

PONDICHERRY UNIVERSITY

PONDICHERRY

EXECUTIVE SUMMARY OF FINAL REPORT OF THE WORK DONE ON THE PROJECT

01. TITLE OF THE PROJECT	Synthetic Applications of the Blaise Reaction
02. NAME AND ADDRESS OF THE PRINCIPAL INVESTIGATOR	H. Surya Prakash Rao Professor, Department of Chemistry, Pondicherry University, Pondicherry – 605 014
03. NAME AND ADDRESS OF THE INSTITUTION	PONDICHERRY UNIVERSITY
04. UGC APPROVAL LETTER NO. AND DATE	MRP-MAJOR-CHEM-2013-20349 Dated 29.12.2015
05. DATE OF IMPLEMENTATION	29.12.2015
06. TENURE OF THE PROJECT	3 years or up to 30-06-2018
07. TOTAL GRANT ALLOCATED	Rs.15,03,600/-
08. TOTAL GRANT RECEIVED	Rs.8,10,600/-
09. FINAL EXPENDITURE	Rs.5,89,869/-
10. TITLE OF THE PROJECT	Synthetic Applications of the Blaise Reaction
11. OBJECTIVES OF THE PROJECT	Objective of the present proposal is the studies on the Blaise reaction. The Blaise reaction is a classical reaction, but less explored. It has, however, enormous scope. Hitherto, the studies were restricted to the use of α -bromo esters. We proposed in the project to widen the scope to include α -acyl bromides of many kinds. Reaction of each one of them with aliphatic / aromatic / benzyl /benzoyl aceto nitriles is expected to provide easy access to 1,3-dicarbonyl / 1,3,5-tricarbonyl / acyl β -keto esters
12. WHETHER OBJECTIVES WERE ACHIEVED	Yes. We could show that Variations on the Blaise Reaction for the synthesis of 3,5-Dioxopentanoates and 3-Amino-5-oxopent-3-enoates. We have also demonstrated Vinylogous Blaise reaction and synthesis of 2-pyridones
13. ACHIEVEMENTS FROM THE PROJECT	Two publications resulted as follows; for details see the report (1) Variations on the Blaise Reaction: Synthesis of 3,5-Dioxopentanoates and 3-Amino-5-oxopent-3-enoates H. Surya Prakash Rao*, NandurkaMuthanna <i>SYNLETT</i> , 2016 , 27, 2014–2018. (2) Vinylogous Blaise reaction: Conceptually new synthesis of 2-pyridones, H. Surya Prakash Rao,* Nandurka Muthanna and Ashiq Hussain Padder <i>SYNLETT</i> 2018 , 29, A-E
14. SUMMARY OF THE FINDINGS (IN 500 WORDS)	By continuing our efforts to broaden the scope of the Blaise reaction, we demonstrated that the zinc mediated condensation of 3-oxo-3-aryl propanenitriles with ethyl bromoacetate furnish 3,5-diketo esters.



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	<p>This reaction is an useful variant for two-carbon homologation of readily available α-keto nitriles into a range of 3,5-diketo pentanoates incorporating aromatic and heteroaromatic and aliphatic groups at C(5) position. While acidic workup of the reaction broth provides 3,5-diketo pentanoates, the basic workup provide ethyl (Z)-3-amino-5-oxo-5-pent-3-enoates. This method allows direct and regioselective synthesis of enamines of 3,5-diketo pentanoates at C(3) position. Mechanistic probing revealed that the Blaise reaction is preferred when the keto and nitrile functional groups are at visinalposition and if there is a possibility of enolization.</p> <p>We have achieved this transformation for synthesis of a a variety of C(6) substituted 2-pyridones where R = Ar, benzyl, alkyl etc. (12 examples), The Vinylogous Blaise reaction works efficiently in the presence of table top zinc. Present work constitutes new pyridine ring synthesis by [C4 + CN] assembly. We have demonstrated an application of the method for a facile synthesis of an analogue of agomelatine an antidepressant drug.</p> <p>In summary, we have well utilized project funds to (i) publish papers which has made contributions to field of synthetic organic chemistry and heterocyclic chemistry, (ii) trained manpower towards Ph.D. and at least four students towards their project, (iii) contributed to academic enrichment of Pondicherry University. We anticipate that the work done will be highly cited and will become routine laboratory practice.</p>
<p>15. CONTRIBUTION TO THE SOCIETY (GIVE DETAILS)</p>	<p>(1) One Ph.D. Degree was awarded to the scholars (Dr. N. Muthanna, SC candidate) and he is working for Pesticide India Limited Rajasthan as scientist (2) Mr. Ashiq Hussain Padder, from minorities and from Kashmir is working for Ph.D. degree now.</p>
<p>16. WHETHER ANY PH.D. ENROLLED/PRODUCED OUT OF THE PROJECT</p>	<p>Two (1) N. Muthanna (received Ph.D. Degree in 2017) (2) Ashiq Hussain Padder working for Ph.D. 3rd year</p>
<p>17. NO. OF PUBLICATIONS OUT OF THE PROJECT (PLEASE ATTACH)</p>	<p>Two (see the attachment) (1) Variations on the Blaise Reaction: Synthesis of 3,5-Dioxopentanoates and 3-Amino-5-oxopent-3-enoates H. Surya Prakash Rao,* NandurkaMuthanna <i>SYNLETT</i> 2016, 27, 2014–2018. (2) Vinylogous Blaise reaction: Conceptually new synthesis of 2-pyridones, H. Surya Prakash Rao,* NandurkaMuthanna and Ashiq Hussain Padder <i>SYNLETT</i>, 2018, 29, A-E</p>

