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Studies on the base catalyzed synthesis of acetophenone enolcarbamate enhanced by



microwaves



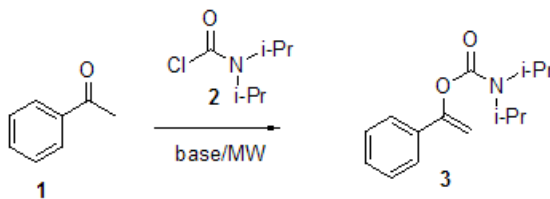
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**Abstract:** Microwave assisted organic synthesis (MAOS) of *N,N*-diisopropyl enol carbamate of acetophenone is achieved in good yield when acetophenone, *N,N*-diisopropylcarbamoyl chloride and Hünig's base, DABCO or TMEDA were irradiated with microwaves. It is remarkable that reaction times are reduced from six days with conventional heating, to twenty minutes.

1-Aryl enol carbamate has proven to be a useful group in organic synthesis. Its chemistry has been widely employed by Hoppe et al. to direct stereoselective metallations in conjunction with sparteine<sup>[1]</sup> for carbolithiations<sup>[2]</sup> and 1,2-wittig rearrangements<sup>[3]</sup>. Our studies on the hydroamination of styrene derivatives<sup>[4]</sup> led us to focus on the synthesis of 1-arylvinyl *N,N*-diisopropylcarbamates as substrates for nucleophilic addition of lithium amides. Up to date there are few methods described for their preparation, they are based on ruthenium<sup>[5]</sup> or palladium<sup>[6]</sup> complexes, alpha-metallation<sup>[7]</sup> and enolization-acylation by heating reagents at 160°C either with or without base.<sup>[8],[9]</sup> The former procedures present the inconvenience of very long reaction times (6 days). This led us to start searching for a new synthetic method to get those compounds in a rapid and easy way.

In the present communication we report the preliminary studies realized to promote by microwave irradiation the carbamoylation of acetophenone (**1**) in basic media. Our first attempt was to irradiate a mixture of acetophenone, *N,N*-diisopropylcarbamoyl chloride (**2**) and pyridine (the classic reagents), however a very low conversion was observed. Similar result was obtained for DMAP. Thus, the study was extended to different bases such as: 1,4-Diazabicyclo[2.2.2]octane (DABCO), 1,8-Diazabicyclo[5.4.0]undec-7-ene (DBU), *N,N*-Diisopropylethylamine (Hünig's base) and *N,N,N',N'*-tetrametiletilenediamine (TMEDA). Temperatures, reaction times and yields are shown in Table 1. DABCO, Hünig's and TMEDA gave similar yields (51-54%, entries 1-4), but the conversion with DBU was lower (37%, entry 5).<sup>[10]</sup>



Entry	Base	Reagent ratio 1:base:2	t (min)	T (°C)	yield(%)
1	DABCO	2:3:5	10	150	53
2	DABCO	2:3:5	20	155	53
3	HÜNING'S	2:3:5	20	190	54
4	TMEDA	2:3:5	20	190	51
5	DBU	2:5:5	10	170	37
6	DMAP + BMIMCl	2:3:5	30	120	15
7	DABCO + BMIMCl	2:5:5	10	150	27
8	DABCO + 1,2-dicloroethane	2:5:5	5	150	36

Addition of an ionic liquid (BMIMCl) to DMAP increased slightly the yield (entry 6). However, in the case of DABCO, ionic liquid lowered the yield from 53% (solvent-free conditions) to 27% (entries 2 and 7). The use of non-ionic solvents (1,2-dichloroethane or DMF) afforded just slightly higher yields than ionic liquid (entries 8 and 9).

In summary, we present a MAOS approach to 1-phenylvinyl diisopropylcarbamate (**3**) from acetophenone, N,N-diisopropylcarbamoyl chloride (**2**) and organic bases. The major advantage compared to classical approach is the strong reduction of the reaction time (more than 400-times faster). Although the yield is not very high, it is high enough to be worth to follow this procedure.

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- 10.- Irradiation was carried out using a sealed tube in a monomode oven (Discover®, CEM) at 150Watts.