ARUNACHALA SREENIVASAN

(13 July 1909 - 20 July 1996)

Biog. Mem. Fell. INSA, N. Delhi **31** 23-52 (2006)

ARUNACHALA SREENIVASAN

(1909-1996)

Elected Fellow 1950

FAMILY BACKGROUND AND EARLY EDUCATION

ARUNACHALA SREENIVASAN was born on 13th July, 1909 in village Pamini of Tanjore district, Tamil Nadu. His father, D Arunachala Sastrigal was a Vedanta scholar while mother Krishnammal was a housewife. He was the youngest of five brothers and had a younger sister. One of his brothers Padmabhushan M Ganapati, an officer of the Indian Engineering Service held the positions of Chairman and Managing Director of Rourkela and Bokaro steel plants. His sister's husband, S Swayambu retired as Chairman and Managing Director of Bharat Heavy Electricals.

Sreenivasan did his BA (Hons) and MA degrees in Chemistry from Madras University. Soon after college he cleared the all India Competitive Services examination with flying colours. However, much to his family's surprise instead of pursuing that he moved on to do research in biochemistry. Quite early in college life young Sreenivasan came under the influence of his chemistry teacher, Professor K Suryanarayana. For this Professor, science was a way of life and he used to tell Sreenivasan that he himself was learning even as he was teaching the student advanced topics outside the scope of the syllabus. Professor K Suryanarayana was a significant influence on young Sreenivasan in making science as a career choice.

PROFESSIONAL CAREER

He moved to the Indian Institute of Science, Bangalore as a Research Biochemist working for the Council of Agricultural Research. For the work done here he got the D Sc degree along with the coveted Lord Curzon prize of the Madras University. He continued his pioneering studies on nutritional qualities of rice at the IISC and the value of these investigations are acclaimed in scientific circles even today. He was subsequently associated with the Institute of Plant Chemistry at Indore for about four years and during this period his research interest was confined to certain aspects of soil chemistry in relation to plant nutrition.

At the UDCT

Dr Sreenivasan's talent in imparting knowledge to others found its most useful expression with his joining the University Department of Chemical Technology at

Mumbai (presently The Institute of Chemical Technology of the Mumbai University) in the year 1943. He became a Lecturer cum Section Head of Foods and Drugs. The pharmaceutical industry was growing fast and naturally many students were interested in pursuing courses offered by the Pharmaceutical Section. These offered greater prospects in life than the courses offered in the Foods and Drugs section. Dr Sreenivasan with his vision and courage started a full-fledged degree programme in food technology when the country hardly had any organized food industry. He was supported in this endeavour by the then Director of UDCT, Dr K Venkataraman. In addition, support came from the University authorities through endowments for the laboratories and for some equipment for the teaching programme. Along with the degree programme Dr Sreenivasan started research activities in biochemistry and nutrition. He received steadily increasing international support from the Rockfeller Foundation, the Williams Waterman Fund as well as from agencies within the country like the Tata Trust, ICMR, CSIR and DAE. It was a matter of great satisfaction for Professor Sreenivasan who nurtured this new discipline for sixteen years that many of his students held key positions in the food industries. Dr Sreenivasan was a great teacher. Among his early innovations was to teach students to gather information from scientific literature, write small dissertations and to speak on them. Likewise his insistence on precision, clarity and brevity in scientific writing had a lasting impact on his students.

At the CFTRI

In view of his contribution to Food Science and Biochemistry and his vast knowledge in these subjects he was invited to take up the position of Deputy Director of the Central Food Technological Research Institute, Mysore. His work on the development of low cost, high quality protein foods from indigenous sources such as oilseeds and fish-meal earned him high praise. It must be mentioned that Dr Sreenivasan was the first Indian to be nominated as a member of Protein Advisory Group of WHO/FAO/UNICEF. This group concerned itself mainly with the protein-calorie malnutrition in the poorer and over-populated regions of the world. He was responsible for projecting the many achievements of the Mysore Institute in national and international forums and for securing expanded facilities for research for the institute from various sources.

Dr Sreenivasan organized and developed a school of research in contemporary areas of particulate biochemistry, molecular biology and enzymology besides helping in activities like meat and fish technology and packaging. He initiated the FAO sponsored regional training programme. In particular he promoted work on an integrated method for processing of oilseeds (peanuts and coconuts to be specific) for protein (isolate) and oil. That was also the time when there was much pressure from abroad for licensing for a more or less similar impulse rendering process. He

along with his colleagues could successfully thwart those attempts because of the know-how they had themselves developed.

At BARC

At the instance of the late Dr HJ Bhabha, Dr Sreenivasan moved to the then Atomic Energy Establishment, Trombay (presently known as the Bhabha Atomic Research Centre) to take charge of the newly created Biochemistry and Food Technology Division. At BARC, he was supported in his efforts by Dr AR Gopal Ayengar. BARC gave him opportunities to exhibit his scientific and organizational skills in developing an advanced laboratory to tackle problems of relevance to the nation. The Food Irradiation Laboratory in Trombay was designed and completed speedily to develop promising technologies of food preservation processes that are commercially viable. This Laboratory has been the venue of several international scientific events related to radiation preservation of food. He became a member of several panels of the International Atomic Energy Agency, which were dealing with food irradiation. In addition Dr Sreenivasan organised a fine school of molecular biochemistry with a dedicated band of young colleagues in BARC.

