

## Phytochemical studies in the genus *Maclurodendron* (Rutaceae): furoquinoline alkaloids of *Maclurodendron magnificum* and *Maclurodendron porteri*

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In 1980, a new species of tree was discovered in the summit area of Gunong Ulu Kali in the Genting Highlands of Malaysia, and filed as *Acronychia magnifica* [Stone 1980]. Hartley, who had monographed *Acronychia* [Hartley 1974, 1982], confirmed the new species but placed it in a new genus *Maclurodendron*, and filed it as *Maclurodendron magnificum* Hartley, sub-family Rutoideae, family Rutaceae. He also renamed *A. porteri* as *Maclurodendron porteri*, considering it to be distinct from *Acronychia* and with an affinity to *Melicope*, sub-family Rutoideae.

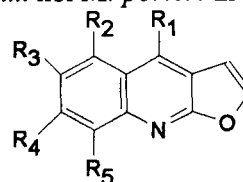
From the leaves of *M. porteri*, two furoquinoline alkaloids were isolated and identified as the known compounds skimmianine (**Ia**) and kokusaginine (**Ib**). Both occur commonly in the family Rutaceae.

The leaves of *M. magnificum* yielded a furoquinoline alkaloid, designated **MM1**, whilst the stems of the plant also contained **MM1** along with kokusaginine. **MM1** had UV and IR data typical of a furoquinoline alkaloid and a molecular mass of 289.0902 (C<sub>15</sub>H<sub>15</sub>NO<sub>5</sub>), which was also the base peak. This suggested a structure similar to **Ia** and **Ib** but with an additional methoxyl group.

The <sup>1</sup>H-NMR confirmed the presence of four OCH<sub>3</sub> groups with resonance at δ 3.92, 3.95 and 3.98 for methoxyls in the aromatic ring and at δ 4.38, typical of a methoxyl at position 4. A singlet at δ 7.2 was assigned to an aromatic proton at position 8 after comparison with chemical shift values of aromatic protons and methoxyl groups in other furoquinoline alkaloids. The downfield resonance (δ 7.2) indicated that it was not flanked by methoxyl groups, as seen in maculosidine (**Ic**; δ 6.68) [Robertson 1963] and acronycidine (**Id**; δ 6.6) [Batterham 1965]. It is more like protons seen in kokusaginine at C-5 (δ 7.42) and C-8 (δ 7.33) [Robertson 1963] and in halfordinine (**Ie**) at C-5 (δ 7.38) [Fish 1976]. Co-chromatography of

**MM1** with halfordinine and acronycidine showed them to be different, and the absence of M-1 and M-29 fragments in the MS suggests that position C-8 is not substituted [Clugston 1965]. **MM1** is therefore identified as 5,6,7-trimethoxydictamine (**If**).

The presence of furoquinolines in both of the investigated species of this new genus might have some taxonomic significance, particularly since the other species for which there is published data, *M. oligophlebium*, contains four furoquinolines [Xu 1984]. This species, however, also yielded four 2-quinolones and one acridone alkaloid. Neither of these compound types were detected in *M. magnificum* nor *M. porteri* in this investigation.



	R1	R2	R3	R4	R5
Ia	OCH <sub>3</sub>	H	H	OCH <sub>3</sub>	OCH <sub>3</sub>
Ib	OCH <sub>3</sub>	H	OCH <sub>3</sub>	OCH <sub>3</sub>	H
Ic	OCH <sub>3</sub>	H	OCH <sub>3</sub>	H	OCH <sub>3</sub>
Id	OCH <sub>3</sub>	OCH <sub>3</sub>	H	OCH <sub>3</sub>	OCH <sub>3</sub>
Ie	OCH <sub>3</sub>	H	OCH <sub>3</sub>	OCH <sub>3</sub>	OCH <sub>3</sub>
If	OCH <sub>3</sub>	OCH <sub>3</sub>	OCH <sub>3</sub>	OCH <sub>3</sub>	H

Anatomical investigations also support a closer relationship between the studied *Maclurodendron* spp. than with *Acronychia pedunculata*.

### References

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