Young Career Focus: Assistant Professor Barla Thirupathi (Indian Institute of Science Education and Research Berhampur, India)

Background and Purpose. SYNFORM regularly meets young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This Young Career Focus presents Assistant Professor Barla Thirupathi (Indian Institute of Science Education and Research Berhampur, India).

Biographical Sketch

Dr. B. Thirupathi

Barla Thirupathi was born in Madavelli, Manchirial district, Telangana, India in 1984. After completing his M.Sc. (organic chemistry) from Osmania University, India (2006–2008), he worked as a research chemist at Aragen Life Sciences, formerly known as GVK-Biosciences, Hyderabad, India (2008–2009). In early 2009, he joined the CSIR-Indian Institute of Chemical Technology, Hyderabad (India) as a Junior Research Fellow (JRF), and undertook his doctoral studies with Dr. Debendra K. Mohapatra (2009–2014). Afterwards, he worked as an associate research scientist in the process R&D division at Sai Life Sciences, Hyderabad, India (2014–2015). Then he moved to Harvard University (USA) as a postdoctoral fellow to work with Nobel laureate Prof. E. J. Corey (2015–2018), where he worked on the development of highly active fluorinated second-generation oxazaborolidine catalysts and their application in enantioselective Diels–Alder reactions. In July 2018, he moved back to India and was appointed as an assistant professor of chemistry at one of India's premier institutes, the Indian Institute of Science Education and Research (IISER) Berhampur. He has already been recognized as an upcoming independent researcher and has received various accolades, including the 2023 Thieme Chemistry Journals Award.

INTERVIEW

SYNFORM *What is the focus of your current research activity?*

Dr. B. Thirupathi My research program emphasizes the development of novel methods for carbon–carbon bond formation reactions and their application in natural product synthesis. The primary emphasis of this research work is on designing and developing innovative reactions through a simple, cost-effective, environmentally friendly, and easy to automate approach, while using readily available starting materials. My area of research also includes the total synthesis of biologically active natural products or model compounds having potential bioactivities.

SYNFORM *When did you get interested in synthesis?*

Dr. B. Thirupathi As an undergraduate student studying mathematics, physics and chemistry as three major subjects, I was attracted to chemistry by considering its job opportunities in the pharmaceutical industry and academia. When I joined a pharmaceutical company after my Master's degree in organic chemistry, I decided to pursue my PhD in organic synthesis because of the way people were involved in and influenced by research and developmental activities in an industry setting. Accordingly, I joined the CSIR-Indian Institute of Chemical Technology, Hyderabad, for doctoral studies. The opportunities I have had throughout my post-graduate and doctoral studies helped me to pursue a research career in synthesis further.

SYNFORM *What do you think about the modern role and prospects of organic synthesis?*

Dr. B. Thirupathi Organic synthesis is one of the most exciting and vital fields of research in modern science. It plays

 Synform **2024/03**, A41–A43 • Published online: February 14, 2024 • DOI: 10.1055/s-0040-1720624

a significant role in improving human welfare, health care and developing new drugs to prevent and treat high-priority diseases. Due to its universality and pervasive nature across science and technology, it has also influenced other fields of science and engineering. Many fields like chemical biology, medicinal chemistry, biology and biotechnology, physics, materials science, and nanotechnology overlap with the area of organic synthesis. This understanding of the centrality and significance of organic synthesis demands and requires its ongoing improvement, encompassing both method development and total synthesis.

SYNFORM *Could you tell us more about your group's areas of research and your aims?*

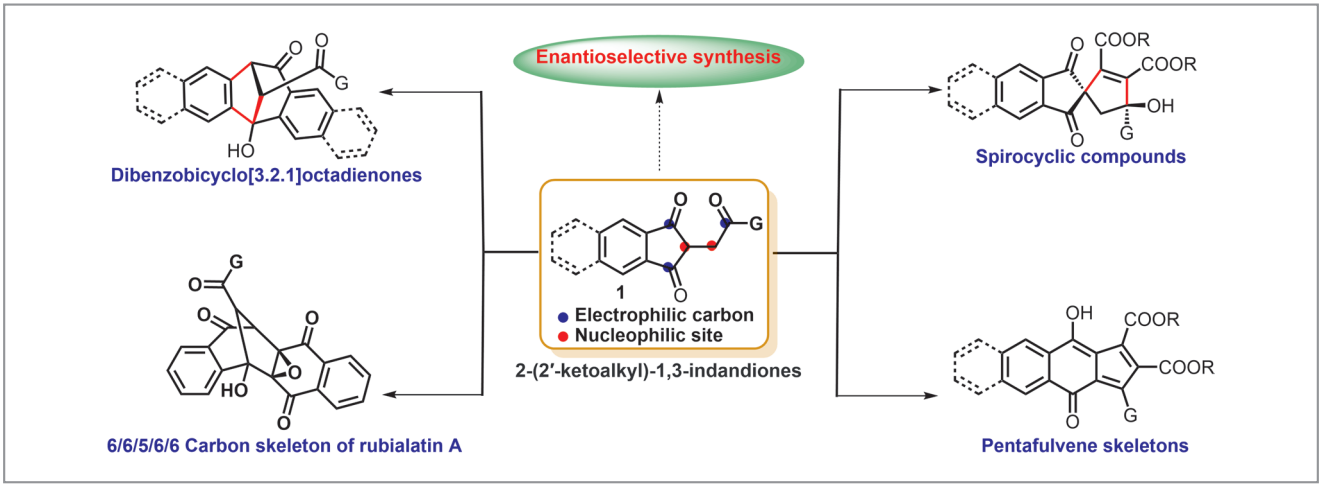
Dr. B. Thirupathi Our research program emphasizes the development of new synthetic methodologies for novel C–C bond formation reactions. Achieving multiple bond formations in a single operation is currently one of the main challenges in the search for cost-effective syntheses. Ideal organic syntheses require a process that is simple, cost-effective, environmentally friendly, and easy to automate while using readily available starting materials and producing products that incorporate substantial portions of all the components. We aim to develop synthetic methods by considering the best possible organic synthesis approach. Accordingly, I have chosen 2-(2′-ketoalkyl)-1,3-indandione as a crucial starting material for method development, as it has the unique characteristics of having two sets of nucleophilic and electrophilic sites within the molecule. So much interesting and exciting chemistry is going on in my laboratory using 2-(2′-ketoalkyl)-1,3-indandione as one of the key, intriguing, starting materials (Scheme 1). Furthermore, we also work on the total synthesis of biologically active natural products or model compounds with potential bioactivities. The targeted molecules pose unique challenges in asymmetric bond construction. An endeavour towards complex multistep synthesis affords a target-oriented setting to engage in reaction innovation and design. Our research aims to facilitate and make significant contributions to the synthesis of important organic molecules, like natural products and heterocyclic compounds, and make these processes more environmentally friendly.

