale | Brazil | Aerial part | Essential oil | LPS-induced leukocyte recruitment/Intragastric | Mouse | Active | [117] |
Table 1. Cont.

| Plant                  | Country  | Part(s)          | Extraction | Assay                                      | Species | Activity | Reference |
|------------------------|----------|------------------|------------|--------------------------------------------|---------|----------|-----------|
| *Proustia pyrifolia*   | Chile    | Dried aerial     | CH₂Cl₂ ext | Acetic acid-induced pedal edema/External   | Mouse   | Active   | [59]      |
|                        | Chile    | Dried aerial     | CH₂Cl₂ ext | 12-0-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Active   | [59]      |
|                        | Chile    | Dried aerial     | MeOH ext   | Acetic acid-induced pedal edema/External   | Mouse   | Active   | [59]      |
|                        | Chile    | Dried aerial     | Hexane ext | Acetic acid-induced pedal edema/External   | Mouse   | Active   | [59]      |
|                        | Chile    | Dried aerial     | Hexane ext | 12-0-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Active   | [59]      |
| *Synedrella nodiflora* | Venezuela| Dried leaf       | EtOH (100%) ext | Carrageenan-induced pedal edema/Intragastric | Rat     | Active   | [94]      |
|                        | Venezuela| Dried leaf       | Hexane ext | Carrageenan-induced pedal edema/Intragastric | Rat     | Active   | [94]      |
| *Tagetes pusilla*      | Ecuador  | Dried entire     | EtOH (100%) ext | Carrageenan-induced pedal edema/Intragastric | Mouse   | Active   | [95]      |
| *Tanacetum vulgare*    | Argentina| Dried aerial     | Dichloromethane ext | 12-0-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Active   | [127]     |
|                        | Argentina| Dried aerial     | EtOH (100%) ext | 12-0-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Weak activity | [128]   |
|                        | Argentina| Dried aerial     | CHCl₃ ext  | 12-0-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse   | Active   | [128]     |
| **Vanillosmopsis arborea** | Brazil | Dried trunkwood | Essential oil | ***/Gastric intubation** | Mouse | Active | [129] |
|---------------------------|--------|----------------|--------------|--------------------------|-------|--------|-------|
| Bignoniaceae              |        |                |              |                          |       |        |       |
| **Adenocalymma alliacea** | Peru   | Dried root + stem | EtOH (100%) ext | EPP-induced rat ear oedema/External | Rat   | Weak activity | [103] |
| **Tabebuia impetiginosa** | Brazil | Dried bark | Type ext not stated | Formalin-induced pedal edema/Route not given | Rat   | Active | [130] |
| **Tecoma sambucifolia**   | Peru   | Dried flowers | H₂O ext | Carrageenan-induced pedal edema/IP | Rat   | Active | [131] |
|                           | Peru   | Dried flowers | EtOH (95%) ext | Carrageenan-induced pedal edema/IP | Rat   | Active | [131] |
|                           | Peru   | Dried perianth | H₂O ext | Carrageenan-induced pedal edema/IP | Rat   | Active | [131] |
|                           | Peru   | Dried perianth | EtOH (95%) ext | Carrageenan-induced pedal edema/IP | Rat   | Active | [131] |
| **Tynnanthus myrianthus** | Peru   | Dried part not specified | EtOH (95%) ext | Carrageenan-induced pedal edema/IP | Rat   | Active | [132] |
| Boraginaceae              |        |                |              |                          |       |        |       |
| **Auxemma oncocalyx**     | Brazil | Dried heartwood | Quinone fraction | Carrageenan-induced pedal edema/Intragastric | Rat   | Active | [133] |
|                           | Brazil | Dried heartwood | Quinone fraction | Dextran-induced pedal edema/IP | Rat   | Active | [133] |
|                           | Brazil | Dried heartwood | Quinone fraction | Carrageenan-induced pedal edema/IP | Rat   | Active | [133] |
| **Cordia verbenacea**     | Brazil | Freeze-dried leaf | Lyophilized extract | Miconazole-induced edema/Intragastric | Rat   | Active | [134] |
|                           | Brazil | Freeze-dried leaf | Lyophilized extract | Nystatin-induced edema/External | Rat   | Active | [134] |
|                           | Brazil | Fresh leaf | EtOH (70%) ext | Cotton pellet granuloma/External | Rat   | Active | [135] |
| Country | Leaf/Plant Type | Extraction Method | Treatment/Induction | Organ | Activity | Reference |
|---------|----------------|------------------|---------------------|-------|----------|-----------|
| Brazil  | Fresh leaf     | EtOH (70%) ext   | Cotton pellet granuloma/Intragastric | Rat   | Active   | [135]     |
| Brazil  | Dried leaf     | EtOH (70%) ext   | Croton oil-induced edema/External | Mouse | Active   | [136]     |
| Brazil  | Dried leaf     | EtOH (70%) ext   | Nystatin-induced pedal edema/Gastric intubation | Rat   | Active   | [136]     |
| Brazil  | Dried leaf     | EtOH (70%) ext   | Cold stress and carrageenin-induced edema combined/Gastric intubation | Rat   | Active   | [136]     |
| Brazil  | Fresh leaf     | EtOH (70%) ext   | Carrageenan-induced pedal edema/Oral | Rat   | Active   | [137]     |
| Brazil  | Fresh leaf     | EtOH (70%) ext   | Cotton pellet granuloma/Oral | Rat   | Active   | [137]     |
| Brazil  | Freeze-dried leaf | Lyophilized extract | Nystatin-induced edema/External | Rat   | Active   | [134]     |
| Brazil  | Dried leaf     | Aqueous high speed supernatant | Carrageenan-induced pedal edema/Gastric intubation | Rat   | Inactive  | [138]     |
| Symphytum officinale | Brazil  | Dried leaf | LPS-induced inflammatory/IP | Mouse | Active   | [139]     |
| Symphytum officinale | Brazil  | Dried leaf | Croton oil-induced edema/External | Mouse | Active   | [140]     |
| Nidularium procerum | Brazil  | Dried leaf | Hexane ext | Rat   | Active   | [94]      |
| Tillandsia streptocarpa | Brazil  | Dried entire plant | Hexane ext | Rat   | Active   | [94]      |
| Tillandsia streptocarpa | Venezuela | Dried leaf | EtOH (100%) ext | Rat   | Active   | [94]      |
| Tillandsia streptocarpa | Venezuela | Dried bark | EtOH (100%) ext | Rat   | Active   | [94]      |
| Burseraceae | Bursera simaruba | Venezuela | Dried leaf | Hexane ext | Rat   | Active   | [141]     |
| Species                        | Origin | Part Used       | Ext Method | Activity       | Route | Ref.  |
|-------------------------------|--------|-----------------|------------|----------------|-------|-------|
| *Protium kleinii*              | Brazil | Dried bark      | Ether ext  | Arachidonic acid-induced edema/External | Mouse | Inactive [142] |
|                               | Brazil | Dried bark      | Ether ext  | 12-0-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/External | Mouse | Active [142] |
| Celastraceae                  |        |                 |            |                |       |       |
| *Cheiloclinium cognatum*      | Brazil | Dried rootbark  | MeCl₂ ext  | Croton oil-induced edema/External | Mouse | Active [143] |
| *Maytenus aquifolium*         | Brazil | Dried leaf/plus piroxican | Hydro-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active [144] |
|                               | Brazil | Dried leaf      | Hydro-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active [144] |
