

## PHOTOCHEMICAL REACTIONS OF SOME CHALCONES II

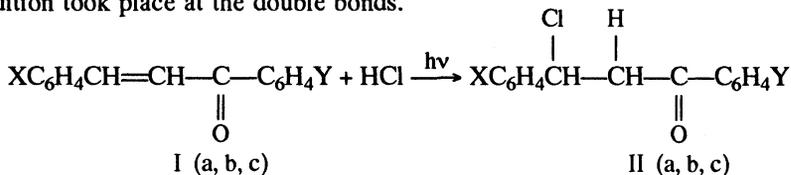
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In the present work the photochemical reactions of chalcones in presence of HCl are reported.

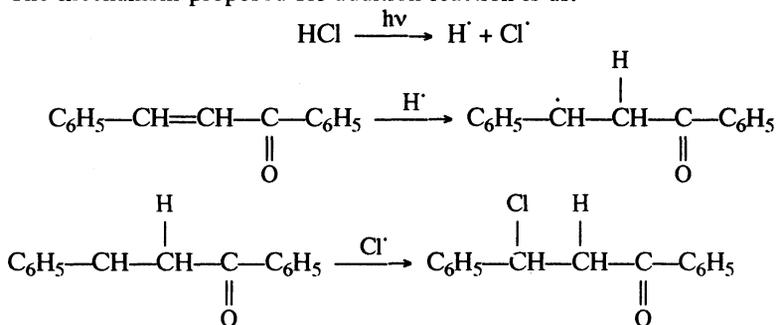
Reactions of chalcones are well studied photochemically<sup>1-7</sup>. All these reactions have been carried out in neutral medium. Some reactions in alkaline medium has also been reported<sup>8</sup>. In this paper we report the photochemical reactions of some chalcones in presence of HCl.

Chalcone, 4-chloro-chalcone and 4'-hydroxy chalcone were synthesized by the standard methods.<sup>9</sup> These were then irradiated by light separately in presence of HCl. Irradiation of chalcones in presence of HCl gave addition products and addition took place at the double bonds.



Ia : X=H, Y=H    Ib : X=Cl, Y=H    Ic : X=H, Y=OH

The mechanism proposed for addition reaction is as.



Hydrogen radical should preferably attack the  $\alpha$ -carbon rather than  $\beta$ , because the radical produced will be more stable in the former as compared to latter, due to the resonance with the benzene ring, which is not possible if the  $\text{H}^\cdot$  attacks the  $\beta$ -carbon. Moreover the product shows carbonyl absorption indicating that 1, 4-addition product is not formed.

IR spectra of the products show shift in the carbonyl absorption towards higher frequency, (chalcones show carbonyl absorption near  $1640\text{ cm}^{-1}$  where as the products show the carbonyl absorption near  $1660\text{ cm}^{-1}$ ) which indicate that in products the conjugation has decreased. Therefore it may be believed that the

addition of HCl has taken place at the double bond. The UV spectra shows carbonyl absorption near 300 nm. The results of elemental analysis are also in accordance with the calculated values.

### Preparation of Chalcones:

The chalcones are prepared by the Claisen-Schmidt condensation of the corresponding benzaldehyde and acetophenone in alkaline alcoholic solution.

### Photochemical Reactions of Chalcones:

#### (i) Reaction of Chalcone.

One gm of chalcone was taken in a double walled beaker and dissolved in dried and distilled alcohol (25 ml). To this 3 ml of dil HCl was added. The solution was then kept on a magnetic stirrer and irradiated by a 100 W tungsten lamp. The temperature of the solution was maintained by constant water circulation. The progress of the reaction was examined by the TLC of the reaction mixture in benzene after every hour. The product was obtained in 18 h. The solid obtained was filtered, washed with water and recrystallized by alcohol to give light yellow crystals, m.pt. 75°C; yield 0.56 g; m.f.  $C_{15}H_{13}OCl$ . Analysis (%): Found (Calcd.) C = 73.55 (73.61), H = 5.41 (5.13) and Cl = 14.44 (14.51).

#### (ii) Reaction of 4-Chlorochalcone:

The reaction was carried out in the same manner as in the previous experiment. The reaction was completed in 10 h. The product obtained was recrystallized from alcohol, m. pt. 105°C, yield 0.87 g, m.f.  $C_{15}H_{12}Cl_2O$ , Analysis (%) Found (Calcd). C = 64.71 (64.28), H = 4.31(4.64) and Cl = 25.45(25.35).

#### (iii) Reaction of 4'-Hydroxychalcone:

The reaction was performed in the same way as in the previous experiment. The reaction was completed in 10 h Product obtained was filtered and washed with water and recrystallized from ethanol to furnish shiny yellow crystals m.pt. 182°C yield 0.65g. m.f.  $C_{15}H_{13}O_2Cl$ , Analysis (%) Found (calcd.) C = 69.11(69.09), H = 4.89(4.99) and Cl = 13.15(13.62).

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