PHYTOALEXINS IN PHASEOLUS AUREUS (LEGUMINOSAE)

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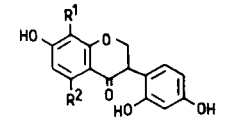
Phytoalexins are low molecular weight antifungal compounds which are produced by higher plants in response to microbial attack or treatment with various abiotic elicitors such as heavy metal ions or UV light (Deverall 1972). More than 150 chemically diverse phytoalexins have been isolated from plants representing 15 families. Certain leguminous plants produce isoflavonoid phytoalexins, some of which possess a broad spectrum of antimicrobial activity against bacteria and both phytopathogenic and zoopathogenic fungi, while showing relatively low toxicity to mammalian cells (Gordon et al 1980). It is conceivable that isoflavonoid phytoalexins might serve as a new class of antifungal agent useful in the chemotherapy of human mycoses. As part of a screening programme for novel isoflavonoid phytoalexins we have investigated the phytoalexins of the 'mung bean' Phaseolus aureus.

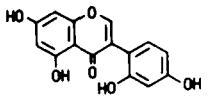
Phytoalexins were elicited in seedlings by treatment with $CuCl_2$ and were detected using a TLC-bioassay technique against Cladosporium cucumerinum. The compounds were purified by TLC and identified by their UV, MS and PMR characteristics.



1) $R^1 = CH_2CH{=}C(CH_3)_2$, $R^2 = OH$

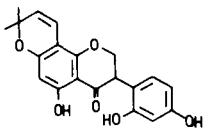
2) $R^1 = H$, $R^2 = OH$

3) $R^1 = CH_2CH{=}C(CH_3)_2$, $R^2 = H$

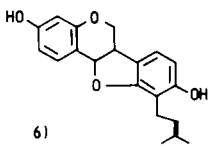


4)

Phytoalexin		Yield µg/g (fresh weight)
kievitone	(1)	360
dalbergioidin	(2)	8
5-deoxykievitone	(3)	13
2'-hydroxygenistein	(4)	16
cyclokievitone	(5)	12
phaseollidin	(6)	20



5)



6)

Kievitone (1) and phaseollidin (6) have been reported previously as phytoalexins in P. aureus (Ingham 1982), but this is the first time that dalbergioidin (2), 2'-hydroxygenistein (4), 5-deoxykievitone (3) and cyclokievitone (5) have been isolated from this plant. 5-deoxykievitone and cyclokievitone have previously been detected in only one other plant - P. vulgaris (Woodward 1979).

Deverall, B.J. (1972) In: Phytochemical Ecology, Ed. J.B. Harborne, Academic Press, London, pp 217-234

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Ingham, J.L. (1982) Phytoalexins, J.A. Bailey and J.W. Mansfield, (eds) Blackie, London pp 21-80

Woodward, M.D. (1979) Phytochem. 18: 2007-2010

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