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MELOVINONE, AN OPEN CHAIN ANALOGUE OF MELOCHINONE FROM *MELOCHIA TOMENTOSA**

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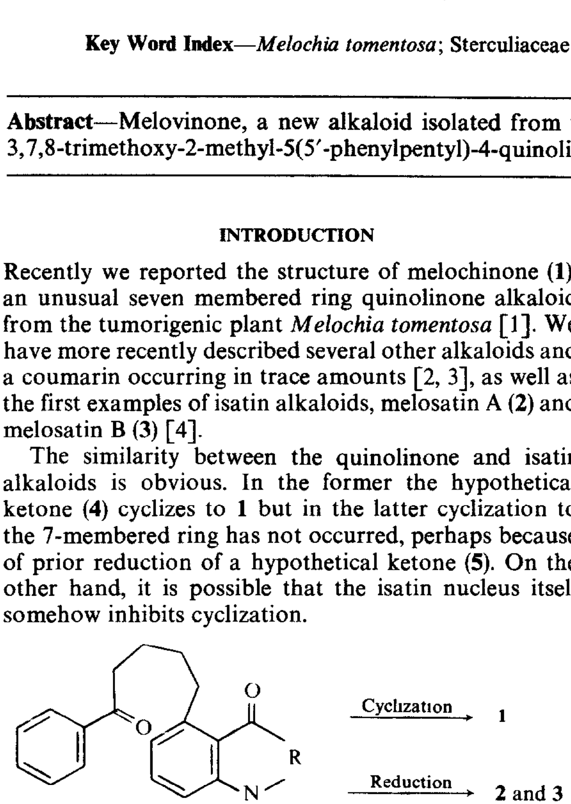
Key Word Index—*Melochia tomentosa*; Sterculiaceae; roots; quinolinone alkaloid; melovinone.

Abstract—Melovinone, a new alkaloid isolated from the roots of *Melochia tomentosa* has been characterized as 3,7,8-trimethoxy-2-methyl-5(5′-phenylpentyl)-4-quinolinone.

INTRODUCTION

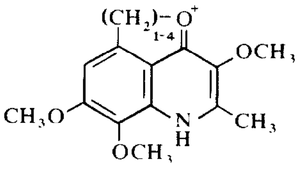
Recently we reported the structure of melochinone (**1**), an unusual seven membered ring quinolinone alkaloid from the tumorigenic plant *Melochia tomentosa* [1]. We have more recently described several other alkaloids and a coumarin occurring in trace amounts [2, 3], as well as the first examples of isatin alkaloids, melosatin A (**2**) and melosatin B (**3**) [4].

The similarity between the quinolinone and isatin alkaloids is obvious. In the former the hypothetical ketone (**4**) cyclizes to **1** but in the latter cyclization to the 7-membered ring has not occurred, perhaps because of prior reduction of a hypothetical ketone (**5**). On the other hand, it is possible that the isatin nucleus itself somehow inhibits cyclization. That this is not the case is suggested by the existence of melovinone (**6**) an open chain analogue of melochinone (**1**) whose structure we report below.



RESULTS AND DISCUSSION

Melovinone (**6**) mp 134–136°, was isolated by Si gel column chromatography of benzene and methylene chloride extracts of defatted plant. After recrystallization from C_6H_6–petrol its MS showed a molecular ion at *m/e* 395. Important ions were presented at *m/e* 91 and *m/e* M-91 proving that the methoxyl groups were in the quinolinone moiety rather than on the phenyl ring. As in the cases of **2** and **3** (but not **1**) important ions were also present for the loss from M^+ of 105 and 119 mass units [$PhCH_2CH_2$. and $Ph(CH_2)_3$.] which we ascribe to facilitation of cleavage of the side chain by the *peri* carbonyl group which stabilizes the charge in the resulting ion† (**7**).



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The NMR spectrum of melovinone (**6**) was a clear combination of **1**, **2** and **3** (Fig. 1). Thus the phenyl ring and 4 of the 5 methylene groups had approximately the same chemical shifts as the analogous groups in **2** and **3** while the benzylic methylene group was shifted strongly downfield (δ3.38) due to the presence of the adjacent carbonyl. This effect is identical to that observed in melochinone (**1**) and securely located the phenylpentyl group at the *peri* position. Two of the three methoxyls in melovinone (**6**) also had the same chemical shifts as in **2** and the lone aromatic proton, as expected, was intermediate in shift between those assigned to position 5 in