| *Maytenus boaria*             | Chile  | Dried aerial parts | MeOH ext  | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active [145] |
| *Maytenus ilicifolia*         | Brazil | Dried leaf      | Hexane-acetone ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active [82] |
|                               | Brazil | Dried leaf      | EtoAc ext  | Carrageenan-induced pedal edema/Intragastric | Rat | Active [82] |
|                               | Brazil | Dried leaf      | Hexane-acetone | Carrageenan-induced pedal edema/Intragastric | Mouse | Active [82] |
|                               | Brazil | Dried leaf      | EtoAc ext  | Carrageenan-induced pedal edema/Intragastric | Mouse | Active [82] |
| *Maytenus laevis*             | Colombia | Bark | EtOH (95%) ext | Carrageenan-induced pedal edema/SC | Rat | Active [146] |
| *Maytenus rigida*             | Brazil | Dried bark      | EtOH (95%) ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active [147] |
| Chloranthaceae                |        |                 |            |                |       |       |
| *Hedyosmum bonplandianum*     | Colombia | Dried leaf      | Butanol ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Active [148] |
| Clusiaceae                    |        |                 |            |                |       |       |
| Species                      | Country   | Part                  | Extractation Method/Preparation | Activity | References |
|------------------------------|-----------|-----------------------|----------------------------------|----------|------------|
| *Hypericum brasiliense*      | Brazil    | Dried leaf            | Type ext not stated              | Carrageenan-induced pedal edema/Oral | Rat        | [149]      |
| Convolvulaceae               |           |                       |                                  |          |            |
| *Cuscuta chilensis*          | Chile     | Dried entire plant    | MeOH ext                         | Carrageenan-induced pedal edema/Intragastric | Guinea pig | [150]      |
|                             | Chile     | Dried entire plant    | Infusion                         | Carrageenan-induced pedal edema/Intragastric | Guinea pig | [150]      |
| *Ipomoea fistulosa*          | Argentina | Oven dried aerial parts | MeOH ext                           | Carrageenan-induced pedal edema/Intragastric | Rat        | [123]      |
|                             | Argentina | Oven dried aerial parts | CH$_2$Cl$_2$ ext               | Phorbol myristate acetate-induced ear inflammation/External | Mouse | [123]      |
| Crassulaceae                 |           |                       |                                  |          |            |
| *Bryophyllum calcinum*       | Brazil    | Dried leaf            | Lyophilized extract              | Carrageenan-induced pedal edema/Intragastric | Rat        | [151]      |
| *Kalanchoe brasiliensis*     | Brazil    | Fresh leaf            | Plant juice                      | Carrageenan-induced pedal edema/Intragastric | Rat        | [152]      |
|                             | Brazil    | Fresh leaf            | Juice                            | Zymosan-induced inflammation/IP **/IP      | Mouse      | [153]      |
|                             | Brazil    | Fresh fruit juice (unripe) | Juice            |                                    | Mouse      | [154]      |
| Cucurbitaceae                |           |                       |                                  |          |            |
| *Cayaponia tayuya*           | Brazil    | Dried root            | MeOH ext                         | Carrageenan-induced pedal edema/Gastric intubation | Mouse | Inactive | [155] |
|                             | Brazil    | Dried root            | CHCl$_3$ ext                     | Carrageenan-induced pedal edema/Gastric intubation | Mouse | Weak activity | [155] |
|                             | Brazil    | Dried root            | MeOH ext                         | Carrageenan-induced pedal edema/IP         | Mouse | Weak activity | [155] |
|                             | Brazil    | Dried root            | CHCl$_3$ ext                     | Carrageenan-induced pedal edema/IP         | Mouse | Active | [155] |
| Species                  | Country     | Part          | Extraction    | Method                          | Species        | Route       | Activity     | References |
|--------------------------|-------------|---------------|---------------|---------------------------------|----------------|-------------|--------------|------------|
| **Wilbrandia ebracteata**| Brazil      | Dried root    | Infusion      | Dye diffusion assay/Intragastric | Mouse          | Equivocal   | [119]        |            |
| Brazil                   | Brazil      | Dried root    | CH₂Cl₂ ext    | Carrageenan-induced pedal edema/Intragastric | Rat            | Weak activity | [156]        |            |
| Brazil                   | Brazil      | Dried root    | CHCl₃ soluble fraction | Carrageenan-induced pleurisy/Intragastric | Mouse          | Active      | [156]        |            |
| Brazil                   | Brazil      | Dried root    | CH₂Cl₂ ext    | Carrageenan-induced pedal edema/IP | Rat            | Active      | [156]        |            |
| Brazil                   | Brazil      | Dried root    | Chromatographic fraction | Carrageenan-induced pleurisy/IP | Mouse          | Active      | [156]        |            |
| Brazil                   | Brazil      | Dried root    | CHCl₃ soluble fraction | Carrageenan-induced pleurisy/IP | Mouse          | Active      | [156]        |            |
| **Wilbrandia species**   | Brazil      | Dried rhizome | EtOH (70%) ext | Acetic acid-induced pedal edema/Intragastric | Mouse          | Active      | [157]        |            |
| Brazil                   | Brazil      | Dried rhizome | EtOH (70%) ext | Carrageenan-induced pedal edema/Intragastric | Rat            | Active      | [157]        |            |
| Brazil                   | Brazil      | Dried rhizome | EtOH (70%) ext | Carrageenan-induced pedal edema/IP | Mouse          | Active      | [157]        |            |
| **Cytaceaeae**            | Peru        | Inner bark    | EtOH (95%) ext | **/**                           | Rabbit         | Active      | [158]        |            |
| **Trichipteris procera** | Peru        | Inner bark    | EtOH (95%) ext | **/**                           | Rabbit         | Active      | [158]        |            |
| **Cyperaceae**            | Brazil      | Venom         | Essential oil | LPS-induced pleurisy model/Intragastric | Mouse          | Active      | [159]        |            |
| **Mariscus pedunculatus** | Brazil      | Venom         | Essential oil | LPS-induced pleurisy model/Intragastric | Mouse          | Active      | [159]        |            |
| **Dilleniaceae**          | Brazil      | Dried stembark| Hydro-alcoholic ext | Carrageenan-induced pedal edema/IP | Rat            | Active      | [160]        |            |
| Brazil                   | Brazil      | Dried stembark| Hydro-alcoholic ext | 12-O-tetradecanoylphorbol-13-acetate(TPA)-induced ear inflammation/IP | Mouse          | Active      | [160]        |            |
Table 1. Cont.

