

Medicinal Plant Images

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Figure 1: *Petalostigma triloculorae* (commonly known as quinine bush) unripe fruit and leaves. *Petalostigma* is an Australian *Euphorbiaceae* genus which consists of 7 species. They grow to between 2 and 10 metres in height and have bright orange fruit (when ripe). *Petalostigma* species were used extensively by indigenous Australians to treat a myriad of bacterial, fungal and viral diseases.¹ *P. pubescens* bark and fruit decoctions were used extensively by Australian Aborigines as an antiseptic and to treat sore eyes. Fruit were also held in the mouth to relieve toothache.¹ Despite its common name, there is no scientific evidence to support the presence of quinine in the fruit or leaves (the common name is presumably due to the extremely sharp bitter flavour of the fruit). Recent studies have confirmed the antibacterial, antifungal and antiviral activity of extracts of the leaves and fruit of this plant.^{2,3} Interestingly, it has recently been reported that *Petalostigma* spp. extracts not only have inherent antibacterial activity, but they also contain synergising compounds that allow conventional antibiotics to function, even in bacterial strains otherwise resistant to their actions.⁴ This photograph was taken at Griffith University, Brisbane, Australia in November 2020 by Dr. Ian Cock.



Figure 2: *Aloe* is a genus of approximately 400 succulent plants, many of which are native to Africa. Plants of the genus *Aloe* have one of the longest recorded history of medicinal usage and are amongst the most widely used plants for traditional medicinal purposes worldwide. The Aloes have been used since ancient times, particularly for the treatment of microbial infections, gastrointestinal disorders and inflammatory conditions.⁵ Some *Aloe* spp. have also been used to treat fungal skin disease,⁶ bacterial⁷ and viral respiratory diseases,⁸ malaria,⁹ diabetes¹⁰ and parasite infestations.¹¹ *Aloe vera*, *Aloe ferox*, *Aloe arborescens* and *Aloe perryi* are the best known and most widely used, although many other species are also used for their therapeutic properties. Despite their wide spread usage, studies from different laboratories often report wide variations in the therapeutic bioactivities from *Aloe* spp., with some studies reporting potent antibacterial activity,^{12,13} yet other studies reporting a complete lack of activity.¹⁴ Leaves from individual plants within the same species may have widely varying levels of the bioactive phytochemicals and thus wide variances in bioactivity. Phytochemical analyses have shown that many *Aloe* species contain various carbohydrate polymers (notably glucomannans) and a range of other low molecular weight phenolic compounds including alkaloids, anthraquinones, anthrones, benzene and furan derivatives, chromones, coumarins, flavonoids, phytosterols, pyrans and pyrenes.⁵ Intra and interspecies differences in the levels and redox states of the individual *Aloe* components (and in the ratios of these components) may affect the physiological properties of *Aloe* extracts.¹⁵ Due to the structure and chemical nature of many of the *Aloe* phytochemicals, it is likely that many of the reported medicinal properties are due to antioxidant or prooxidant effects. The antioxidant/prooxidant activities of many *Aloe* spp. phytochemicals depend not only on their individual levels, but also on the ratios between the various components and their individual redox states. Therefore, discrepancies between bioactivity studies are likely when using different crude mixtures. This photograph was taken in the Walter Sisulu Botanical Gardens, Johannesburg, South Africa by Dr. Ian Cock in 2019.

REFERENCES

1. Cock IE. Medicinal and aromatic plants – Australia. In Ethnopharmacology, Encyclopedia of Life Support Systems (EOLSS) 2011. Developed under the auspices of UNESCO. Oxford UK; EOLSS Publishers. 2011. Available from <http://www.eolss.net>.
2. Kalt FR, Cock IE. Gas chromatography-mass spectroscopy analysis of bioactive *Petalostigma* extracts: Toxicity, antibacterial and antiviral activities. *Pharmacognosy Magazine*. 2014;10(37 Supplement):S37-49.
3. Kalt FR, Cock IE. The medicinal potential of Australian native plants from Toohey Forest, Australia. *The South Pacific Journal of Natural and Applied Sciences*. 2010;28(1):41-7.
4. Ilanko A, Cock IE. The interactive antimicrobial activity of conventional antibiotics and *Petalostigma* spp. extracts against bacterial triggers of some autoimmune inflammatory diseases. *Pharmacognosy Journal*. 2019;11(2):292-309.
5. Cock IE. The genus Aloe: Phytochemistry and therapeutic uses including treatments for gastrointestinal conditions and chronic inflammation. *Progress in Drug Research* 2015;70:179-235.
6. Cock IE, Vuuren V. A review of the traditional use of southern African medicinal plants for the treatment of fungal skin infections. *Journal of Ethnopharmacology*. 2019;251:112539. DOI: 10.1016/j.jep.2019.
7. Cock IE, Vuuren V. The traditional use of southern African medicinal plants in the treatment of bacterial respiratory diseases: A review of the ethnobotany and scientific evaluations. *Journal of Ethnopharmacology*. 2020. DOI: 10.1016/j.jep.2020.113204
8. Cock IE, Vuuren V. The traditional use of southern African medicinal plants in the treatment of viral respiratory diseases: A review of the ethnobotany and scientific evaluations. *Journal of Ethnopharmacology*. 2020;113194. DOI: 10.1016/j.jep.2020.
9. Cock IE, Selesho MI, Vuuren SFV. A review of the traditional use of southern African medicinal plants for the treatment of malaria. *Journal of Ethnopharmacology*. 2019;245:112176.
10. Cock IE, Ndlovu N, Vuuren SFV. The use of South African botanical species for the control of blood sugar. *Journal of Ethnopharmacology*. 2020;113234. DOI: 10.1016/j.jep.2020.
11. Cock IE, Selesho MI, Vuuren SFV. A review of the traditional use of southern African medicinal plants for the treatment of selected parasite infections affecting humans. *Journal of Ethnopharmacology*. 2018;220:250-64.
12. Saritha V. Antioxidant and antibacterial activity of *Aloe vera* gel extracts. *International Journal of Pharmaceutical and Biological Archive*. 2010;1(4):376-84.
13. Cock IE. Antimicrobial activity of *Aloe barbadensis* Miller leaf gel components. *Internet Journal of Microbiology*. 2008;4(2):17.
14. Mpala L, Chikowe G, Cock IE. No evidence of antiseptic properties and low toxicity of selected Aloe species. *Journal of Pharmaceutical Negative Results*. 2010;1(1):10-6.
15. Cock IE. Problems of reproducibility and efficacy of bioassays using crude extracts, with reference to *Aloe vera*. *Pharmacognosy Communications*. 2011;1(1):52-62. DOI: 10.5530/pc.2011.1.3