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Activity of alkaloids from Angostura bark against *Mycobacterium tuberculosis*

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Preliminary studies showed that the ethanolic extract of angostura bark *Galipea officinalis* Hancock (Rutaceae) significantly inhibited the growth of *M. tuberculosis* (Grange & Davey, 1990).

The broth microdilution method, using microtitre plates, was used to determine the minimum inhibitory concentration (MIC) of fractions and isolated compounds obtained from these fractions. Ten strains of *M. mycobacterium* were grown in Middlebrook 7H9 medium and any growth of organisms observed after 14 days by noting the presence of turbidity (Telles and Yates, 1994).

The ethanolic extract of *G. officinalis* bark was fractionated by acid-base solvent partition into an aqueous component A and two lipophilic components containing non-basic B and basic compounds C. Alkaloids were detected in both of the lipophilic fractions and isolated.

The structures of the isolated alkaloids were determined by spectroscopic methods, especially NMR. One alkaloid was novel and was named allocuspareine **1**.

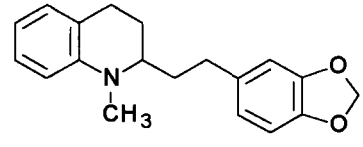
The fractions and isolated alkaoids were tested against each strain of *M.tuberculosis*. Results giving the highest and lowest MIC are given in the table.The fraction B, containing the basic alkaloids, and the alkaloids **3-6** from this fraction, exhibited the greatest activity whilst **1,2** from the non-basic fraction showed little activity (Table). Considerable variation in sensitivity to the compounds was observed for the different strains of M. tuberculosis

Similar quinoline alkaloids have been shown to possess antiprotozoal and molluscicidal activity (Fournet et al., 1993; Gantier et al., 1996) but this is the first report of their activity against mycobacteria.

Table Antibacterial activity (MIC expressed as μg mL^{-1} for extracts, μM for compounds) of *G. officinalis fractions* after 14 days incubation against ten different strains of *M. tuberculosis*

Extract/Alkaloid	MIC	
	Highest	Lowest
A	100	25
B	25	6.25
Allocuspareine **1**	>339*	169*
Cuspareine **2**	>322*	80*
C	12.5	3.13
4-Methoxy-2-pentylquinoleine **3**	167*	21*
Cusparine **4**	162*	41*
Galipine **5**	155*	19*
N-methyl-2-quinolone **6**	314*	157*

* values in μM



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