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# In vitro 5-lipoxygenase and anti-oxidant activities of South African medicinal plants commonly used topically for skin diseases

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# *In vitro* 5-lipoxygenase and anti-oxidant activities of South African medicinal plants commonly used topically for skin diseases


## ABSTRACT

Thirty plant species traditionally used to treat skin pathologies were chosen from the readily available ethnobotanical literature. Four plants (aqueous or methanol extracts) displayed promising 5-lipoxygenase inhibitory activity with $IC_{50}$ values below 61 ppm. These included *Aloe greatheadii*, *Melianthus comosus*, *Pentanisia prunelloides* and *Warburgia solutaris*. Essential oils generally displayed superior 5-lipoxygenase inhibitory activity with $IC_{50}$ values between 22 and 75 ppm. These included the essential oils of *Ballota africana*, *Helichrysum odoratissimum*, *Heteropyxis natalensis* and *Lippia javanica*. A large proportion of the plants exhibited dose-dependent DPPH anti-oxidant activity with $IC_{50}$ values between 5 and 94 ppm for the most active. These included *Halleria lucida*, *Croton sylvaticus*, *Melianthus comosus*, *Lippia javanica* and *Pentanisia prunelloides*. Aqueous extracts of *Melianthus comosus* exhibited the most potent anti-inflammatory and anti-oxidant activity.

The methanol extract of the leaves of *Halleria lucida* was subjected to activity guided fractionation and two anti-oxidant molecules were isolated, namely luteolin-5-*O*-glucoside and verbascoside (acteoside). Isobologram construction resulted in a concentration-dependent additive and antagonistic interaction being recognised between the two isolated compounds.

*Warburgia salutaris* displayed promising 5-lipoxygenase inhibitory activity. Two isolated compounds, mukadiaal and warburganal were found to partially contribute to the anti-inflammatory activity of the plant. The essential oils of *Helichrysum odoratissimum*, *Heteropyxis natalensis* and *Lippia javanica* were subjected to gas chromatography and major compounds contributing to possible anti-inflammatory effects identified. These included β-caryophyllene, 1,8-cineole, limonene and α-humulene. Enantiomers and racemic mixtures of limonene displayed significantly different 5-lipoxygenase inhibitory activity suggesting stereoselectivity of the enzyme-catalysed reaction. The monoterpene 1,8-cineole appeared to cause partial potentiation of the anti-inflammatory activity displayed by limonene.

These results provide some *in vitro* scientific rationale for their traditional use as dermatological agents.