| Family                  | Country | Part             | Extraction | Method                        | Animal | Active | Ref |
|-------------------------|---------|------------------|------------|-------------------------------|--------|--------|-----|
| Equisetaceae            | Brazil  | Dried stem bark  | Hydro-alcoholic ext | Capsaicin induced mouse ear edema/IP | Mouse  | Active | [160] |
| Equisetum arvense       | Brazil  | Stem             | EtOH - H₂O (1:1) ext | Carrageenan-induced pedal edema/IP | Mouse  | Active | [161] |
| Erythroxylaceae         | Brazil  | Dried leaf       | EtOH (70%) ext | Carrageenan-induced pedal edema/IP | Rat    | Active | [162] |
| Erythroxylum argentinum | Brazil  | Dried leaf       | EtOH (70%) ext | Carrageenan-induced pedal edema/IP | Rat    | Active | [162] |
| Euphorbiaceae           | Peru    | Dried part not specified | EtOH (95%) ext | Carrageenan-induced pedal edema/IP | Rat    | **     | [132] |
| Alchornea castaneaefolia| Peru    | Dried stem bark  | EtOH (100%) ext | Epp-induced rat ear edema/** | Rat    | Active | [103] |
| Croton cajucara         | Brazil  | Bark essential oil | Essential oil | Carrageenan-induced pedal edema/IP | Mouse  | Active | [163] |
| Croton celtidifolius    | Brazil  | Dried bark       | H₂O ext     | Carrageenan-induced pedal edema/IP | Mouse  | Active | [164] |
|                         | Brazil  | Dried bark       | EtoAc ext   | Carrageenan-induced pedal edema/IP | Mouse  | Active | [164] |
|                         | Brazil  | Dried bark       | EtOH (80%) ext | Carrageenan-induced pedal edema/IP | Mouse  | Active | [164] |
|                         | Brazil  | Dried bark       | Butanol ext | Carrageenan-induced pedal edema/IP | Mouse  | Active | [164] |
|                         | Brazil  | Dried bark       | EtoAc ext   | Carrageenan-induced pedal edema/IP | Mouse  | Active | [164] |
### Table 1. Cont.

| Country | Plant Part | Extract/Ext. | Test Method | Species | Mouse | Activity | Reference |
|---------|------------|--------------|-------------|---------|-------|----------|-----------|
| Brazil  | Dried bark | H2O ext      | Carrageenan-ind. pedal edema/IP | Mouse   | Active | [164]    |
| Brazil  | Dried bark | Butanol ext  | Carrageenan-ind. pedal edema/IP | Mouse   | Active | [164]    |
| Peru    | Fresh sap  | Latex        | **/Injection | Rat     | Active | [165]    |
| Ecuador | Freeze-drilld latex | **   | Carrageenan-ind. pedal edema/IP | Rat     | Active | [166]    |
| Venezuela | Dried bark | H2O ext  | Albumin-ind. edema/IP | Mouse   | Active | [167]    |
| Ecuador | Dried seed | CH2Cl2 ext | Carrageenan-ind. pedal edema/Intragastric | Mouse   | Active | [96]     |
| Ecuador | Dried entire plant | EtOH (100%) ext  | Carrageenan-ind. pedal edema/Intragastric | Mouse   | Weak activity | [95]     |
| Brazil  | Dried leaf  | MeOH ext     | Carrageenan-ind. pedal edema/Intragastric | Mouse   | Active | [78]     |
| Brazil  | Fresh tuber | EtOH-H2O(50%) ext | Carrageenan-ind. pedal edema/Intragastric | Rat     | Active | [168]    |
| Brazil  | Fresh tuber | EtOH-H2O (50%) ext | Dextran-ind. pedal edema/Intragastric | Rat     | Inactive | [168]    |
| Brazil  | Fresh tuber | EtOH-H2O(50%) ext | Serotonin-ind. pedal edema/Intragastric | Rat     | Active | [168]    |
| Brazil  | Dried aerial parts | Hexane ext | Cfa induced edema/Intragastric | Mouse   | Active | [169]    |
| Brazil  | Dried entire plant | Hydro-alcoholic ext | Formalin-ind. pedal edema/IP | Mouse   | Active | [170]    |
| Brazil  | Dried leaf + root + stem | EtOH-H2O(1:1) ext | Carrageenan-ind. pedal edema/vs. dextran-ind. pedal edema/IP | Mouse | Inactive | [171]    |
| Brazil  | Fresh bark  | Infusion     | Dye diffusion assay/Intragastric | Mouse   | Active | [119]    |

**Note:** H2O ext denotes water extract, Butanol ext denotes butanol extract, Latex **/**/Injection denotes latex with or without injection, CH2Cl2 ext denotes chloroform extract, EtOH (100%) ext denotes ethanol (100%) extract, MeOH ext denotes methanol extract, Hexane ext denotes hexane extract, Hydro-alcoholic ext denotes hydro-alcoholic extract, Dye diffusion assay/Intragastric denotes dye diffusion assay with intragastric administration.
Table 1. Cont.

