



# Pau D'arco

*Handroanthus impetiginosa*

## Common names

Lapacho, taheebo

## Family

*Bignoniaceae* (trumpet creepers)

## Part used

Inner bark/heart wood

## Background and traditional uses

The common name 'pau d'arco' refers to approximately one hundred evergreen trees in the *Bignoniaceae* family that are indigenous to tropical South America, making *Handroanthus impetiginosa* somewhat difficult to correctly identify. The tree is hard, durable and strikingly attractive, growing up to 38 metres tall and covered in bright rose to violet coloured flowers that bloom before the growth of new leaves. The trees show extreme resistance to fungal growths and insects.<sup>1,2</sup>

Pau d'arco has been used by indigenous Brazilians for at least a thousand years, who have prized the tea brewed from the inner bark as a medicinal panacea, prescribed for skin diseases and cancers, fevers, sore throats, dysentery, cancers and applying the bark topically to wounds and snake bites.<sup>3,4</sup> The inner bark has also been used orally for infectious diarrhoea, bladder infections, parasitic infections, cancer, diabetes, ulcers, gastritis, liver ailments, asthma, bronchitis, cystitis, prostatitis, ringworm, rheumatism, hernias, gonorrhoea, syphilis, chlorosis, boils, wounds, as a tonic and blood builder, and for viral respiratory infections including the common cold and flu.<sup>1,4,5</sup>

Pau d'arco also has a strong traditional reputation for treating *Candida albicans* infections, both orally and topically, and it has become very popular in modern western herbal medicine for this purpose.<sup>1-5</sup>

## Actions

### Primary:<sup>6</sup>

- Antibacterial
- Antifungal
- Anti-inflammatory
- Antiparasitic
- Antitumour
- Antiviral
- Lymphagogue

### Secondary:<sup>5</sup>

- Antidepressant
- Depurative
- Immune enhancing
- Cytotoxic

## Applications and indications

- Adjuvant therapy for cancers and leukaemias.<sup>6</sup>
- Adjuvant therapy for protozoal infections.<sup>6</sup>
- Topical treatment for skin diseases and disorders, including fungal infections, skin cancers and varicose ulcers.<sup>5</sup>

## Active constituents and pharmacodynamics

The most significant compounds found in pau d'arco are considered to be the naphthaquinones, which include lapachol and various furanonaphthoquinones. Lapachol is often identified as the main active constituent in pau d'arco and a large portion of the pharmacological research on the herb is based on it.<sup>5</sup>

Lapachol has been of particular interest to researchers due to strong preclinical indications of cytotoxic activity via the induction of cellular and immune factors, while also showing specific activity against certain species of parasites and other microbes.<sup>5</sup> The furanonaphthoquinones are thought to retain significant antitumour and immune-enhancing activities.<sup>5</sup>

## Summary of clinical evidence

The majority of evidence for the therapeutic uses of pau d'arco consists of *in vivo* and *in vitro* investigations that served to theoretically legitimise many of the traditional uses of the plant. It is clear that further investigation via human trials is necessary.

### Anti-inflammatory

Daily oral administration of pau d'arco at 100mg/kg was shown to completely diminish arachadonic acid induced mouse ear oedema in one week in a 2008 *in vivo* experiment.<sup>7</sup> Previous to this investigation, *in vitro* testing had shown water extracts of pau d'arco had significantly suppressed the production of prostaglandins and nitric oxide, and blocked the expression of their catalyzing enzymes, in lipopolysaccharide-stimulated cells. The researchers concluded that pau d'arco appears to modulate macrophage-mediated inflammatory responses by suppressing the production of inflammatory prostaglandins and suggested that the herb could be useful in the treatment of arthritis, atherosclerosis and other inflammatory diseases.

### Cancer treatment adjuvant

*In vivo* and *in vitro* investigations have shown that pau d'arco and isolated lapachol show great promise as a cytotoxic agent. However, the mere two human clinical trials conducted on cancer patients were prematurely stopped and showed a high dropout rate respectively.<sup>5</sup> The first, involving 21 leukaemia patients, was ceased due to prolonged prothrombin times and thus potential anticoagulant effects in participants.<sup>8</sup> The high doses that were calculated to be required for antitumour activity also caused nausea and vomiting in several subjects.

The second trial of nine cancer patients saw three participants cease treatment due to nausea and vomiting, although of the remaining six, three had complete remissions from their cancers.<sup>9</sup> Both trials utilised isolated lapachol dosed at 0.25-0.5g and 20-30mg/kg respectively – doses difficult to achieve using whole bark extracts of pau d'arco. It is likely that other constituents in the plant bark would offset the digestive disturbances caused by isolated lapachol.

Despite the lack of clinical data, pau d'arco is regularly employed as an adjuvant therapy for patients with cancer and leukaemia with strong positive anecdotal evidence.<sup>5</sup>

### Obesity

Recent preclinical *in vivo* experiments have suggested that pau d'arco may have promise as a supportive treatment for weight loss. In mice fed a high fat diet, the addition of an ethanolic extract of the herb was associated with reduced body weight gain, fat accumulation in the liver, fat pad weight, hypertrophy of fat cells and lower serum levels of triglycerides, insulin and leptin. The researchers also examined the effects of pau d'arco on mRNAs and proteins related to lipid metabolism and suggested that the herb may regulate gene expressions of obesity.<sup>10</sup>

### Antidepressant

*In vivo* experiments have explored the traditional use of pau d'arco as an antidepressant by testing the effects of an ethanolic extract on mice modeling depression via olfactory bulbectomy. This procedure causes disruption in the limbic-hypothalamic axis and induced changes in behavior and neurological functions that resemble those of human depressed patients. Mice treated with pau d'arco were seen to display significant improvements in tail suspension tests (TSTs) and behavioural self-care and motivation compared to the control group; results indicative of antidepressant effects.<sup>13</sup> Further exploration by the same research team deduced that the antidepressant actions of the herb were likely dependent on a blockade of NMDA receptor activation and inhibition of NO-cGMP synthesis.<sup>3</sup>

## Dosage summary

**Liquid extract (1:1):** 10-20mL/week<sup>12</sup>

**Liquid extract (1:2):** 20-50mL/week<sup>5</sup>

## Safety information

- Pau d'arco is considered a category D substance and must not be taken during pregnancy or attempted conception. Pau d'arco must be used with caution in breastfeeding mothers.<sup>5</sup>
- Clinical trials have shown that high doses of isolated lapachol can cause nausea and vomiting in patients with cancers and leukaemias.<sup>5</sup>
- Must be prescribed with caution for patients taking anticoagulation medications as pau d'arco has an anticoagulant action.<sup>5</sup>

## References

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