Acknowledgements
At this very moment of completing the thesis, the precious memories generated in the past three years all come to my mind. From China to the Netherlands, from a joint PhD candidate of Jiangnan University and Groningen University to a regular PhD student of Groningen University, from food science to microbial physiology, from analyzing physiochemical properties of food components to characterizing the carbohydrate acting enzymes, all these transformations are full of difficulties. I cannot imagine that I could succeed in these transformations without the efforts from the friendly people surrounding me. I feel lucky that I can meet so many nice people in such a lovely country. I would like to take this opportunity to say “thanks” to all of them.

Firstly and most importantly, I would like to express my sincerest appreciation and deepest gratitude to my promoter, Prof. Lubbert Dijkhuizen. Thank him for kindly accepting me to join Microbial Physiology group as a joint PhD student and providing me with a full PhD position in Groningen. Thank him for giving me a promising topic, which let me involve in the knowledgeable Carbohydrate Competence Center and made me love in scientific research. I will never forget all the fruitful and inspiring discussions with him in the past years. His erudition, wisdom, enthusiasm, preciseness and kindness deeply influenced me and helped me to develop a positive attitude towards scientific research. It is a great treasure and fortune of mine to have him as my supervisor during this precious period of my life. I really appreciate that he had always tried to make his word simple and easy to be understandable in my first studying year. I will never forget his kindness to my requests. I will also keep in mind that he always encouraged me to be active in showing my research by posters and oral presentations in all possible occasions and to communicate with other scientists from various institutes or companies. I appreciate that he, as a director of many reputable organizations, offered me opportunities to meet and discuss with so many important persons from Universities, industries, and governments in many high level meetings. I will always remember that he worked on my chapters and discussed with me via email in many midnights and non-working days. He is a father-like supervisor who tries to make me independent, strict and responsible. I sincerely wish him and his family a healthy and happy life.
I would like to give my grateful thank and appreciation to my copromoter and daily supervisor, Dr. Rachel van der Kaaij. Without her help, I cannot finish the thesis efficiently and I may still be struggling with my research at this moment. I will never forget that she had spent a lot of time on revising and reconstructing my manuscripts and chapters time by time. She taught me many basic concepts in microbiology and enzymology. She is not only a supervisor but also a kind friend of mine. I appreciate her patience when listening my reports and complaints. I will remember every inspired discussion in her offices in either Linnaeusborg or Bernoulliborg. I appreciate all the constructive and valuable advices from her. I also thank her for helping me to translate the summary of my thesis in Dutch.

My sincere and grateful thanks go to Prof. Zhengyu Jin, who is my Chinese supervisor in my joint PhD program in Jiangnan University. Thank him for providing me with the hard-won position to work in his group as a master student. Thank him for giving me the opportunity to be a combined PhD/master student in his group. Thank him for supervising me and introducing me to the carbohydrate field since my master period. I appreciate that he provided me with the scarce opportunity to study abroad, indicated the direction of my oversea research, and encouraged me to finish my PhD study in Groningen. His kindness to all of my requests in the past years will be kept in my mind forever. I also appreciate that he gave me opportunities to visit various companies in China and to participate international conferences, which broadened my vision and helped me to establish a right attitude to scientific research.

My deep gratitude also goes to Prof. Xueming Xu, who had helped me a lot during my master and PhD periods. Thank him for providing me with many brilliant ideas on my topics and encouraging me to continue my study abroad.

To my Chinese daily supervisor, Prof. Yaoqi Tian, I am deeply grateful for his support and guidance during my master and early PhD periods. I will never forget all the moments we discussed together in the studying room when he was still a PhD candidate. I was so impressed by his intelligence, diligence and kindness. I appreciate that he taught me how to organize a story for publication in international journals and helped me to correct my sentences word by word during my master period.
Here, I also would like to thank Prof. Johannis P. Kamerling. I will cherish all the times we met in the past years. I will remember all the great ideas from him. I also appreciate that you kindly wrote a recommendation letter for me when I was looking for a position in China.

My gratitude goes to the members of the reading committee Prof. T. Desmet, Prof. D.B. Janssen, and Prof. M.J.E.C. van der Maarel. Thank them for spending time on critically reading my thesis and giving valuable comments, and approving the thesis for the public defence.

My deep appreciation goes to Dr. Tjaard Pijning. His profound knowledge on the structure of carbohydrate acting enzymes is so impressive. I thank him for teaching me so much on understanding the crystal structure of carbohydrate acting enzymes. I really enjoyed all the inspired discussions with him. I will never forget the days we sit together and discuss on how to organize and write a excellent story from our results. I also appreciate his help on designing the beautiful cover of my thesis.

I would like to thank Joana Gangoiti and Markus Böger, who are willing to be my pananimfs. I am glad to work and give talk together with Joana in the same project for AVEBE in my first two years. Thank her for many wonderful discussions on our topics. I appreciate Markus’ help on growth of anaerobic bacteria using the system established by him and his contribution on the chapter 4 of this thesis.