| Plant Name               | Country | Part               | Extractant | Activity | Species | Reference |
|--------------------------|---------|--------------------|-------------|----------|---------|-----------|
| *Bauhinia guianensis*    | Brazil  | Dried stem bark    | CH$_2$Cl$_2$ ext | Dextran-induced pedal edema/IP | Rat | Active [172] |
| Brazil                   | Dried stem bark | CH$_2$Cl$_2$ ext | Histamine-induced edema/IP | Rat | Inactive [172] |
| Brazil                   | Dried stem bark | EtoAc ext | Histamine-induced edema/IP | Rat | Active [172] |
| Brazil                   | Dried stem bark | MeOH ext | Carrageenan-induced pedal edema/IP | Rat | Active [172] |
| Brazil                   | Dried stem bark | MeOH ext | Dextran-induced pedal edema/IP | Rat | Active [172] |
| Brazil                   | Dried stem bark | MeOH ext | Histamine-induced edema/IP | Rat | Active [172] |
| *Bauhinia tarapotensis*  | Ecuador | Dried leaf          | H$_2$O ext | Croton oil-induced edema/** | Mouse | Active [76] |
| Ecuador                  | Dried leaf | Dichloromethane ext | Croton oil-induced edema/** | Mouse | Active [76] |
| Ecuador                  | Dried leaf | MeOH ext | Croton oil-induced edema/** | Mouse | Active [76] |
| Ecuador                  | Dried leaf | Hexane ext | Croton oil-induced edema/** | Mouse | Active [76] |
| Ecuador                  | Dried leaf | CHCl$_3$ ext | Croton oil-induced edema/** | Mouse | Active [76] |
| *Caesalpinia ferrea*     | Brazil  | Dried fruit         | H$_2$O ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active [173] |
| *Calliandra angustifolia*| Peru    | Dried bark          | EtOH (100%) ext | Epp-induced rat ear edema/** | Rat | Inactive [103] |
| *Copaifera cearensis*    | Brazil  | Dried balsam        | Oleoresin | Carrageenan-induced pedal edema/Intragastric | Mouse | Active [174] |
| *Copaifera langsdorffii* | Brazil  | Dried oleoresin     | Resin | Acetic acid-induced colitis/Intragastric | Rat | Active [174] |
| Copaifera species | Brazil | Oleoresin | Oleoresin | Carrageenan-induced pedal edema/Intragastric | Rat | Active | [174] |
|-------------------|--------|-----------|-----------|---------------------------------------------|-----|--------|-------|
| Brazil            | Oleoresin | Oleoresin | Cotton pellet granuloma/Intragastric | Rat | Active | [174] |
| Brazil            | Oleoresin | Oleoresin | Histamine-induced vascular permeability/Intragastric | Rat | Active | [174] |
| Erythrina velutina| Brazil  | Dried leaf | Decoction | Carrageenan-induced pedal edema/Intragastric | Rat | Inactive | [175] |
| Brazil            | Dried leaf | Decoction | Carrageenan-induced pedal edema/Intragastric | Rat | Inactive | [175] |
| Brazil            | Dried leaf | Decoction | Carrageenan-induced pedal edema/Intragastric | Rat | Inactive | [175] |
| Erythrina crista-galli | Argentina | Dried aerial parts | Dichloromethane ext | 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/*** | Mouse | Active | [176] |
| Argentina         | Dried aerial parts | MeOH ext | 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/*** | Mouse | Active | [176] |
| Argentina         | Dried aerial parts | H2O ext | 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced ear inflammation/*** | Mouse | Active | [176] |
| Argentina         | Dried aerial parts | MeOH ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active | [176] |
| Argentina         | Dried aerial parts | H2O ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active | [176] |
| Argentina         | Dried aerial parts | Dichloromethane ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active | [176] |
| Marsypianthes chamaedrys | Brazil | Fresh leaf | Infusion | Dye diffusion assay/Intragastric | Mouse | Active | [119] |
Table 1. Cont.

| Species                   | Country | Part            | Extractant | Assay                           | Species | Activity | Reference |
|---------------------------|---------|-----------------|------------|---------------------------------|---------|----------|-----------|
| Psoralea glandulosa       | Chile   | Dried aerial parts | Infusion   | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active   | [150]    |
|                           | Chile   | Dried aerial parts | MeOH ext   | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active   | [150]    |
|                           | Chile   | Dried aerial parts | Pet ether ext | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active   | [177]    |
|                           | Chile   | Dried aerial parts | Dichloromethane ext | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active   | [177]    |
|                           | Chile   | Dried aerial parts | MeOH ext   | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active   | [177]    |
| Pterocarpus ulei          | Peru    | Dried stembark   | EtOH (100%) ext | EPP-induced rat ear oedema/** | Rat     | Inactive | [103]    |
| Pterodon emarginatus      | Brazil  | Dried fruit      | Hexane ext | Carrageenan-induced pedal edema/Intragastric | Rat     | Active   | [178]    |
|                           | Brazil  | Dried fruit      | Hexane ext | Carrageenan-induced pedal edema/Intragastric | Rat     | Active   | [178]    |
| Stryphnodendron adstringens | Brazil  | Dried stembark   | Acetone ext | Acetic acid induced vascular permeability/Intragastric | Mouse   | Active   | [179]    |
|                           | Brazil  | Dried stembark   | Acetone ext | Dextran-induced pedal edema/carrageenan-induced pedal edema/Intragastric | Rat     | Active   | [179]    |
|                           | Brazil  | Dried stembark   | Acetone ext | **/Intragastric | Rat     | Weak activity | [179]    |
| Torresea cearensis        | Brazil  | Dried stembark   |             | Carrageenan-induced pedal edema/Intragastric | Rat     | Active   | [180]    |
| Flacouriaceae             |         |                 |            |                                  |         |          |          |
| Casearia sylvestris       | Brazil  | Fresh bark + leaf | Infusion   | Dye diffusion assay/Intragastric | Mouse   | Weak activity | [119]    |
| Gentianaceae              |         |                 |            |                                  |         |          |          |
Table 1. Cont.

| Species               | Country     | Part of Plant | Extraction Method | Assay/Induction                        | Species | Active/Inactive | Reference |
|-----------------------|-------------|---------------|------------------|----------------------------------------|---------|----------------|-----------|
| *Gentianella achalensis* | Argentina   | Dried aerial parts | Chromatographic fraction | 12-0-tetradecanoylphorbol-13-acetate(TPA)-induced ear inflammation/** | Mouse    | Active         | [181]     |
|                       | Argentina   | Dried aerial parts | Pet ether ext  | 12-0-tetradecanoylphorbol-13-acetate(TPA)-induced ear inflammation/** | Mouse    | Inactive       | [181]     |
|                       | Argentina   | Dried aerial parts | MeOH ext        | 12-0-tetradecanoylphorbol-13-acetate(TPA)-induced ear inflammation/** | Mouse    | Inactive       | [181]     |
|                       | Argentina   | Dried aerial parts | Dichloromethane ext | 12-0-tetradecanoylphorbol-13-acetate(TPA)-induced ear inflammation/** | Mouse    | Active         | [181]     |
|                       | Argentina   | Dried aerial parts | Dichloromethane ext | Carrageenan-induced pedal edema/Intragastric | Rat      | Inactive       | [181]     |
|                       | Argentina   | Dried aerial parts | Pet ether ext   | Carrageenan-induced pedal edema/Intragastric | Rat      | Inactive       | [181]     |
|                       | Argentina   | Dried aerial parts | MeOH ext        | Carrageenan-induced pedal edema/Intragastric | Rat      | Inactive       | [181]     |
| *Lamiaceae*           |             |               |                  |                                        |         |                |           |
| *Hyptis pectinata*    | Brazil      | Dried leaf     | H₂O ext          | Arachidonic acid-induced edema/Intragastric | Rat      | Active         | [182]     |
|                       | Brazil      | Dried leaf     | H₂O ext          | Carrageenan-induced pedal edema/Intragastric | Rat      | Active         | [182]     |
| *Lavandula latifolia* | Paraguay    | Aerial parts   | Chromatographic fraction | Carrageenan-induced pedal edema/** | Rat      | Active         | [183]     |
|                       | Paraguay    | Aerial parts   | EtOH (70%) ext   | Carrageenan-induced pedal edema/** | Rat      | Active         | [183]     |
| *Raphiodon echinus*   | Brazil      | Dried aerial parts | H₂O ext          | Acetic acid-induced dye diffusion/Intragastric | Mouse    | Active         | [129]     |
| *Liliaceae*           |             |               |                  |                                        |         |                |           |
Table 1. Cont.

