

Acknowledgement

*I express my deep sense of gratitude and respectful regards to my thesis supervisor **Dr. Surjit Mukherjee**, Associate Professor, Physics Department, Faculty of Science, The M. S. University of Baroda for his invaluable guidance, continuous encouragement and admirable patience throughout my research work. His enthusiasm helped to drive my pursuits in moments when I became defocused or weary and for this I am utterly grateful. I am convinced that one could not find a more supportive and knowledgeable advisor than Dr. Mukherjee. He went above and beyond to provide guidance, making this work more lucid and accessible.*

*Words are really insufficient for me to gratefully acknowledge **Dr. Haladhara Naik**, Scientific officer (G), Radiochemistry Division, BARC, Mumbai. He came into picture when I was completely demoralized to pursue my career in nuclear science. Dr. Naik has been an absolute blessing! His insistence upon excellence, complete kindness and understanding are rarely found in any single individual. The degree of Ph. D could be a dream without Dr. Naik.*

*I can never forget to acknowledge **Dr. S. V. Suryanarayana**, Scientific officer (G), Nuclear Physics Division, BARC who played a principal role during the course of my Ph. D. He must be recognized for numerous extensive and fruitful discussions. He carefully explained to me the subtleties of reaction theory, responded to an endless stream of e-mails and provided valuable nuclear model based calculations. He was advisor to me, in many respects, and his generosity is greatly appreciated.*

*It gives me an immense pleasure to acknowledge my indebtedness to **Dr. R. K. Sinha**, Director, BARC, Mumbai for his tremendous support, keen interest and motivation during the course of Ph.D. He provided all the facilities during my stay at BARC which helped a lot to complete research work in a due course of time.*

*I take this opportunity to thank **Dr. S. Kailas**, Director, Physics Group, BARC for his advices, suggestions and kind co-operation. I also thank **Prof. S. Ganesan** for his interest and useful suggestions.*

*I am greatly indebted and thankful to **Prof. A. C. Sharma**, Head, Physics Department, for providing me all kind of support and facilities during the course these investigations. I also express my indebtedness to **Prof. C. F. Desai** for his kind support in smooth running DAE-BRNS, Govt. of India sponsored project at Physics Department, The M. S. University of Baroda. Further, I am grateful to **Prof. N. D. Desai**, Dean, Faculty of Science, for his help, encouragement and co-operation. I express my warm regards to all other staff members of the Physics Department for their co-operation.*

I thank to all crew members of APSARA reactor, Purnima Neutron Generator and BARC-TIFR Pelletron facility for their very kind support during all the experiments.

*My Special thanks are due to **Drs. R. Srivenkatesan, P. P. Chandrachoodan and K. K. Rasheed** of BARC, Mumbai for their unfailing support during the initial stage of Ph. D. I am thankful to **Dr. A. Goswami**, Head Radiochemistry Division and **Dr. P. D. Krishnani**, Head Reactor Physics Design Division of BARC, for giving me permission to carry out research work in their divisions. I am really grateful to **Drs. S. V. Thakre and K.C. Jagadeesan** of Radiopharmaceutical Division, BARC for their active collaboration in the present work. I am also thankful to **Drs. Alok Saxena and B. K. Nayak** of BARC for their useful scientific suggestions. I thank **Dr. Debanik Roy**, Programme officer (NRFC), DAE-BRNS, Mumbai for the financial support given under the collaborative research scheme.*

*I also wish to express my sincere gratitude to **Mr. Ankur Contractor**, Scientific Officer (E), Reactor Safety Division, BARC for his unbelievable support and providing me accommodation in Akash Ganga, Anushaktinagar. I thank my colleagues **Shivashankar, Rita, Kirti and Vikas** for their valuable support during experiments and the things I share with them at BARC. I thank my fellow colleague **Nikit** for his valuable assistance and kind co-operation. I also express my thanks to colleagues **Aditya, Chaitali, Kavita, Purvi, Gaurang, Dolly, Sangeeta** and all.*

*Friends- a part of this work deserve credit for steering me toward career in the science. Especially, I have no words to express my heartiest thanks to **Rachna** for ever being with me in times of high and despair. Among them my best – **Sunil, Piyush, Jagadish, Viral, Babita, Jaspreet, Indrajeet, Apexa, Dharmesh, Jeetu, Manoj, Kalpesh, Vishal, Mahendra, Gajendra** and **Dhiren** need to be gratefully acknowledged for their moral support and encouragement.*

*I would not be here if it were not for my loving parents who reared me with a strong work ethic and a passion for life. I extend my innate feeling to my parents whose encouragement, love, affection brought me thus far in academics. How can I forget my brother, **Vinu** – lifelong friend, at this moment of joy. He has always stood first during my tuff period. Hearty wishes to my **Grandmother, Mama-Mami, Honey & Zinal, Kokiben**, my extended family, all my teachers and persons who have influenced, inspired me through out.*

*Above all I thank the almighty **Sai** for everything!!!*

(Parash M. Prajapati)