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A NEW SYNTHETIC METHOD FOR AROMATIC α-OXO ALDEHYDES : FRIEDEL-CRAFTS REACTION

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Aromatic glyoxals and their derivatives have been found to possess marked antiviral (1) activity and to some extent known as antitubercular (2) agents. Substituted phenyl glyoxals have also been used for the synthesis of cardio-active compounds (3). Naturally a good deal of concentrated research have been carried out with a view to finding out a suitable and convenient method for the synthesis of aromatic glyoxals. A considerable number of methods developed for the synthesis of these compounds used acetophenones as starting materials. Among these the SeO_2 oxidation (4, 5) was extensively applied. Substituted ω,ω-dihaloacetophenones (6) were also treated in different ways to yield aromatic glyoxals and their derivatives. Another interesting method dealt with the transformation of β-keto sulfoxides (7). Reaction of α-picoline-N-oxide with α-haloketones (8) also provided a synthetic route for the preparation of aromatic glyoxals. Some of the derivatives of aromatic 1, 2 -diketones (9) were also subjected to various reactions to furnish the corresponding glyoxals.

We now wish to report a simple and elegant method for the synthesis of aromatic glyoxals in good yields.

Toluene was reacted with dichloroacetyl chloride in presence of anhydrous aluminium chloride at a temperature of 0-5°. The product after being decomposed with ice-HCl mixture was steam distilled to remove unreacted toluene. The resulting dichloromethyl p-methylphenyl ketone (1) was taken up with ether, washed free from acid and was purified by distillation, b.p. 110°/ 10 mm. yield 95%; (Found : C, 53.45 ; H, 4.1 ; $C_9H_8OCl_2$ requires C, 53.2 ; H, 3.94 %). The compound is slightly steam volatile, produces irritation to skin and is to some extent lachrimatory; 2, 4-D.N.P. crystallised from alcohol, m.p. 186° (Found : N, 14.6 ; $C_{15}H_{12}O_4Cl_2N_4$ requires N, 14.62 %).

The above ketone (I) was subjected to hydrolysis with 15 % aqueous sodium carbonate under strictly regulated conditions of temperature and time of reaction. p- Methylphenyl glyoxal was isolated by distillation with steam, hydrate m.p. 105°, yield 90 % (in lit.[6] 80 %); the α-2, 4-D.N.P. crystallised from benzene, m.p. 246° (Found : N, 16.67 ; $C_{15}H_{12}O_5N_4$ requires N, 17.07 %).

The compound (I) on being subjected to disproportionation with 10% aqueous caustic soda under the standard condition (10) yielded p- methylmandelic acid, crystallised from water, m.p. 146-47° (the mixed m.p. remained undepressed on admixture with an authentic sample).

Benzene was in the same way subjected to the above reaction when in the first stage ω,ω - dichloroacetophenone was obtained (yield 95%) which in the subsequent stage of reaction yielded phenylglyoxal, yield 70% (in lit.[7] 68 -74%), hydrate, m.p. 95°.

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