

SHORT
COMMUNICATIONS

Efficient Synthesis of Chalcones at Room Temperature in the Presence of Potassium Phosphate*

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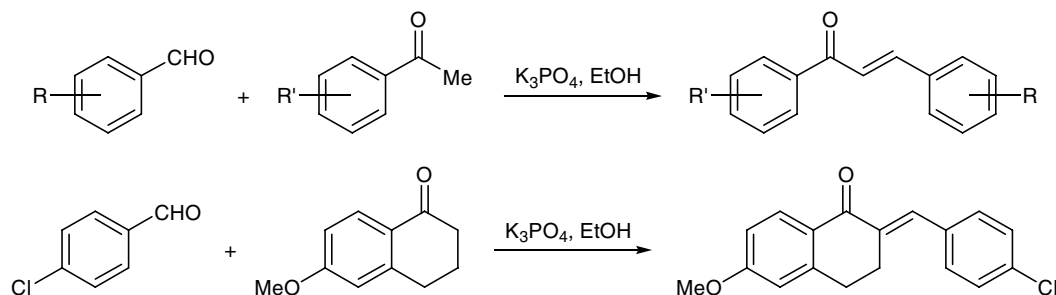
Chalcones (α,β -unsaturated aromatic ketones) are important intermediate products in organic synthesis [1–5]; they also exhibit versatile biological activity [6–10]. These compounds are usually synthesized by the Claisen–Schmidt condensation of aromatic aldehydes with methyl ketones in the presence of bases, such as aluminum oxide [11], barium hydroxide [12], hydroxalcite [13], zeolites [14], natural phosphate [15], etc.

We previously found [16] that potassium phosphate is capable of catalyzing nitroaldol condensation. We presumed that it may also be active in the Claisen–Schmidt condensation and examined reactions of aromatic aldehydes with substituted acetophenones in the presence of K_3PO_4 at room temperature. The reactions were carried out in ethanol using equimolar amounts of the reactants and 15 mol % of potassium phosphate. The target products were isolated in good to excellent yields (see table). It is seen from the obtained results that compounds having electron-withdrawing groups reacted at a higher rate, and the corresponding chalcones were isolated in almost quantitative yield. Furfurol turned out to be the most reactive: its reaction

with *p*-bromoacetophenone was complete in 20 min to afford 96% of the corresponding chalcone. The slowest reaction was observed with *p*-chlorobenzaldehyde and 6-methoxy-1,2,3,4-tetrahydronaphthalen-1-one: the yield of 2-(*p*-chlorobenzylidene)-6-methoxy-1,2,3,4-tetrahydronaphthalen-1-one was 70% in 2 h.

General procedure for the synthesis of chalcones. Potassium phosphate, 0.327 g (1.5 mmol), was added under stirring to a solution of 10 mmol of the corresponding aldehyde and 10 mmol of ketone in 15 ml of ethanol. The mixture was stirred at room temperature until the reaction was complete (TLC) and extracted with diethyl ether. The extract was repeatedly washed with water and dried over anhydrous sodium sulfate, the solvent was removed, and the residue was purified by recrystallization from anhydrous ethanol. All the isolated compounds were identified by comparing their spectral data with those reported in the literature.

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For R and R', see table.

* The text was submitted by the authors in English.

Reactions of aromatic aldehydes with ketones in ethanol at room temperature in the presence of potassium phosphate

R	R'	Reaction time, min	Yield, ^a %	R	R'	Reaction time, min	Yield, ^a %
4-MeO	4-Cl	55	94	4-Cl	4-Me	35	89
H	4-Cl	40	89	4-Cl	H	25	88
3-O ₂ N	4-Cl	30	94	4-MeO	H	50	84
4-Cl	4-Cl	30	96	3-O ₂ N	H	30	92
4-Me	4-Cl	90	86	4-Me	H	50	86
4-Cl	4-MeO	60	83	3-O ₂ N	4-MeO	50	88
4-MeO	4-MeO	90	71	H	4-Me	60	79
H	4-MeO	55	81	Furfurol	4-Br	20	96

^a Isolated product after purification.

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