Anti-inflammatory activity of medicinal plants native to Bangladesh: A review

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ABSTRACT

Inflammation is characterized by redness, pain and swelling. Anti-inflammatory drugs are agents that reduce inflammation. It has been found that conventional synthetic NSAIDs accelerate damage and erosion of joint cartilage, advancing the osteoarthritis process. These NSAIDs are also known to cause liver and kidney damage with long-term use. Experimental research have shown that the use of proven natural anti-inflammatory herbal agents have not been shown to cause erosion injury to the intestinal tract, acceleration of cartilage destruction or production of liver and kidney toxicities. This enables practitioners to use these substances in a safe and responsible way. In this overview the medicinal plants reported to have anti-inflammatory activity available in Bangladesh are summarized to assess the research advancements.

Keywords: Anti-inflammatory, Inflammation, Bangladesh, NSAID, Medicinal plants, Pain.

INTRODUCTION

Inflammation is a severe response by living tissue to any kind of injury. There can be four primary indicators of inflammation: pain, redness, heat or warmness and swelling. When there is injury to any part of the human body, the arterioles in the encircling tissue dilate. This gives a raised blood circulation towards the area (redness) (Burke et al., 2005). Vasoactive chemicals also increase the permeability (increase pore size) of these arterioles which allows blood cells, chemical substance, blood proteins and fluid to accumulate in that region. This fluid accumulation causes swelling and may compress nerves in the area resulting in pain. In addition, prostaglandins, that might also result in ‘irritatio’ of the nerves and further contribute to pain. Most people who take anti-inflammatory drugs have no side-effects, or only minor types. When taken appropriately, the advantage usually far outweighs the possible harms. In particular many people have a short course of an anti-inflammatory for all sorts of painful conditions. However, side-effects, and also occasionally very severe possible adverse effects, can occur. There are a number of anti-inflammatory herbs that could help to achieve similar results without the harmful effect (Burke et al., 2005).
DESCRIPTION

Despite the progresses in modern medicine, it has been reported that more than 70% of the developing world’s population still depends on complementary and alternative systems of medicine, otherwise known as traditional medicine (Shaikh et al., 2005). Some herbs possess anti-inflammatory properties and have the ability to reduce both internal and external swelling and inflammation. Herbal drugs have gained importance and popularity in recent years because of their safety, efficacy and cost effectiveness. In Bangladesh there are several indigenous medicinal plants available that have anti-inflammatory capabilities. Lists of these medicinal plants are given in table 1.

DISCUSSION

The crude extracts of the various parts or the whole plants of the medicinal plants and isolated compounds from the medicinal plants showed statistically significant anti-inflammatory activity both in in vivo and in vitro assay. The in vivo bioassay was conducted on formalin (Mosaddek et al., 2008), serotonin and egg albumin (Alam et al., 2008) or carrageenan (Saha et al., 2007) induced paw edema in the rat and the result was compared with various positive controls. Cotton pellet implantation model (Das et al., 2005; Bala et al., 2011) or xylene-induced ear edema in mice (Ali et al., 2011) for anti-inflammatory activity was also used by the researchers. As a positive control researchers used various standard anti-inflammatory compounds like phenylbutazone (Datta et al., 2004), dexamethasone (Mosaddek et al., 2008), diclofenac sodium (Ahmed et al., 2004), indomethacin (Alam et al., 2008), etc. In vitro anti-inflammatory activity was evaluated using protease enzyme inhibition method (Alam et al., 2011). In a study (Rashid et al., 2011), researchers revealed the significant in vitro membrane stabilizing effect of two Bangladeshi medicinal plants namely Mesua nagassarium, Kigelia pinnata, which indicates the anti-inflammatory activity of the medicinal plants. From Persicaria stagnina (Ahmed et al., 1997), Scoparia dulcis (Ahmed et al., 2001), Polygonum viscosum (Datta et al., 2004) and Sida cordifolia (Sutradhar et al., 2007) researchers isolated potent anti-inflammatory compounds and tested using standard methods. The compounds were of sesquiterpene, dipterpen, flavonoid glycoside and alkaloid types. In case of the rest of the medicinal plants the researchers conducted the anti-inflammatory study using the crude extracts and found significant activity.

