

## NOTES

**Studies of Synthesis and Antibacterial Activity of Chalkones and Flavones**

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Two new chalkones and two new flavones have been synthesized and tested for their antibacterial activity.

Chalkones<sup>1,2</sup>,  $\alpha,\beta$ -unsaturated ketones<sup>2</sup>, flavones<sup>3</sup> and flavonoids<sup>4-6</sup> have been reported to possess various biological activities. Considering these facts, we have synthesised two new chalkones and two new flavones and tested for their antibacterial activity.

Condensation of 2'-hydroxy and 2'-hydroxy-5'-methyl acetophenone with 4-bromo-1-naphthaldehyde in the presence of alkali yielded the 1-(2'-hydroxy phenyl)-3-(4-bromo-1-naphthyl)-2-propene-1-one and 1-(2'-hydroxy-5'-methyl-phenyl)-3-(4-bromo-1-naphthyl)-2-propene-1-one respectively. Flavones, *i.e.*, 2-(4'-bromo-1'-naphthyl) and 2-(4'-bromo-1-naphthyl)-6-methyl-flavones are prepared from above chalkones by selenium dioxide oxidation.

Structures of chalkones and flavones are confirmed by elemental analysis, IR and NMR spectra and also by Wilson test<sup>7</sup>. Chalkones show positive Wilson test. Chalkones and flavones were tested for their antibacterial activity against *Escherichia coli* and *Staphylococcus aureus* following disc-diffusion method<sup>8</sup>. The results of inhibition were found to be significant.

Melting points were taken in open capillaries and are uncorrected. IR spectra (nujol) were recorded on a Perkin-Elmer spectrophotometer and PMR spectra studied in CDCl<sub>3</sub> using TMS as internal standard.

**1-(2'-Hydroxy-5'-methylphenyl)-3-(4-bromo-1-naphthyl)-2-propen-1-one**

To an equimolar (0.01 mol) mixture of 2'-hydroxy-5'-methyl acetophenone and 4-bromo-1-naphthaldehyde dissolved in ethanol (30–40 mL) was added a 20% KOH solution (10–15 mL) and the reaction mixture was kept at 60° for 20 h. It was then diluted with ice cold water and acidified with concentrated HCl. The resulting yellow solid was washed with cold water, dried and crystallised from

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glacial acetic acid, m.p. 172°C; yield 80%;  $\nu_{\max}$  ( $\text{cm}^{-1}$ ) 1645 (C=O) and 1580  $\text{cm}^{-1}$  (C=C);  $\delta(\text{CDCl}_3)$ : 2.1 (3H, S,  $\text{CH}_3$ ); 10.1 (1H, S, OH) and 6.4–8.2 (m, ArH), Elemental analysis %: Found: Br, 21.72;  $\text{C}_{20}\text{H}_{15}\text{O}_2\text{Br}$  required: Br, 21.80.

### 1-(2'-Hydroxy phenyl)-3-(4-bromo-1-naphthyl)-2-propen-1-one

Similarly from 2'-hydroxy acetophenone and 4-bromo-1-naphthyl aldehyde above chalcone is prepared, crystallised from glacial acetic acid; m.p. 156°C; yield 64%; IR (nujol)  $\nu_{\max}$  ( $\text{cm}^{-1}$ ) 1635 (C=O); 1585 (C=C);  $\delta(\text{CDCl}_3)$ : The aromatic and ethylenic protons appear at 6.9 to 8.77. The signal due to phenolic (OH) proton appears at 12.8 as singlet.

Elemental analysis %: Found C, 64.64; H, 3.72; Br, 22.60;  $\text{C}_{19}\text{H}_{13}\text{O}_2\text{Br}$  required: m.p. C, 64.59; H, 3.68 and Br, 22.66.

### 2-(4'-Bromo-1-naphthyl)-6-methyl flavone

A mixture of 1-(2'-hydroxy-5'-methylphenyl)-3-(4-bromo-1-naphthyl)-2-propen-1-one (3.67 g; 0.01 mole) and  $\text{SeO}_2$  (4.48 g; 0.04 mole) in isoamyl alcohol (50 mL) was refluxed for 12–16 h. The reaction mixture was filtered hot; on cooling solid product was obtained. The crude product was collected by filtration and crystallised from ethyl alcohol; m.p. 180°; yield 62% IR (nujol)  $\nu_{\max}$  ( $\text{cm}^{-1}$ ): 1650 (C=O); 1575 (C=C); 1380 ( $\gamma$ -pyron ring); PMR  $\delta(\text{CDCl}_3)$ : 2.55 (S, 3H,  $\text{CH}_3$ ); 6.55 (S, 1H, pyron ring); 7.2 to 8.23 (m, aromatic protons), Elemental analysis %: Found C, 56.32; H, 3.50; Br, 21.90; Required C, 65.75; H, 3.56; Br, 21.92.

### 2-(4'-Bromo-1'-naphthyl) flavone

Similarly from 1-(2'-hydroxy phenyl)-3-(4-bromo-1-naphthyl)-2-propene-1-one and  $\text{SeO}_2$  in isoamyl alcohol, above flavone is prepared. M.p. 210°; yield 60%; elemental analysis %: Found C, 64.95; H, 3.34; Br, 22.70; required: C, 64.96; H, 3.13; Br, 22.79; IR (nujol)  $\nu_{\max}$  ( $\text{cm}^{-1}$ ): 1650 (C=O); 1575 (C=C); 1380 ( $\gamma$ -pyron ring); PMR  $\delta(\text{CDCl}_3)$ ; 6.53 (S, 1H, pyron ring); 7.2 to 8.25 (m, aromatic protons).

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