At the CRI

After he officially relinquished his position in BARC his services continued to be used by the Department of Atomic Energy, which appointed him as an Emeritus Scientist and Advisor. He subsequently became the Director of The Cancer Research Institute, Mumbai. In the short time he served there he got the young scientists to interact freely cutting across divisional barriers and to this end he established working groups on defined areas of time bound research with interdisciplinary participation. He restructured the scope of research at the Institute to problems of relevance to the country and which could utilise the wealth of clinical material available in the connected hospital. The Scientific Advisory Committee of the Institute was fully with him while he was carrying out these changes.

Professor Sreenivasan's Outlook on Research

While basic research had always been his first preference, Professor Sreenivasan strongly felt that research must lead to appropriate developments in technology that ultimately benefit the masses. He was also a firm believer in indigenous technology. His views on the research work carried out during his tenure at the Food Technological Research Institute are noteworthy. He says "Notwithstanding all the resources built and the achievements accomplished I am not sure if I can speak with authority and say that these have made an impact on the community. Take for example, the very many specific projects of the Institute for an enriched protein food derivable from local raw materials that could meet a national nutritional need. So far much of the effort has contributed to a kind of indigenous research experience with

very little impact into industrial growth or nutritional improvement of the masses. Such obstacles to progress in the adoption of processes with potential economic importance only serve to remind one of the general malaise in the country for seeking imported packages of technology that could be purchased off the shelf even if they are obsolete, overpriced or inappropriate. I am glad that things have improved somewhat lately with correspondingly greater reliance on indigenous capability".

HONOURS AND AWARDS

Professor Sreenivasan was the recipient of several honours. These are listed in the annexure. The one honour that must have pleased him most was a function held at Hotel Centaur on Sunday, April 11, 1976 to felicitate him for his meritorious and distinguished achievements in the field of scientific education and research. Many of his colleagues, students and well-wishers participated in the programme and a souvenir was brought out on that occasion listing out his achievements. The souvenir carries an interview with him and also contains some of his speeches made at august bodies.

After retirement from Cancer Research Institute, Mumbai he moved to Bangalore and for a few years kept himself busy as a consultant for a few MNCs. He passed away on 20th July, 1996 after a brief illness.

FAMILY OF PROFESSOR SREENIVASAN

At this point a few words must be said about Dr Sreenivasan's family. He married Sundarammal, daughter of Venkataraman of Kuttalam in Tanjore district, Tamilnadu on 12th July, 1937. The Sreenivasans had three children, two daughters and a son. The elder daughter Mrs Indumati Sampathkumar is an MA in economics and is married to an engineer. They reside in Berlin, Germany.

The younger daughter Sumati was smart, beautiful and highly accomplished. Unfortunately she died in a tragic accident at the prime of her youth. Dr Sreenivasan bore this loss with equanimity characteristic of the person totally devoted to a mission in life.

The son, Mr Shivakumar Sreenivasan is a mechanical engineer. Shivakumar is married to an artist. He worked for sometime in Germany and currently runs a small-scale industry in Bangalore.

Mrs Sundarammal Sreenivasan played a big role in the life of Dr Sreenivasan. She stood by him through good and bad periods alike and had always worked hard to keep the family happy. She spent her time attending to the children helping them in their education and also making them useful members of the society. She was an ideal hostess – a challenging job since the house had a constant stream of visitors

from India and abroad. She played a great part in Dr Sreenivasan's social activities. She also devoted time to women's organizations and was the President of one of them. Mrs Sundarammal Sreenivasan passed away on 14th September 2004.

ACKNOWLEDGEMENTS

The author is indebted to Professor V Ramamurti for providing valuable material on the life of Professor A Sreenivasan. He is also grateful to Mr Shivkumar for providing some of the information. The help of Dr Paduval Desai, a colleague of Dr Sreenivasan is also acknowledged.

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ANNEXURE

Academic Achievements

- BA (Hons) & MA (First Class) in Chemistry (1930 & 1931); D Sc in Biochemistry (1936), University of Madras.

Academic Distinctions

- Arni Gold Medal for Chemistry, University of Madras (1930);
- Lord Curzon Prize, University of Madras (1936);
- Curzon Memorial Lecturer, University of Madras (1940);
- Visiting Scientist, Harvard University and Massachusetts Institute of Technology (1948-49), University of Wisconsin (1948, 1952-53), Rockefeller Institute for Medical Research (1958).
- Williams Waterman Fund Fellow; Thailand, Philippines, Hong Kong, Japan, Gautemala, Puerto Rico, Jamaica (1958).

