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## Professor Sambasivarao Kotha

### A Tribute



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This special issue of Arkivoc is dedicated to Professor Sambasivarao Kotha on the occasion of his 65th birthday

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Sambasivarao Kotha (SRK) was born in Amarthalur, Andhra Pradesh, India, in 1957 and studied Chemistry at Loyola College, Vijayawada, Nagarjuna University, where he received a BSc degree in 1977. Later in 1979, he received his MSc from the University of Hyderabad. During his MSc training, he worked on the synthesis of cubane derivatives and published a paper in *JCS Chem. Commun.* (1980, 650). He continued his research work with Prof. G. Mehta and was awarded his PhD degree in 1985. Subsequently, he moved to the University of Manchester Institute of Science and Technology (UMIST) as a post-doctoral fellow and worked with Prof. R. Stoodley (1986-87) on the synthesis of anthracycline antibiotics. Later, he proceeded to Wisconsin to work with Prof. J. M. Cook (1987-89) on the Weiss-Cook reaction. Before joining IIT Bombay in 1994, he spent two years (1991-92) at Cornell University with Prof. A. Kuki working on Aib peptides. He was also employed for two years (1992-93) at Hoechst Celanese as a Research Chemist where he contributed to acylation technology and asymmetric synthesis. In 2001, he became a full professor at IIT Bombay. During 2011-2020, he occupied the Pramod Chaudhari Chair in Green Chemistry at the Department of Chemistry, IIT Bombay.

SRK has guided 48 PhD students, 22 postdoctoral fellows, 44 MSc students and several visiting scholars (a total of 140 scientific personnel). Contributions of all these associates led to 320+ publications (including 18 accounts on diverse topics). His work has been cited extensively (~9,000 citations, h-index 51) including 6 citations in text books. It is noteworthy that during the last 20 years (2003-2022) publications from his group were among the most cited category. Many of his students are now well placed in industry and academia. SRK was a member of the editorial board of various journals including the *Eur. J. Org. Chem.*, *Indian J. Chem.*, *J. Chem. Sci.*, and *J. Amino Acids*. He was a visiting faculty member at several universities. (IISc-Bangalore, NUS-Singapore, University of California-Santa Cruz, IUPUI-Indianapolis and NDSU-Fargo). He presented his work at various international conferences (ACS, Gordon Conference, ISOM, Tetrahedron Symposium, Flo-Het, Indo-French meet, Indo-Taiwan meet, Singapore International Chemical Conference, and World Congress on Chemistry) and delivered over 300 lectures at various meetings.

SRK is a fellow of all three major academies in India (FNA, FASc, FNASc) and is also a Fellow of the Royal Society of Chemistry, and Fellow of Andhra Pradesh Academy of Sciences and Maharashtra Academy of Sciences. Various organizations (Costal Chemical Research Society, Chemical Research Society of India, Indian Chemical Society, Convention of Chemists and Department of Science and Technology) and several Universities (Punjab University, Mysore University, MS University-Baroda, University of Hyderabad, Pune University, and Institute of Chemical Technology) honored him with fellowships, lectureships and endowment awards. He received research related awards from IIT-Bombay 6 times and played a critical role in the development and growth of the IIT-Bombay Chemistry Department. He is married to Mrs. Chandra. They have two daughters and the elder daughter, Dr. Leela, is a biologist and the younger daughter, Ms. Pallavi, is a Software Engineer. SRK is fully focused on academic activities and is easily accessible and helpful to his students and associates.

SRK's research program covers "development of new synthetic strategies to polycycles, heterocycles and macrocycles." In this regard, his group has used metathesis, Suzuki coupling and [2+2+2] cycloaddition reactions as key steps. For the first time, he demonstrated an enyne metathesis-Diels-Alder reaction-aromatization sequence as a useful strategy to prepare diverse polycyclic compounds. This methodology has been used extensively by other researchers around the world (*Chem. Soc. Rev.* 2009, 38, 2065). He used Suzuki coupling for the first time for peptide modification (*Bioorg. Med. Chem. Lett.* 2001, 11, 2887). Based on this work, several groups prepared modified proteins and other peptidomimetics. His work on [2+2+2] cycloaddition using Wilkinson's catalyst and  $\text{Mo}(\text{CO})_6$  for [2+2+2] cycloaddition is praiseworthy. With  $\text{Mo}(\text{CO})_6$ , one can use propargyl bromide as reaction partner. These conditions allow the preparation of sensitive

substrates that are not accessible by conventional methods. These compounds are also precursors to o-xylylenes.

SRK has shown that cyclotrimerization of carbonyl compounds followed by cross-coupling is an attractive sequence to design C<sub>3</sub> symmetric molecules/ligands. These strategies have found extensive application in material science. He identified ethyl isocyanoacetate as a key glycine equivalent in the preparation of dialkylated amino acid derivatives. This is now affectionately called the “Kotha-Schöllkopf” glycine equivalent (cited in a book, *Organic Syntheses Based on Name Reactions*. A. Hassner and I. Namboothiri, Elsevier 2012, 3<sup>rd</sup> Edition). His group also established extremely mild conditions to effect retro-Diels Alder reactions, a very useful strategy in the preparation of sensitive substrates. He employed “rongalite” to generate sultines, a useful precursor to o-xylene derivatives. These studies expanded the Diels-Alder chemistry and resulted in around 40 publications.

SRK, for the first time, observed aromatization of 1,4-hexadiene derivatives in the presence of IBX. His work on unusual amino acids has been published as a perspective in JOC (2013, 78, 12288). During the past three decades, his group has made seminal contributions in the areas of metathesis and Suzuki coupling which are summarized as Accounts in *Synlett* (2007, 18, 2767) and *Eur. J. Org. Chem.* (2007, 1221). It is noteworthy that these two themes have been recognized by Nobel Prizes (2005 and 2010).

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