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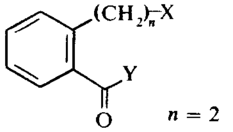
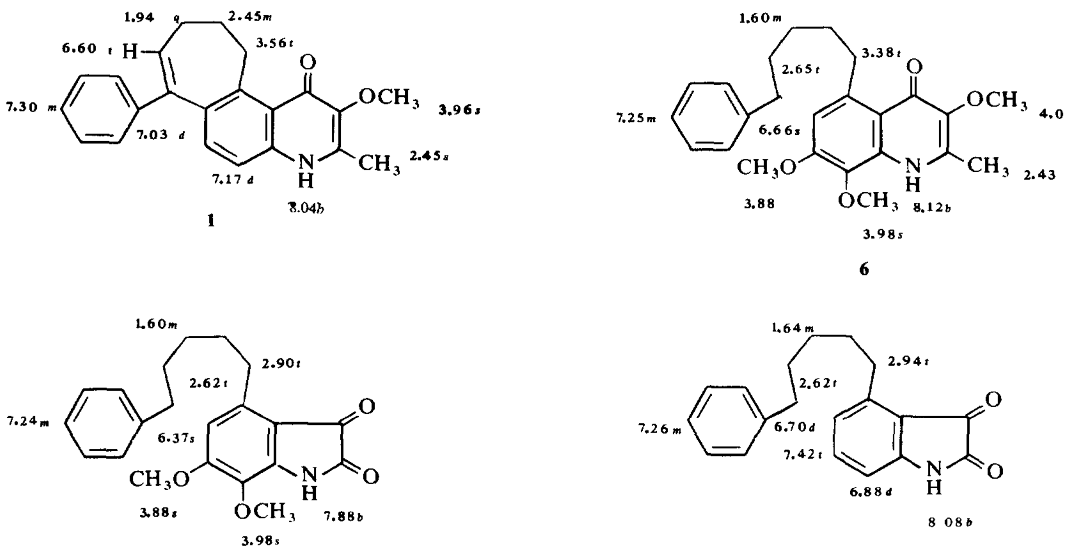
* This paper was presented [5] in part at the 18th Annual Meeting of the American Society of Pharmacognosy, Olympic Hotel, Seattle, Washington, August 1977. Part 12 in the series "Potential Carcinogens", for Part 11 see ref. [6].

† This process may be quite general in other systems containing the group:



and we are currently exploring this possibility.



1 6 2 3

Fig. 1. Comparative NMR spectral data of melochinone (**1**), melovinone (**6**), melosatin-A (**2**) and melosatin-B (**3**).

2 and **3**. Attachment of the proton at position 6 would result in a strong downfield shift due to the *para* carbonyl group as it does in **3**. Additional NMR peaks were observed for the quinolinone methoxyl (δ4.00), the C-methyl at δ2.43 and the NH at δ8.12, all of which compare favourably with **1**.

The UV spectrum of **6** was in reasonable agreement for a methoxylated quinolinone although no simple models were available for comparison. The IR spectrum lacked distinctive carbonyl absorption, a property typical of 4-quinolinones which we noted earlier in the case of **1**.

EXPERIMENTAL

Capillary mps are uncorr., IR were determined in Nujol, UV in EtOH and 100 MHz NMR spectra in $CDCl_3$ with TMS as internal standard.

Extraction and isolation. Air dried and powdered roots of *M. tomentosa* (1.6 kg) were extracted continuously with boiling petrol, C_6H_6 and CH_2Cl_2 (2 days, 5 l. each solvent). The C_6H_6 extract (4.86 g) and the CH_2Cl_2 extract (2.6 g), being identical on TLC, were combined and chromatgraphed on a Si gel column (100 g, 100–200 mesh) that was eluted with mixtures of hexane, C_6H_6 and $CHCl_3$. The fractions obtained in C_6H_6–$CHCl_3$ (1 : 2), were combined and purified by Si gel PLC using $CHCl_3$–EtOAc (1 : 1).

Melovinone (**6**) (12 mg, 0.00075 %), crystallized from C_6H_6–petrol, mp. 134–136°, $C_{24}H_{29}NO_4$: MS: m/e 395 (M^+), 380, 365, 352, 304, 290, 276 (base peak), 91,77; IR ν_{max}^{Nujol} cm^{-1}: 1620 (CO), 1560, 1520, 1320 (Ar), 1250 and 1130 (OCH_3); UV λ_{max} nm: 205, 237, 262 and 337; NMR ($CDCl_3$): δ8.12 (1H, *b*, NH), δ2.43 (3H, *s*, CH_3), δ2.65 (2H, *t*, $J = 7$ Hz, Ar–CH_2), δ6.66 (1H, *s*, H-6), δ7.25 (5H, *m*, C_6H_5), δ3.38 (2H, *t*, $J = 7$ Hz, Ar–CH_2), δ3.88, 3.98, 4.00 (3H each, *s*, three OCH_3), δ1.60 [6H, *m*, $(CH_2)_3$].

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