Table 1: Bangladeshi medicinal plants with anti-inflammatory activity and their traditional use (Uddin, 2006; Ghani, 2003).

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Local name</th>
<th>Traditional use(s)</th>
<th>Scientific name</th>
<th>Family</th>
<th>Part(s) used for the study</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bisshkatali</td>
<td>Duretic, analgesic</td>
<td>Persicaria stagnina</td>
<td>Polygonaceae</td>
<td>Whole plant</td>
<td>Ahmed et al., 1997</td>
</tr>
<tr>
<td>2</td>
<td>Misridana</td>
<td>Anti diabetic, gastric ulcer</td>
<td>Scoparia dulcis</td>
<td>Scrophulariaceae</td>
<td>Leaves</td>
<td>Ahmed et al., 2001</td>
</tr>
<tr>
<td>3</td>
<td>Ti plant</td>
<td>Antipyretic, lung infection</td>
<td>Cordyline terminalis</td>
<td>Agavaceae</td>
<td>Not found</td>
<td>Ahmed et al., 2004</td>
</tr>
<tr>
<td>4</td>
<td>Ahalo Bisshkatali</td>
<td>Duretic, analgesic</td>
<td>Polygonum viscosum</td>
<td>Polygonaceae</td>
<td>Aerial parts</td>
<td>Datta et al., 2004</td>
</tr>
<tr>
<td>5</td>
<td>Balkan</td>
<td>Stomachic, diuretic, antiasthmatic</td>
<td>Lippia nodiflora</td>
<td>Verbenaceae</td>
<td>Leaves</td>
<td>Ahmed et al., 2004</td>
</tr>
<tr>
<td>6</td>
<td>Ulu</td>
<td>Fever</td>
<td>Imperata cylindrica</td>
<td>Poaceae</td>
<td>Not found</td>
<td>Saha et al., 2005</td>
</tr>
<tr>
<td>7</td>
<td>Dhandul, Amur</td>
<td>Dysentery, skin diseases</td>
<td>Amoora cucculata</td>
<td>Meliaceae</td>
<td>Leaves</td>
<td>Das et al., 2005</td>
</tr>
<tr>
<td>8</td>
<td>Bhant</td>
<td>Bronchitis, asthma</td>
<td>Clerodendron viscosum</td>
<td>Verbanaceae</td>
<td>Aerial parts</td>
<td>Khatay et al., 2005</td>
</tr>
<tr>
<td>9</td>
<td>Choi</td>
<td>Paralysis, schizophrenia</td>
<td>Piper chaba</td>
<td>Piperaceae</td>
<td>Stem</td>
<td>Rahman et al., 2005</td>
</tr>
<tr>
<td>10</td>
<td>Raktodrone</td>
<td>Tonic, febrifuge</td>
<td>Leonurus sibiricus</td>
<td>Lamiaceae</td>
<td>Aerial part</td>
<td>Islam et al., 2005</td>
</tr>
<tr>
<td>11</td>
<td>Lajkari</td>
<td>Antiasthmatic, antiinflamme, antiallergic</td>
<td>Polygonum lanatum</td>
<td>Polygonaceae</td>
<td>Whole plant</td>
<td>Saha et al., 2005</td>
</tr>
</tbody>
</table>

