



BIO-ACTIVE COMPOUNDS
ISOLATED FROM MISTLETOE (*Scurulla oortiana* (Korth.) Danser)
PARASITIZING TEA PLANT (*Camellia sinensis* L.)

by

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DECLARATION

This work contains no material which has been accepted for the award of any other degree or diploma in any University or tertiary institution and to the best of my knowledge and belief, contains no material previously published or written by any other person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

signed:

date: 30 September 1996

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SUMMARY

The primary aim of this thesis was to investigate non-proteinaceous low molecular weight flavonoid and alkaloid compounds in *Scurulla oortiana* (Korth.) Danser grown on *Camellia sinensis*. *S. oortiana* (Korth.) Danser growing on *Citrus maxima* and *Persea americana* have been used as control comparisons for the flavonoid and alkaloid compounds when this mistletoe parasitizes the tea plant.

Three flavonols, quercitrin (quercetin 3-rhamnoside); isoquercitrin (quercetin 3-glucoside) and rutin (quercetin 3-rhamnoglucoside) have been identified in *S. oortiana* (Korth.) Danser growing on different hosts. The identification and characterisation of these flavonoids was carried out using various chromatographic and spectrometric procedures. The high performance liquid chromatography patterns of phenolic components found in mistletoes were significantly different to those found in the host plants. The flavonoids found in *S. oortiana* (Korth.) Danser were found to be independent of the host plants.

The total content of individual flavonols found in butanol extracts of mistletoes and the hosts were quantitated by HPLC and, in general, the amount of individual flavonols found in the parasitizing mistletoes was always much higher than those found in the respective host plants. However, between different mistletoes, the amount of individual flavonols varied substantially. The HPLC patterns of individual flavonols of mistletoes were different of those of the respective hosts, thus the flavonols with the highest concentration in the mistletoes were not necessarily the highest in the mistletoe's host.

The activities of the phenolic compounds in an ethyl acetate extract of mistletoes grown either on tea or citrus were measured. They showed only weak activity against the growth of *Fusarium sp.* The activity of these extracts can be attributed to the present of quercetin derivatives in the extracts.

Two purine alkaloids, caffeine (1,3,7, trimethylxanthine) and theobromine (3,7 dimethylxanthine), have been isolated from and identified in *S. oortiana* (Korth.) Danser parasitizing tea plant, *C. sinensis*. The identification and characterization of these compounds was carried out using chromatographic, spectrophotometric and spectrometric procedures.

The total individual purine alkaloids found in the mistletoe and the host were quantitated by HPLC. In contrast to the findings with flavonoids, the content of purine alkaloids in mistletoe was always less than those found in the host. The total caffeine found in *C. sinensis* host was 6.0% (dry weight) and theobromine 0.4% (dry weight). The relative amount of caffeine in the parasitizing mistletoe was approximately 10% of that found in the host, whilst the amount of theobromine was approximately 7% of that in the host tea plant. It seems likely that both caffeine and theobromine in the mistletoe were derived from the host tea plant, although the possibility that signal molecules from the tea plant induced alklaoid synthesis in the parasite can not be excluded.