| Plant                          | Origin | Part Used          | Extractant     | Activity (Model)                           | Species       | Activity     | Reference |
|-------------------------------|--------|--------------------|----------------|--------------------------------------------|---------------|--------------|-----------|
| *Polygonatum punctatum*       | Argentina | Oven dried aerial parts | CH$_2$Cl$_2$ ext | Phorbol myristate acetate-induced ear inflammation/** | Mouse         | Active       | [123]    |
|                               | Argentina | Oven dried aerial parts | H$_2$O ext     | Carrageenan-induced pedal edema/Intragastric | Rat           | Weak activity | [123]    |
| Linaceae                      | Peru    | Dried stem bark     | EtOH (100%) ext | EPP-induced rat ear oedema/**               | Rat           | Strong activity | [103]    |
| *Vantanea peruviana*          | Peru    | Dried stem          | EtoAc ext      | Carrageenan-induced pedal edema/Intragastric | Rat           | Active       | [184]    |
| Loasaceae                     | Peru    | Dried stem          | H$_2$O ext     | Carrageenan-induced pedal edema/Intragastric | Rat           | Active       | [184]    |
| *Mentzelia chilensis*         | Peru    | Dried stem          | EtOH (100%) ext | EPP-induced rat ear oedema/**               | Rat           | Strong activity | [103]    |
| Lythraceae                    | Peru    | Dried stem          | EtOH (100%) ext | Carrageenan-induced pedal edema/IP          | Rat           | Inactive     | [185]    |
| *Adenaria floribunda*         | Brazil  | Dried leaf          | EtOH (95%) ext | Carrageenan-induced pedal edema/IP          | Rat           | Active       | [186]    |
| Magnoliaceae                  | Brazil  | Dried leaf          | EtOH (100%) ext | Carrageenan-induced pedal edema/IP          | Rat           | Active       | [185]    |
| *Talauma ovata*               | Brazil  | Seed                | EtOH (90%) ext | Carrageenan-induced edema/Gastric Intubation | Rat           | Active       | [187]    |
| *Urena lobata*                | Ecuador | Dried entire plant  | EtOH (100%) ext | Carrageenan-induced pedal edema/Intragastric | Mouse         | Weak activity | [95]     |
| *Guarea guidonia*             | Brazil  | Seed                | EtOH (90%) ext | Carrageenan-induced edema/Gastric Intubation | Rat           | Active       | [187]    |
|                               | Brazil  | Seed                | EtOH (90%) ext | Cotton pellet granuloma/Gastric Intubation  | Rat           | Active       | [187]    |
| *Trichilia glabra*            | Argentina | Dried leaf          | EtOH (90%) ext | Zymosan-induced immediate inflammation moded/IP | Mouse         | Active       | [188]    |
Table 1. Cont.

| Family              | Country | Part Used   | Extraction Method | Test System                          | Species                          | Route | Activity | Ref.  |
|---------------------|---------|-------------|-------------------|--------------------------------------|----------------------------------|-------|----------|-------|
| Menispermaceae      | Peru    | Dried part not specified | EtOH (95%) ext  | Carrageenan-induced pedal edema/IP   | Abuta grandifolia                | Rat   | **       | [132] |
| Cissampelos sympodialis | Brazil | Dried leaf | EtOH (80%) ext  | Capsaicin induced edema/IP           | **                                | Mouse | Active   | [189] |
|                     | Brazil  | Dried leaf | EtOH (80%) ext  | 12-O-tetradecanoylphorbol-13-acetate(TPA)-induced ear inflammation/IP | **                                | Mouse | Active   | [189] |
| Monimiaceae         | Brazil  | Dried leaf | EtOH (80%) ext  | Carrageenan-induced pedal edema/IP   | Cissampelos sympodialis          | Rat   | Active   | [189] |
| Peumus boudius      | Chile   | Dried leaf | EtOH (70%) ext  | Carrageenan-induced pedal edema/IP   | Peumus boudius                   | Rat   | Active   | [190] |
| Moraceae            | Brazil  | Fresh root | Infusion          | Dye diffusion assay/Intragastric      | Dorstenia brasiliensis           | Mouse | Weak activity | [119] |
| Myristicaceae       | Peru    | Dried vine | EtOH (95%) ext  | Carrageenan-induced pedal edema/IP   | Virola pavonis                   | Rat   | Active   | [132] |
| Virola peruviana    | Peru    | Dried part not specified | EtOH (95%) ext  | Carrageenan-induced pedal edema/IP   | Virola peruviana                 | Rat   | Active   | [132] |
| Eugenia uniflora    | Brazil  | Fresh leaf | Infusion          | Carrageenan-induced pedal edema/Intragastric | **                                | Rat   | Active   | [191] |
|                     | Brazil  | Fresh leaf | EtOH (100%) ext  | Carrageenan-induced pedal edema/Intragastric | **                                | Rat   | Active   | [191] |
|                     | Brazil  | Fresh leaf | Decoction         | Carrageenan-induced pedal edema/Intragastric | **                                | Rat   | Active   | [191] |
|                     | Brazil  | Dried leaf | Infusion          | Carrageenan-induced pedal edema/Intragastric | **                                | Rat   | Inactive | [191] |
|                     | Brazil  | Dried leaf | EtOH (100%) ext  | Carrageenan-induced pedal edema/Intragastric | **                                | Rat   | Inactive | [191] |
Table 1. Cont.

