



## Antinociceptive Activity of Traditional Chinese Medicinal Plants

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### ABSTRACT

The Antinociceptive activity of many traditional Chinese herbs are discussed in this paper. Few of the traditional Chinese medicines are focused such as *Murraya exotica*, *Taxillus liquidambaricola*, mycelial extract from three species of fungi of Basidiomycetes, *Polygonatum verticillium*, *Croton tiglium*, *Angelica root*, *Salvia miltiorrhiza bunge*. Their general uses and mainly the antinociceptive activity are compiled together in this review.

**Keywords:** Antinociceptive activity, Chinese herbs, TCM.

### INTRODUCTION

Chinese tradition of using herbal medicines was developed more than 5000 years ago. Traditional Chinese medicines are based on Ying yangism. There are over 300 herbs that are commonly being used today.<sup>1</sup>

Pain and inflammation are some of the most common manifestations of disease affecting millions of people worldwide. Even though there are effective orthodox medicines used to alleviate these manifestations, traditional medicine practitioners have used herbal medicines to treat various ailments including pain and inflammation.<sup>2</sup> Thus the main aim of this article is to state that these herbs have the property to reduce the sensitivity to painful stimuli.

#### Murraya Exotica

This is a folk medicine used in southern China. It belongs to Rutaceae family. Its common name is Julixiang. Dried leaves of *Murraya exotica* are extracted with ethonol.



Figure 1: *Murraya exotica*

#### Uses

For the treatment of various disorders such as cough, fever and infectious bone as well as alleviating pain.<sup>4</sup>

#### Antinociceptive Actions

Wu L et al, Min-Hsiung Pan *et al*, found that antinociceptive activity is present in murraya exotica through their research. They concluded that this herb decreased writhing response, paw edema, ear swelling in rat. The iNOS activity, IL-1 $\beta$  and TNF- $\alpha$  showed decrease and increase of superoxide dismutase activity Analgesic effects are seen. It has a strong anti-oxidant crude drug that may either mitigate or prevent generation of free radicals.<sup>3,5</sup>

#### Taxillus Liquidambaricola

Chinese Name : Sang Ji Sheng

English Name : Mulberry Mistletoe Stem



Figure 2: *Taxillus liquidambaricola*

#### Uses

To treat rheumatic arthralgia, threatened abortion and hypertension.

#### Anti nociceptive Actions

Anti-inflammatory mechanisms of *Taxillus liquidambaricola* was studied by Jeng-Shyan Denga et al that there was decrease in the level of malondi aldehyde, induced nitric oxide iNOS, and cyclooxygenase-2 COX-2 by increasing the activities of catalase, superoxide dismutase, and glutathione peroxidase in the edema paw.<sup>6</sup>

**Mycelial Extract from Three Species of Fungi of Basidiomycetes**

These are fermented mushroom of *Ganoderma lucidum*, *Coprinus comatus* and *Grifola frondosa*.



**Figure 3:** *Ganoderma lucidum*, *Coprinus comatus* and *Grifola frondosa*

**Uses**

They showed strong activities against neurolysin, a protease involved in the regulation of dynorphin and neurotensin metabolism.

**Antinociceptive Actions**

Chunchao Han compared three species of fungi of basidiomycetes and found that the antinociceptive activity was due to the inhibition of inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2) through the down regulation of nuclear factor kappaB (NF-kappaB) binding activity.<sup>7</sup>

**Polygonatum Verticillium**

*Polygonatum verticillatum* is a perennial rhizomatous herb also known as Yu Zhu. *Polygonatum* (King Solomon's-seal, Solomon's Seal) is a genus of about 57 species belongs to family Liliaceae or Convallariaceae. It is widely distributed in East Asia, mainly China and Japan where 40 species of *Polygonatum* are found. Solomon's seal has been used for thousands of years in herbal medicine.