Positions Held

- Research Biochemist, Indian Council of Agricultural Research at the Indian Institute of Science, Bangalore (1931-38).
- Agricultural Chemist, Indian Central Cotton Committee at the Institute of Plant Industry, Indore (1938-43).
- Lecturer in Foods and Drugs, later Reader and Professor of Food Technology, Mumbai University, Department of Chemical Technology (1943-59).

- Deputy Director, Central Food Technological Research Institute, Mysore (1959-64).
- Head, Biochemistry & Food Technology Division, Bhabha Atomic Research Centre, Mumbai (1964-71).
- Emeritus Scientist, BARC and Adviser, Department of Atomic Energy, Mumbai (1972-73).
- Director, Cancer Research Institute, Mumbai, (1974-75).

Additional positions held

- Advisor, Williams Waterman Fund, Research Corporation, New York, 1950-1964;
- Member, FAO/WHO/UNICEF Protein Advisory Group (New York), 1960, 1961 and Vice-President 1963-65;
- Member, Governing Body, Indian Council of Agricultural Research;
- Member, Nutrition Expert Group, Indian Council of Medical Research;
- Chairman, Biology and Medical Committee, Member, Food and Agriculture Committee, Member, Board of Research in Nuclear Sciences, Department of Atomic Energy.
- Chairman, Achievement Audit Committee, Central Institute of Fisheries Technology (ICAR), 1973.
- Member, National FAO Liaison Technical Committee.
- Member, Food and Nutrition Board, Govt. of India.
- Member, Advisory Committee, Advanced Centre for Biochemistry, Indian Institute of Science, Bangalore.
- Member, Editorial Board; J Scientific and Industrial Research; Indian J Biochemistry; J Nutrition and Dietetics; J Food Science and Technology

Awards and Distinctions

- Biresh Chandra Guha Memorial Lecturer, Indian National Science Academy, 1973.
- Rafi Ahmed Kidwai Memorial Prize (biennium 1966-67), Indian Council of Agricultural Research, 1973.
- Acharya Jagadis Chandra Bose Memorial Lecturer, 1973.
- Padma Bhushan, Republic Day Award, Jan. 1974 by the President of India -

- Golden Jubilee Lecturer, Ind. Inst. Sci., Bangalore, 1979.
- Kane Memorial Lecturer, Univ. Bombay, 1981.
- Endowment Lecturer, Assn. of Food Scientists and Technologists of India, 1981.
- Outstanding Teacher Award, Mumbai University, Department of Chemical Technology Golden Jubilee Year (1985).
- Distiguished Alumnus award, Indian Institute of Science Platinum Jubilee Year (1985).
- Honoured Member, Society of Biological Chemists (1989).

Invited principal speaker and participant in

- III International Conference, Global Impacts of Applied Microbiology, Bombay, 1969.
- III International Congress, Food Science and Technology, Washington, 1970.
- Fourth UN Conference on Peaceful Uses of Atomic Energy, Geneva, 1971.
- First Asian Congress of Nutrition, Hyderabad, 1971.
- IAEA Symposium on Radiation Preservation of Food (also Session Chairman) Bombay, 1972.
- IAEA Panel to consider application of food irradiation to developing countries (also Chairman, Drafting Committee for summary and recommendations) Bombay, 1972.
- Society for Parliamentarians, New Delhi, 1972.
- International Symposium, Transcription (Session Chairman), Calcutta, 1972.
- IAEA Panel on improving food quality by Irradiation (also Panel Chairman), Vienna, 1973.
- International Symposium, Biomembranes, Madurai, 1973.
- Participant, IX International Congress of Biochemistry (also leader, Indian delegation to General Assembly, International Union of Biochemistry), Stockholm, 1973.
- Keynote Speaker, National Symposium on Biotechnology (1981).
- Inaugural Lecturer, Association of Food Scientists and Technologists Convention, Mumbai (1986).
- First Founder's Day Lecturer, CFTRI, Mysore (1987).

Membership of Learned Societies and Scientific Bodies

- Fellow, Indian National Science Academy (1950) and past council Member,
- Fellow, Indian Academy of Sciences, India.
- Fellow, Royal Institute of Chemistry of Great Britain and Ireland.
- Past President, Society of Biological Chemists of India.
- Past Vice President, Nutrition Society of India.
- Past Vice President, Association of Food Scientists and Technologists.
- Past Chairman, Indian National Committee for Bio-Chemistry.
- Past Vice President, International Congress of Food Science and Technology.

Research Areas

Contributions to an understanding of:

- Basic metabolic events and regulatory mechanisms as influenced by (a) nutritional, (b) hormonal, and (c) radiation effects
- Tissue differentiation and de-differentiation processes
- Development and evaluation of (i) protein rich food formulations for combating protein-calorie malnutrition, and (ii) other food processing technologies
- Food preservation by gamma radiation.

Disseminating Knowledge

- Guided over fifty research students for doctoral and masters' degrees besides training some 150 post B.Sc. Food Technology graduates. Several of these scientists and technologists are/were holding responsible and important positions in Industry, Government, Universities and other research establishments.
- Published over 200 papers in various national and international journals.

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