| Species                        | Country | Extract/Part Used                     | Solvent (Extraction Method) | Test Results                                  | Species | Extract/Part Used                     | Solvent (Extraction Method) | Test Results                                  |
|--------------------------------|---------|---------------------------------------|-----------------------------|-----------------------------------------------|---------|---------------------------------------|-----------------------------|-----------------------------------------------|
| Psidium guineense              | Brazil  | Fresh leaf essential oil              | Essential oil              | Carrageenan-induced pedal edema/Intragastric  | Rat     | Active                               | [192]                        |                                               |
| Olacaceae Heisteria acuminata  | Ecuador | Dried part not specified              | CH₂Cl₂ ext                 | Carrageenan-induced pedal edema/Intragastric  | Mouse   | Inactive                             | [96]                         |                                               |
| Ecuador                       | Ecuador | Dried entire plant                    | EtOH (100%) ext            | Carrageenan-induced pedal edema/Intragastric  | Mouse   | Active                               | [95]                         |                                               |
| Orchidaceae Catasetum barbatum | Paraguay| Dried aerial parts                    | EtOH (70%) ext             | Carrageenan-induced pedal edema/**           | Rat     | Active                               | [193]                        |                                               |
| Phytolaccaceae Petiveria alliacea | Brazil  | Dried root                            | EtOH (70%) ext             | Croton oil-induced irritation/**             | Rat     | Active                               | [194]                        |                                               |
| Brazil                        | Brazil  | Dried root                            | EtOH (70%) ext             | Cotton pellet granuloma/**                  | Rat     | Active                               | [194]                        |                                               |
| Brazil                        | Brazil  | Dried root                            | Hydro-alcoholic ext        | Nystatin induced edema/Intragastric          | Rat     | Active                               | [195]                        |                                               |
| Brazil                        | Brazil  | Dried root                            | Hydro-alcoholic ext        | Carrageenan-induced pedal edema/Intragastric | Rat     | Active                               | [195]                        |                                               |
| Brazil                        | Brazil  | Dried root                            | Lyophilized extract        | Carrageenan-induced pedal edema/Intragastric | Rat     | Active                               | [195]                        |                                               |
| Brazil                        | Brazil  | Dried root                            | Hydro-alcoholic ext        | Cotton pellet granuloma/Intragastric         | Rat     | Active                               | [195]                        |                                               |
| Peru                          | Peru    | Dried entire plant                    | EtOH (100%) ext            | EPP-induced rat ear oedema/**               | Rat     | Inactive                             | [103]                        |                                               |
| Phytolacca bogotensis         | Ecuador | Dried entire plant                    | EtOH (100%) ext            | Carrageenan-induced pedal edema/Intragastric | Mouse   | Inactive                             | [95]                         |                                               |
| Ecuador                       | Ecuador | Dried entire plant                    | CH₂Cl₂ ext                 | Carrageenan-induced pedal edema/Intragastric | Mouse   | Inactive                             | [96]                         |                                               |
| Phytolacca rivinoides         | Ecuador | Dried entire plant                    | EtOH (100%) ext            | Carrageenan-induced pedal edema/Intragastric | Mouse   | Weak activity                        | [95]                         |                                               |
| Plant Family   | Country | Plant Part                        | Solvent  | Effect | Animal       | Status     | Reference |
|---------------|---------|-----------------------------------|----------|--------|--------------|------------|-----------|
| Piperaceae    |         |                                   |          |        |              |            |           |
| *Peperomia pellucida* | Ecuador | Dried entire plant               | CH$_2$Cl$_2$ ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Inactive | [96] |
| *Piper lenticellosum* | Ecuador | Dried entire plant               | EtOH (100%) ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Active   | [95] |
| *Piper marginatum* | Ecuador | Dried fruit                      | CH$_2$Cl$_2$ ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Active   | [96] |
| *Piper marginatum* | Brazil  | Dried leaf                       | H$_2$O ext | Carrageenan-induced pedal edema/Intragastric | Rat   | Active   | [198] |
| Plantaginaceae |         |                                   |          |        |              |            |           |
| *Plantago australis* | Brazil  | Dried root                       | Hydro-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Rat   | Active   | [199] |
| *Plantago australis* | Brazil  | Dried leaf                       | Hydro-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Rat   | Active   | [199] |
| *Plantago australis* | Brazil  | Dried fruit                      | Hydro-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Rat   | Active   | [199] |
| *Plantago major*   | Brazil  | Dried leaf                       | H$_2$O ext | Croton oil-induced edema/** | Mouse | Inactive | [200] |
| *Plantago major*   | Brazil  | Dried leaf                       | H$_2$O ext | Croton oil granuloma/** | Rat   | Active   | [200] |
| *Plantago major*   | Brazil  | Dried leaf                       | H$_2$O ext | Dextran-induced pedal edema/Intragastric | Rat   | Inactive | [200] |
| *Plantago major*   | Brazil  | Dried leaf                       | H$_2$O ext | Carrageenan-induced pleurisy/Intragastric | Rat   | Active   | [200] |
| *Plantago major*   | Brazil  | Dried leaf                       | H$_2$O ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Weak activity | [200] |
| Plant Family | Species | Country | Part | Extraction | Test | Test Condition | Animal | Activity | Reference |
|-------------|---------|---------|------|------------|------|----------------|--------|----------|------------|
| Polygonaceae | *Polygonum punctatum* | Brazil | Dried entire plant | Decoction | Carrageenan-induced pedal edema/Gastric intubation | Rat | Active | [201] |
| Brazil | Dried entire plant | EtOH-H₂O (1:1) ext | Carrageenan-induced pedal edema/Gastric intubation | Rat | Active | [201] |
| Brazil | Dried entire plant | EtOH-H₂O (1:1) ext | Carrageenan-induced pedal edema/** | Rat | Inactive | [201] |
| Brazil | Dried entire plant | Decoction | Carrageenan-induced pedal edema/** | Rat | Inactive | [201] |
| Polypodiaceae | *Campyloneurum phyllitidis* | Paraguay | Dried leaf | H₂O ext | Croton oil-induced edema/** | Mouse | Active | [106] |
| Paraguay | Dried leaf | CH₂Cl₂ ext | Croton oil-induced edema/** | Mouse | Active | [106] |
| Paraguay | Dried leaf | MeOH ext | Croton oil-induced edema/** | Mouse | Active | [106] |
| Paraguay | Dried leaf | H₂O ext | Carrageenan-induced pedal edema/IP | Mouse | Active | [106] |
| Paraguay | Dried leaf | MeOH ext | Carrageenan-induced pedal edema/IP | Mouse | Active | [106] |
| Paraguay | Dried leaf | CH₂Cl₂ ext | Carrageenan-induced pedal edema/IP | Mouse | Active | [106] |
| Proteaceae | *Lomatia hirsuta* | Chile | Dried leaf | Infusion | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active | [202] |
| Rhamnaceae | *Trevoa trinervis* | Chile | Dried aerial parts | MeOH ext | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Weak activity | [203] |
Table 1. Cont.