**Uses**

Antiperiodic, antitussive, cardiotoxic, demulcent, diuretic, energizer, hypoglycemic, sedative, tonic, anti diabetic and are used in the treatment of dry coughs and pulmonary problems, including tuberculosis, emollient, aphrodisiac, appetizer and tonic, galactagogue (increases milk release), weakness.<sup>8</sup>



**Figure 4:** *Polygonatum verticillium*

**Antinociceptive Actions**

Haroon Khan *et al* studied the antinociceptive activity of this plant. This thus was useful in the treatment of pain, pyrexia, burning sensation and for phthisis. It is also used in combination with other herbs to promote urine discharge (diuretic) and removes painful urine. The opioid dependant central effect of the *Polygonatum verticillatum* has synergistic effect by enforcing the peripheral analgesic.<sup>9</sup>

**Croton Tiglium**

The seed of *Croton tiglium* is a well known folk medicine. It is also known as Ba Dou. The genus *Croton* belongs to the family Euphorbiaceae.





Figure 5: *Croton tiglium*

### Uses

Constipation, a purgative and treating dyspepsia, dysentery and to treat the gastrointestinal disorders, intestinal inflammation, rheumatism, headache, peptic ulcer, leukemia and visceral pain.<sup>10</sup>

### Antinociceptive Actions

Zhen Liu et al found that the mechanism of Croton oil induced contraction was mediated via Ca<sup>2+</sup> influx through L-type Ca<sup>2+</sup> channel in mice. The active compounds for *C. tiglium* induced muscle contraction maybe phorbol esters. Eight phorbol esters isolated from the *C. tiglium* have the ability to inhibit an HIV induced cytopathic effect on MT-4 cells.<sup>11</sup>

### Angelica Root

Also known as Bai Zhi or Dang Gui.

Family: *Apiaceae*, parsley family

Part used in Chinese medicine: root



Figure 6: *Angelica root*

### Uses

For aches and pains that are aggravated by cold or damp weather. Nourishes the blood, regulates the menses, mildly invigorates and harmonizes the blood. Used for flatulence, heart burn, anorexia, arthritis, plague, insomnia, dyspepsia, unblocks nasal passage, etc.<sup>12</sup>

### Antinociceptive Actions

Kunanusorn P et al and Min-Hsiung Pan et al., have mentioned in their article that angelica root suppresses NO, PGE<sub>2</sub> and TNF- $\alpha$  production by blocking the activation of p38 MAPK, extracellular signal regulated kinase, Jun N terminal kinase and downstream transcription factors AP and NF- $\kappa$ B. This can relieve pain, headache and has anti-inflammatory and anti-spasmodic effect.<sup>13,5</sup>

### Salvia Miltiorrhiza Bunge

Tanshinone II A is an extract from *Salvia Miltiorrhiza bunge*. It is also known as Danshen.



Figure 7: *Salvia miltiorrhizabunge*

### Uses

For anti-atherosclerosis, anti-hypertensive effects and for the treatments of alcoholism.<sup>14</sup> It lowers plasma viscosity, erythrocyte aggregation.<sup>15</sup>

### Anti nociceptive Actions

Donghong Gao et al., showed that *Salvia Miltiorrhiza bunge* inhibits pro-inflammatory cytokine IL-1 $\beta$ , IL-6 and TNF- $\alpha$ , inhibits inflammatory serum markers of CRP and MCP-1, decreases cardiac inflammation by suppressing NF- $\kappa$ B p56 protein phosphorylation and reducing of myeloperoxidase activity in BALB/c Mice.<sup>16,5</sup>

### CONCLUSION

The herbs *Murraya exotica*, ethanolic extracts of *Taxillus liquidambaricola*, mycelial extract from three species of fungi of Basidiomycetes, *Polygonatum verticillium*, *Croton tiglium*, *Angelica root*, *Salvia miltiorrhiza bunge* has antinociceptive activity. This had already been investigated by medicine practitioners.

The anti-inflammatory effects, antioxidant and antinociceptive effects can be related to iNOS and COX-2 reduction and reduction of excess TNF- $\alpha$  generation and increase of antioxidant enzymes and their needs more study on these herbs to know about other pharmacological actions.

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