Of course, my thanks also go to my other two officemates, Ana Ceniceros and Tim Devlamynck, who brought me so much warmness. Thank them for chatting with me on various topics including research, cultures and politics. Thank them for providing me so much useful information to make me live here happy. Thank them for accompanying with me in the office after working time in many days. I wish you all a nice promotion in the near future.

I would like to thank Justyna Dobruchowska, Sander van Leeuwen and Gerrit Gerwig for the structural analysis of the saccharides. They always offered kind supports even though they are very busy with other work at the same time. I appreciate their patient explanation on interpreting the NMR spectra and contribution to some chapters in this thesis.
I would like to express my appreciation to Piet Buwalda and Piet van der Zaal from AVEBE starch company and Wageningen University for all the worthy discussion and knowledge sharing in the project meetings.

Grateful thanks go to Albert Woortman and Gert Alberda van Ekenstein for helping to do the SEC and DSC analysis. Thank Albert for contributing to some of my chapters. I appreciate that they patiently explained the principle of all the technologies and provided me with many useful suggestions.

My thanks go to Prof. Jan Kok and Harma Karsens for kindly offering me help on gene inactivation in *Lactobacillus*.

My gratitude goes to Pieter. I appreciate his technical support at my first year in the lab. I will never forget the word “backup” from you.

Sincere thanks go to our secretaries Bea, Manon, and Anmara, and managing director of GBB, Engel for their kind help on a series of issues such as identity transformation, extension, arrangement of conference and so on.

I should not forget to thank Tseard de Graaf, who is expertise on learning and teaching foreign languages. Thank him for giving me a warm welcome, chatting with me in my first journey from Amsterdam to Groningen, and showing me around the Museum of Groningen University.

I would like to thank Xiangfeng Meng for helping me to settle quickly into the Dutch life-style and laboratory work. I thank him for all the valuable discussions on the work. Also, thank Huifang Yin for the work discussion during lunchtime.

I am grateful to all the former and present colleagues in MicFys including Slavko, Hans, Jelle, Jolanda, Evelien, Cecile, Alle, Alicia, Elena, Lara, Mark, Mirjan, Hans-Jörg, Marnix, Veronica, Gerda, Maarten, Vincent, Laura, Hien, Rivca, Sahar, Ahmed, Sebastiaan, Geralt, Marta. I will never forget their supports, which made my PhD fruitful. My deep gratitude also goes to my colleagues in Jiangnan University including Xing Zhou, Jianwei Zhao, Jinpeng Wang, Zhengjun Xie, Aiquan Jiao, Huanxin Zhang, Bo Yu, Wangyang Shen, Fengfeng Wu, Yisheng Chen, Huanlong Liu, Na Yang, Jin Xu, Xu Cao, Guangyao Chen, Xuexia Ji, Jing Chen, Yawei Ning, Jun Nie, Xiuting Hu, Benxi
Wei, Chunsen Wu, Jie Long, Hongyan Li, Xiuchao Zhai, Yan Xu, Yan Yue, Haining Zhuang, Yamei Jin, Zhixuan Sheng, Qianqian Jiang, Lulu Zhang, Tiantian Wang, Bao Zhang, Tao Feng. I appreciate all the support from them and I really enjoyed the happy time with them.

I would like to thank all my Chinese friends in the Netherlands: Wanli Zheng, Peng Peng, Feng Hu, Bian Wu, Wenjuan Ma, Yanping Geng, Qiuyan Yang, Pei Zhao, Nana Yu, Youtao Liu, Min Wu, Xuewen Zhang, Mengqiu Ge, Yan Zeng, Jiquan Wu, Xiaoyu Ruan, Di Wang, Yuxi Tang, Fei Deng, Jinfeng Shao, Pu Yang, Yirenjile, Jiawei Chen, Wenjun Wang, Tao Zhang, Wenzuan Zhang, Sheng He, Yinxing Jin, Dongdong Mu, Gang Huang, Juanjuan Su, Qian Li, Haojie Cao, Yanglei Yi, Jingjing Deng, Xin Zhao, Boqun Liu, Zhiwei Zhou, Ximin Wang, Shengcheng Ren, Fangjie Gu, Sheng He, Mingbo Liu, Michael, Jia Liu. Bin Jiang, Yuanyuan Ju, Jinfeng Peng, Xuan Xu, Qihan Zhang and so on. Their enthusiasm and goodness let me feel warm and unlonely. I feel lucky to have them in this lovely country.

Last but not least, I would like to express my appreciation to my dear family, my parents, parents in law, grandma in law, sisters, brothers in law and nephews. I would never achieve my study abroad without their understanding, encouragement, support and love. Thank my sisters and brothers in law for taking care of my parents in the past years and visiting them in all the important festivals. Finally and especially, I should not forget to thank my dearest wife. I appreciate that she travelled so frequently between China and the Netherlands and spend all of her holidays with me together. Her companionship relieved my pressure from work and my homesickness. It is a sweet memory that we got the marriage certificate in Chinese embassy in the Netherlands. Travelling around many beautiful European countries and wonderful cities in the Netherlands with her will be kept in my mind forever. Her love, trust and understanding made my PhD life bright and colorful!

Yuxiang Bai
University of Groningen
January 2016