| Country | Plant Material and Part | Extractants | Inflammation Model | Route | Species | Activity | Reference |
|---------|-------------------------|-------------|--------------------|-------|---------|----------|-----------|
| Chile   | Dried aerial parts      | Hexane ext  | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Weak activity | [203] |
| Chile   | Dried aerial parts      | Dichloromethane ext | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Weak activity | [203] |
| Chile   | Dried aerial parts      | H2O ext     | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Weak activity | [203] |
| Chile   | Dried aerial parts      | MeOH ext    | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Active | [203] |
| Rosaceae | Acaena splendens     | CH2Cl2 ext  | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Weak activity | [204] |
| Chile   | Dried bark + spines     | Infusion    | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Weak activity | [204] |
| Chile   | Dried bark + spines     | MeOH ext    | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Weak activity | [204] |
| Chile   | Dried aerial parts      | Hexane ext  | Acetic acid-induced pedal edema |** | Mouse | Active | [205] |
| Chile   | Dried aerial parts      | CHCl3-MeOH extract (2:1) | Acetic acid-induced pedal edema |** | Mouse | Active | [205] |
| Chile   | Dried aerial parts      | MeOH ext    | Acetic acid-induced pedal edema |** | Mouse | Active | [205] |
| Chile   | Dried aerial parts      | CHCl3-MeOH extract (2:1) | Carrageenan-induced pedal edema | Intragastric | Guinea pig | Active | [205] |
| Country | Plant Origin | Part of Plant | Extrait/Preparation Method | Bioassay Method | Animal Model | Activity (Route) | Reference |
|---------|--------------|---------------|-----------------------------|-----------------|-------------|-----------------|-----------|
| Chile   | Dried aerial parts | H₂O soluble fraction | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active | [205] |
| Chile   | Dried aerial parts | MeOH ext | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active | [205] |
| Chile   | Dried aerial parts | Hexane ext | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Active | [205] |
| Rubiaceae | | | | | | | |
| Chiococca brachiata | Brazil | Fresh root | Infusion | Dye diffusion assay/Intragastric | Mouse | active | [119] |
| Coutarea hexandra | Brazil | Dried stem bark | EtOH (95%) ext | Carrageenan-induced pedal edema/Intragastric | Rat | Active | [206] |
| Uncaria guianensis | Peru | Dried bark | Lyophilized extract | **/** | Human adult | Active | [207] |
| Uncaria tomentosa | Peru | Freeze-dried bark | H₂O ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Active | [208] |
| Peru     | Freeze-dried bark | Hydro-alcoholic ext | Carrageenan-induced pedal edema/Intragastric | Mouse | Active | [208] |
| Peru     | Dried bark | Lyophilized extract | **/IP | Mouse | Active | [209] |
| Peru     | Dried bark | Lyophilized extract | **/Oral | Human adult | Active | [209] |
| Peru     | Dried bark | H₂O ext | Cell Culture 5-HT-induced pedal edema/Intragastric | In vitro | Active | [210] |
| Peru     | Dried bark | H₂O ext |zell Culture 5-HT-induced pedal edema/Intragastric | Rat | Active | [211] |
| Peru     | Dried bark | Lyophilized extract | **/Oral | Human adult | Active | [207] |
| Peru     | Dried vine | Type ext not stated | **/Route not given | Human adult | Active | [212] |
| Location | Part | Ext | Method | Induction | Species | Route |活性 | Ref. |
|----------|------|-----|--------|-----------|---------|-------|------|------|
| Peru     | Dried bark | Pet ether ext | 5-HT-Induced pedal edema/IP | Rat | Active | [213] |
| Peru     | Dried bark | H2O ext | Chronic intestinal inflammation induced by indomethacin/** | Rat | Active | [210] |
| Peru     | Dried root | Rootbark | Convulsions strychnine-induced/carrageenan-induced pedal edema/IP | Rat | Active | [214] |
| Peru     | Dried bark | EtoAc ext | 5-HT-Induced pedal edema/IP | Rat | Active | [211] |
| Peru     | Part not specified | Type ext not stated | **/** | Human adult | Equivocal | [215] |
| Brazil   | Dried leaf | Pet ether ext | Carrageenan-induced pedal edema/IP | Rat | Active | [216] |
| Brazil   | Dried leaf | EtOH (70%) ext | Carrageenan-induced pedal edema/IP | Rat | Active | [217] |
| Brazil   | Dried rootbark | EtOH (95%) ext | Carrageenan-induced pedal edema/Gastric Intubation | Rat | Active | [218] |
| Brazil   | Dried entire plant | EtOH (95%) ext | Histamine-induced edema/carrageenan-induced pedal edema/IP | Rat | Active | [219] |
| Brazil   | Dried entire plant | H2O ext | Carrageenan-induced pedal edema/IP | Rat | Inactive | [219] |
| Brazil   | Dried entire plant | EtOH (95%) ext | Carrageenan-induced pedal edema/IP | Rat | Active | [219] |
| Family         | Species               | Origin      | Part                  | Extract          | Assay/Route          | Animal | Activity     | Reference |
|---------------|-----------------------|-------------|-----------------------|------------------|--------------------|--------|--------------|-----------|
| Simaroubaceae | Simaba cedron         | South America | Seed                  | Ether ext        | **/SC              | Rat    | Inactive     | [219]     |
|               |                       | South America | Seed                  | Pet ether ext    | **/SC              | Rat    | Inactive     | [220]     |
| Solanaceae    | Brunfelsia bonodora   | Peru        | Dried part not specified | EtOH (95%) ext | Carrageenan-induced pedal edema/IP | Rat    | Active       | [132]     |
|               |                       | Brazil      | Root                  | MeOH ext         | Carrageenanin-induced pedal edema/Oral | Rat    | Active       | [221]     |
|               |                       | Brazil      | Root                  | CHCl$_3$ ext     | Data incomplete/Oral | Data incomplete Oral    | Rat    | Active       | [222]     |
|               |                       | Brazil      | Fresh leaf            | Infusion         | Dye diffusion assay/Intragastric | Mouse | Active       | [119]     |
|               |                       | Chile       | Dried aerial parts    | Infusion         | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Weak activity | [223]     |
|               |                       | Chile       | Dried aerial parts    | Decoction        | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Weak activity | [223]     |
|               |                       | Chile       | Dried aerial parts    | MeOH ext         | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Weak activity | [223]     |
|               |                       | Chile       | Dried aerial parts    | Dichloromethane ext | Carrageenan-induced pedal edema/Intragastric | Guinea pig | Weak activity | [223]     |
Table 1. Cont.