SYNFORM *What is your most important scientific achievement to date and why?*

Dr. B. Thirupathi I was delighted with our recent achievements in developing new synthetic methods using 2-(2′-ketoalkyl)-1,3-indandiones as a key substrate. These recent accomplishments were published in *Chemistry A European Journal* (*Chem. Eur. J.* **2023**, *29*, e202301976), and *The Journal of Organic Chemistry* (*J. Org. Chem.* **2022**, *87*, 11925–11938) and showcased on these journals' cover pages. These accomplishments gave me immense pleasure, because my initial hypothesis was materialized in the form of publications.

SYNFORM *Could you tell us something about yourself outside the lab, such as your hobbies or extra-work interests?*

Dr. B. Thirupathi Outside the lab, I enjoy watching movies and cooking for myself and my family.



Scheme 1 Synthesis of intriguing carbon skeletons involving 2-(2′-ketoalkyl)-1,3-indandiones

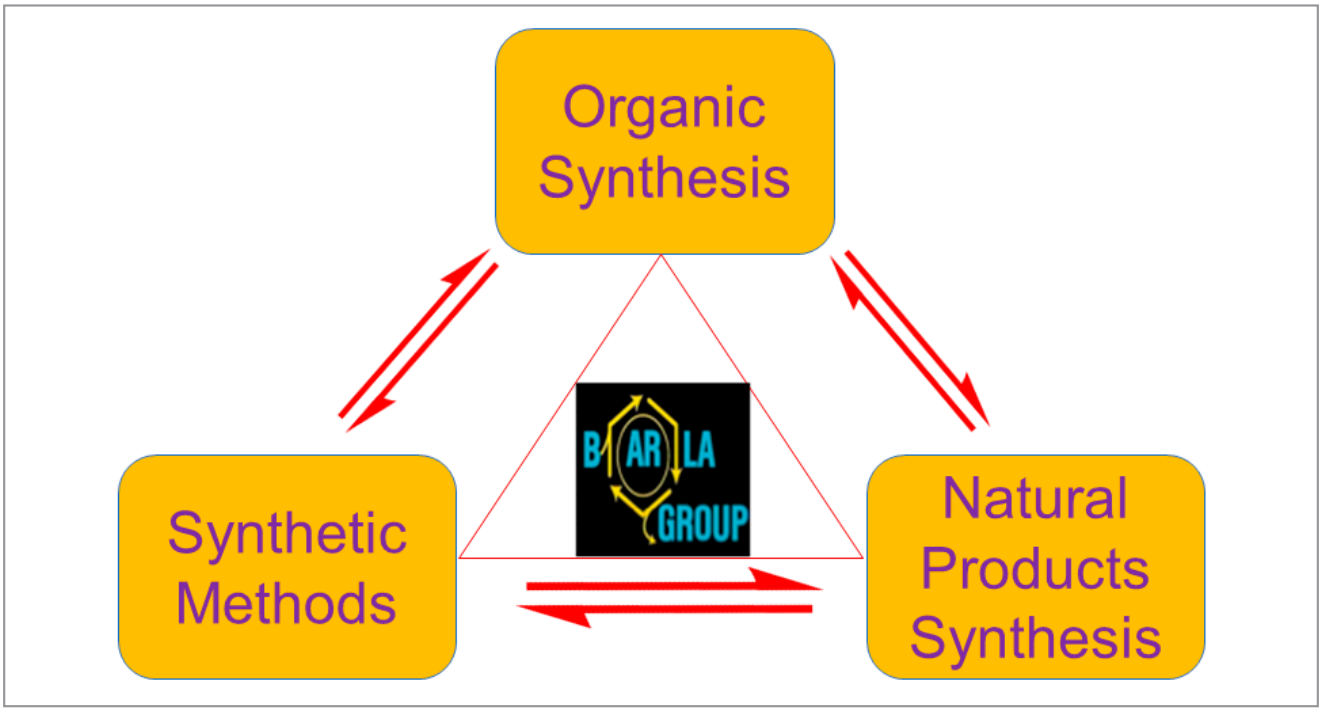


Figure 1 Schematic representation of Dr. Thirupathi's research

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 Synform **2024/03**, A41–A43 • Published online: February 14, 2024 • DOI: 10.1055/s-0040-1720624