Kulaiya

Eye diseases, stomach trouble

Desmodium triflorum

Fabaceae

Whole plant

Chowdhury et al., 2005

Dolon Champa

Antirheumatic, febrifuge

Hedygium coronarium

Zingibereaceae

Rhizome

Shrotiya et al., 2007

Brela

Tonic, astringent, emollient

Sida cordifolia

Malvaceae

Aerial parts

Sutradhar et al., 2007

Chitki, Panjuli

Antidiabetic

Phyllanthus reticulatus

Euphorbiaceae

Aerial parts

Saha et al., 2007

Keu, Kemak

Osteoarthritis, otitis

Costus speciosus

Zingibereaceae

Aerial parts

Alam et al., 2008

Neem

Rheumatic disorders, antiallergic

Acadinricha indica

Meliaceae

Leaves

Mosaddek et al., 2008

Sirish, Koror

Toothache, gum diseases

Albizia lebbeck

Fabaceae

Bark

Saha et al., 2009

Neem

Arthritis, gout, fever, pain

Acadinricha indica

Meliaceae

Leaves

Mahabub-Uz-Zaman et al., 2009

Morphal, Belong

Bronchitis, asthma

Xeromphis spinosa

Rubiaceae

Bark

Das et al., 2009

Aum

Antiasthmatic

Mangifer indica

Anacardiaceae

Leaves

Islam et al., 2010

Muktajhuri

Bronchitis, asthma, arthritis

Acaslypha indica

Euphorbiaceae

Whole plant

Rahaman et al., 2010

Rakta kombol

Arthritis, gout, rheumatism

Adenanthera pavonina

Fabaceae

Barks

Ara et al., 2010

Bara Bisshkatali

Duretic, analgesic

Polygonum stagninum

Polygonaceae

Aerial parts

Mess et al., 2010

Bittarak

Boils

Argyria argentea

Convolvulaceae

Leaves

Uddin et al., 2010

Kalo Sarisha, Rai Sarisha

Rheumatism, toothache

Brassica nigra

Brassicaceae

Leaves

Alam et al., 2011

Manakhu

Abdomen & spleen diseases

Alocasia indica

Araceae

Rhizomes

Rahaman et al., 2011

Nagesar

Cough, rheumatism

Mesua nagassarium

Clusiaceae

Leaves

Rashid et al., 2011

Haritaki

Wounds, abscesses

Kigelia pinnata

Bignoniaceae

Leaves

Rashid et al., 2011

Sadi urisha

Rheumatoid arthritis

Clausena sigrificiosa

Rutaceae

Root

Chakma et al., 2011

Jhau

Sore throat, ulcerating piles

Tamarix indica

Tamaricaceae

Root

Rahman et al., 2011

Alkushi

Rheumatism, snakebite

Macuna pruriens

Fabaceae

Aerial parts

Bala et al., 2011

Potol

Antidiabetic, skin disorders

Trichosanthos dioica

Cucurbitaceae

Fruit

Alam et al., 2011

Lalmesta

Rheumatic fever, ulcer

Hibiscus sabdariffa

Malvaceae

Calx

Ali et al., 2011

Gina shak

Arthritis

Glinus oppositifolius

Molluginaceae

Whole plants

Hoque et al., 2011

Supurn

Boils, fevers, gout

Cymbidium aloifolium

Orchidaceae

Leaves

Howlader et al., 2011

...
CONCLUSION

The advancement of allopathic medication shifted scientific and general people’s interest from conventional medicinal preparations. However, in recent years, a significant paradigm change has taken place. Attraction has re-focused in traditional medicine, simply because of the higher cost of modern drugs, time and expenditure which is essential to bring a drug to market after proper clinical tests, severe side-effects of a variety of modern drugs, and drug-resistance developing in both microorganisms and parasites. So, researchers are currently taking an active interest in traditional medicinal preparations of native peoples, which are plant-based. In recent years researcher are working on anti-inflammatory plants. Inflammatory diseases are common in the aging society of developed and developing countries; yet, the drugs used to combat inflammatory diseases like rheumatoid arthritis often have serious side-effects. Several leads from plant sources, like curcumin, resveratrol, baicalein, boswellic acid, betulinic acid, ursolic acid and oleandric acid are now studied as possible drugs for the future against inflammatory (Gautam et al., 2009). This review will help the recent and future researchers in their research work as they could select the anti-inflammatory medicinal plants from which they can isolate active constituents by using various separation techniques. These types of research works may unveil some new molecules which help us to fight against inflammatory disorders.

Most of the researchers concluded their study by mentioning that the anti-inflammatory activity may be due to inhibition of the enzyme cyclooxygenase leading to inhibition of prostaglandin synthesis. But more extensive study could be conducted to determine exact mechanism(s) of action.

REFERENCES