| Country   | Organ                | Extractant          | Activity        | Route                |
|-----------|----------------------|---------------------|-----------------|----------------------|
| Chile     | Dried aerial parts   | H$_2$O ext          | Carrageenan-induced pedal edema/Intragastric | Guinea pig          | Weak activity [223] |
| Chile     | Dried aerial parts   | Pet ether ext       | Carrageenan-induced pedal edema/Intragastric | Guinea pig          | Weak activity [223] |
| Chile     | Dried aerial parts   | MeOH ext            | Carrageenan-induced pedal edema/Intragastric | Guinea pig          | Weak activity [223] |

*Solanum lycocarpum*

| Country   | Organ                | Extractant          | Activity        | Route                |
|-----------|----------------------|---------------------|-----------------|----------------------|
| Brazil    | Dried fruit          | EtOH (95%) ext      | Croton oil-induced edema/Intragastric | Mouse               | Active [224]        |
| Brazil    | Dried fruit          | Alkaloid fract      | Carrageenan-induced pedal edema/SC | Mouse               | Active [224]        |
| Brazil    | Dried fruit          | Alkaloid fract      | Croton oil-induced edema/SC | Mouse               | Active [224]        |

*Turneraceae*

*Turnera ulmifolia*

| Country   | Organ                | Extractant          | Activity        | Route                |
|-----------|----------------------|---------------------|-----------------|----------------------|
| Brazil    | Dried entire plant   | Hydro-alcoholic ext | Cotton pellet granuloma/Intragastric | Rat                | Active [225]        |
| Brazil    | Dried entire plant   | EtoAc ext           | Carrageenan-induced pedal edema/Intragastric | Rat                | Inactive [225]      |

*Verbenaceae*

*Bouchea fluminensis*

| Country   | Organ                | Extractant          | Activity        | Route                |
|-----------|----------------------|---------------------|-----------------|----------------------|
| Brazil    | Dried leaf           | H$_2$O ext          | Carrageenan-induced pedal edema/Route not given | Rat                | Active [87]         |
| Brazil    | dried aerial parts   | EtOH (95%) ext      | 5-ht-induced pedal edema/Intragastric | Mouse               | Active [226]        |
| Brazil    | dried aerial parts   | EtOH (95%) ext      | Histamine-induced pedal edema/Intragastric | Mouse               | Active [226]        |
| Brazil    | dried aerial parts   | EtOH (95%) ext      | Carrageenan-induced pedal edema/Intragastric | Mouse               | Active [226]        |

*Stachyartheta cayennensis*

| Country   | Organ                | Extractant          | Activity        | Route                |
|-----------|----------------------|---------------------|-----------------|----------------------|
| Brazil    | Dried leaf           | EtOH (70%) ext      | Carrageenan-induced pedal edema/Intragastric | Rat                | Weak activity [227] |
Table 1. Cont.

| Country | Plant Part | Extract | Assay Type | Species | Activity | Reference |
|---------|------------|---------|------------|---------|----------|-----------|
| Brazil  | Dried leaf | Infusion | Carrageenan-induced pedal edema | Rat | Active | [227] |
| Brazil  | Dried entire plant | H₂O ext | Dextran-induced pedal edema/carrageenan-induced pedal edema | Mouse | Inactive | [227] |
| Brazil  | Dried leaf | Butanol ext | Carrageenan-induced pedal edema/IP | Salvelinus alpinus | Weak activity | [227] |
| Brazil  | Dried leaf | Butanol ext | Carrageenan-induced pedal edema/IP | Rat | Active | [227] |
| Winteraceae | Drimys winter | Dried bark | Hydro-alcoholic ext | PGE₂ induced paw oedema | Rat | Equivocal | [229] |
| Brazil  | Dried bark | Hydro-alcoholic ext | Histamine-induced edema | Rat | Inactive | [229] |
| Brazil  | Dried bark | Hydro-alcoholic ext | Carrageenan-induced pedal edema/IP | Rat | Active | [229] |
| Brazil  | Dried bark | Hydro-alcoholic ext | Dextran-induced pedal edema/IP | Rat | Active | [229] |
| Brazil  | Dried bark | Hydro-alcoholic ext | Bradykinin-induced pedal edema/IP | Rat | Weak activity | [229] |
| Brazil  | Dried bark | Hydro-alcoholic ext | Paw oedema | Rat | Weak activity | [229] |
| Brazil  | Dried bark | Hydro-alcoholic ext | Paf-acether induced paw oedema/IP | Rat | Weak activity | [229] |
| Brazil  | Dried bark | Hydro-alcoholic ext | Ovalbumine induced paw oedema/IP | Rat | Weak activity | [229] |
| Zingiberaceae | | | | | | [229] |
Table 1. Cont.

| Plant Family          | Country     | Part          | Extract                   | Test Model                        | Species                  | Active Sources |
|-----------------------|-------------|---------------|---------------------------|-----------------------------------|--------------------------|----------------|
| Zingiber officinale   | Brazil      | Fresh rhizome | Hydro-alcoholic ext       | Carrageenan-induced pedal edema/IP | Rat                      | Active [230]   |
|                       | Brazil      | Fresh rhizome | Hydro-alcoholic ext       | 5-ht-induced pedal edema/IP        | Rat                      | Active [230]   |
|                       | Brazil      | Fresh rhizome | Hydro-alcoholic ext       | 48180 compound-induced edema/**    | Rat                      | Active [230]   |
|                       | Brazil      | Fresh rhizome | Hydro-alcoholic ext       | 48180 and 5-ht induced skin edema/IP | Rat                      | Active [230]   |
| Zygophyllaceae        | Argentina   | Dried leaf    | MeOH ext                  | Cotton pellet granuloma/Intragastric | Rat                      | Active [231]   |
| Larrea divaricata     | Argentina   | Dried leaf    | H₂O ext                   | Peritoneal macrophages/IP          | Mouse                    | Active [232]   |

** Incompleted dates; IP = intraperitoneal; SC = subcutaneous; EtOH = ethanolic extract; H₂O ext = aqueous extract; MeOH ext = methanol extract; EtoAc ext = ethyl acetate extract; CH₂Cl₂ ext = dichloromethane extract; CHCl₃ ext = chloroformic extract; CCl₄ = chloroform; MeCl₂ ext = dichloromethane extract; EtOH-H₂O = crude aqueous/alcoholic extract; CHCl₃-MeOH extract = dichloromethane and methanol extract.
3. Material and Methods

In the present work, the anti-inflammatory activity of the plants was searched through the data bank of the University of Illinois in Chicago, the NAPRALERT (Acronym for Natural Products ALERT). The data were updated in September 2009, using anti-inflammatory plants as legend. The plant extracts studied in South America were selected for this work and the references found in the search were later consulted for details of the models or mechanisms.

4. Conclusion

Given the above, this review is of fundamental importance to intensify studies with medicinal plants for the discovery of new bioactive molecules in healing of many diseases, including inflammation, thus benefiting populations affected by ensuring a better quality of life.

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