Table 1. Occurrence of 2'-*O*-methylphaseollidinisoflavan (**1**) and phaseollidin (**2**) in infected cowpea stems

| Inoculum | I.I.T.A. Accession line: TVu 32 | TVu 37 | TVu 76 | TVu 57 | TVu 317 | TVu 400 | TVu 2366 | TVu 2398 |
|---|---|---|---|---|---|---|---|---|
| *Colletotrichum lindemuthianum* isolate I 47 (ex I.I.T.A.) | — | — | — | (1) | (1) | (1) | (1) | |
| Tobacco necrosis virus | (2) | (1) | (2)* | (1) | (1) | (1) | | (1) |

* See Ref. 1.

287 (3·80) [3]. In view of the reported occurrence of phaseollidin in cowpea line TVu 76 following inoculation with tobacco necrosis virus [1], seven additional lines were examined qualitatively for the presence of (**1**) and (**2**), with the results shown in Table 1. Lines TVu 32, 37 and 76 are susceptible [7] to *C. lindemuthianum* and therefore required virus inoculation to give an adequate yield of antifungal compounds; the other lines investigated were classified as resistant. (**1**) and (**2**) were identified by TLC ($SiO_2$, $CHCl_3$:$C_2H_5OH$ 97:3 and $C_6H_6$:$MeCOOC_2H_5$ 3:1) and by their UV spectra. It is appreciated that mixtures of (**1**) and (**2**) might escape identification by these methods if the minor component is present only in trace quantities.

Compound (**1**) totally inhibited conidiospore germination of Nigerian isolates I 47 and I 57 (ex I.I.T.A.) of *C. lindemuthianum* at 10 and 15 ppm respectively; the values for compound (**2**) were 20 and 25 ppm.

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# TYRAMINE FROM *MAGNOLIA* SPECIES

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**Key Word Index**—*Magnolia denudata*; *M. liliiflora*; *M. obovata*; *M. kobus*; *M. grandiflora*; Magnoliaceae; amine; tyramine.

In Chinese medicine, Shin-i, prepared from dried young buds of *Magnolia* plants, is used as a sedative or an analgesic. In Japan, Shin-i taken internally for treatment of headaches or colds are also young buds of *M. kobus* or *M. salicifolia*. In addition, *M. obovata* is utilized in Japan for abdominal distention or pains, and as a diuretic, and *M. grandiflora* for headache or giddiness.

Table 1. Tyramine content of *Magnolia* species

| Species | Collection time | Plant part | Tyramine content (mg/100 g) |
|---|---|---|---|
| *M. denudata* | mid September | Leaves | 8·0* |
| *M. liliiflora* | mid September | Leaves | 2·5* |
| *M. liliiflora* | late May | Buds | 7·8† |
| *M. obovata* | late May | Leaves | 2·8* |

* Method A: content per 100 g of plant parts was calculated based on the weight of crystalline tyramine monohydrochloride isolated.

† Method B: calculated from amino acid analyser.

Investigation of leaves, buds and flowers of 5 *Magnolia* species revealed the presence of tyramine as a common component besides several of the normal protein amino acids. This unusual occurrence of tyramine, known as an important adrenergic drug [1, 2], may be responsible for the pharmacological action of the oriental folk medicines mentioned above. The tyramine content of the plants examined are shown in Table 1. In addition, qualitative tests on TLC of aqueous extracts from flowers and leaves of *M. kobus* and leaves of *M. grandiflora* also showed the presence of tyramine in appreciable amounts.

It was shown that tyramine was not formed by enzymatic decarboxylation of tyrosine during the isolation procedure, since the amounts of the amine did not vary after either immediate boiling the fresh leaves of *M. denudata* or keeping the homogenate at room temperature for several hours.

The identity of the isolated sample with authentic tyramine monohydrochloride was confirmed by elemental analysis, amino acid analysis (15 cm column, 0·24 N borate buffer of pH 11·3; retention time; 29 min), IR, UV and NMR spectra.

## EXPERIMENTAL

Isolation of tyramine. The fr. leaves (500 g) of *M. obovata* collected in the end of May were macerated and extracted 2× with boiling $H_2O$. The combined filtrate (3 l.) was chromatographed on an Amberlite CG-50 ($NH_4^+$ form) column 3 × 50 cm. The eluate with 2 N-$NH_4OH$ (0·6 l.) was evaporated *in vacuo*. Repetition of the column chromatography with gradient elution of $NH_3$ gave pure tyramine which was crystallized from EtOH as mono HCl-ide (14 mg) as leaflets, mp 245–255° (dec.). The same method was used for the other 2 species. IR, $\nu$ 3180, 1620, 1600 $cm^{-1}$; UV, $\lambda_{max}^{EtOH-H_2O}$ 282, 276, 223, 198 nm ($\epsilon$ 1420, 1670, 7990, 2770); NMR ($D_2O$) 100 MHz, $\delta$7·2 (4H, *q*, aromatic proton), 3·2 (4H, $A_2B_2$ type). Anal. found: C, 54·90, H, 6·96; N, 7·95; Cl, 20·26. Calcd for $C_8H_{12}ONCl$: C, 55·34; H, 6·97; N, 8·07; Cl, 20·42%.

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# α-SPINASTEROL GLUCOSIDE AND OTHER CONSTITUENTS OF *MAESA CHISIA**

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**Key Word Index**—*Maesa chisia*; Myrsinaceae; fatty acids; fatty alcohols; long-chain ketones; α-spinasterol; α-spinasterol-β-D-glucoside; stigmasta-8(14),22-dien-3β-ol; β-amyrin.

*Plant. Maesa chisia* D. Don. *Source.* Sub-Himalayan region. The specimen is available in the herbarium of Central Drug Research Institute. Lucknow. *Uses.* Insecticide [1]. *Previous work.* Nil.

*Present work.* Leaves and branchlets. Light petrol extracts on chromatography yielded (a) a mixture of long chain methyl ketones, mp 76–77° (IR 1720 $cm^{-1}$, positive DNP test) with C-31 and

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