Molecular and biochemical studies of fragrance biosynthesis in rose

Sun, P.

Publication date
2017

Document Version
Other version

License
Other

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Acknowledgements

Accomplishment of this thesis project required tremendous guidance and support from many people. Hereby, I would like to express my deepest gratitude to all of these people who have helped and supported me during the past three years. I am afraid that there are too many people that I should acknowledge, but due to my terrible memory, I may not be able to include all of them here.

First I would like to give special thanks to Sylvie Baudino, who offered me this interesting, beautiful and challenging topic at Université Jean Monnet Saint-Etienne (UJM). Sylvie has always greatly supportive of my work and provided me with a lot of professional guidance and insightful comments. Through her network of collaborators, she provided many opportunities for me to work with many nice people in various aspects. Specially, she initiated the collaboration with the Plant Physiology group at University of Amsterdam (UvA), where I gained valuable knowledge on plant transcriptional regulation. During my stay in Amsterdam, I had a warm welcome and great support from Rob Schuurink and Michel Haring. Being my daily supervisor, Rob kept track of my progress and provided me with a lot of support, not only through suggestions that enlightened my research, but also by helping me for in many other things, like arranging the plants materials.

Apart from my supervisors, I would like to specially thank Aurélie Bony (UJM) and Michel de Vries (UvA). Aurélie tutored me in molecular biology. She taught me all the molecular biology techniques that I needed to use and she has always been kind and patient with me. Her accuracy during experiment influenced me, which has contributed greatly to the success of this project. Michel constantly helped me with all the experiment-related issues during my stay in UvA. He was very busy because he himself had a lot of work to do, but he always offered his help whenever he could.

I would also like to express my appreciation to all my collaborators, without their help, this project would not have succeeded. Here, I would like to specially thank Philippe Hugueney (INRA Colmar) and his colleague Raymonde Baltenweck. I have worked in their lab at least once a year for the last three years and they helped me with all the in vitro enzymatic assays and the measurements of geranyl-/farnesyl-glycosides. Besides, they also welcomed me kindly and arranged the accommodation each time I went there. Speaking about kindness, I am also grateful to Fabrice Foucher and his colleagues, Laurence Hibrand-Saint-Oyant, Tatiana Thouroude and Julien Jeufrre (Institut de Recherche en Horticulture et Semences, INRA Angers). They offered a great support with their petal collection, especially Tatiana, who helped me to collect the petals and arranged a very efficient schedule with a well-organized table to ensure my sample collection went smoothly; and Laurence, who helped me to weigh and extract the petals every day and even sacrificed her own time to help me finish the task. In addition, she is also the one who helped me with all the quantitative trait locus (QTL) analysis and gene mapping. Apart from this, she is also very nice and patient. She was willing to spend almost an hour on the phone just to explain QTL to me until I fully understood it. Meanwhile, during my stay in Angers, Julien taught me their protocol for RNA extraction step by step, and he also helped me with the gene mapping as well. I had no experience in protein structure modelling, but Stéphane Réty (Institut de Biologie et Chimie des Protéines) showed me the power of this technique. He helped me with the modelling of NUDX1 proteins. Somehow, I feel like that he was full-time helping me because whenever I asked him question regarding the modelling, he could reply me within an hour with beautiful pictures of protein structures. Besides, when I visited him with further questions, he was very patient to answer all of them and fulfil all my requests as well. Carine Tisé and Clément Dégut (Université Paris Descartes) helped me with one of the most difficult tasks: protein crystallography. They spent a lot of time and effort to obtain the crystal of RhNUDX1-1 and AtNUDX1 proteins in order to characterize their 3D structure. All the protein modelling was based on the structures that they determined. Finally, Ahmed Abd-el-Haliem (UvA) and Sylvain Legrand (Université de Lille) are my tutors in bioinformatics. Ahmed taught me
how to do the RNA-Seq assembly and the evaluation of RNA-Seq data, while Sylvain taught me how to do the annotation step by step and spent much of his time in answering my questions via emails and messages. Chapter 5 is basically the result of their help.

Of course, my work and my life would be much more difficult without the help of my colleagues in UJM and UvA. In UJM, I would like to thank Jean-Claude, who helped me with GC-MS analysis, confocal microscopy (with help from an amazing lady, Sabine Palle, in the optical department) and great support on botany; Sandrine Moja, who helped me collect all the petals in 2015; Jean-Louis Magnard and Frédéric Jullien, who are specialists on molecular biology and offered a number of useful technical advises and ideas, which helped me to overcome many obstacles during experiments and writing. I would also like to thank Cécile Prunier, who is very skilled in molecular biology and she helped me to solve many problems during experiments. Outside the lab, she is a true friend. She has invited me many times to her home and shared lots of her experiences and knowledge with me, which were very useful for my daily life in France. I would like to thank Florence Nicolè, who helped me with statistical questions and Denis Saint-Marcoux, who helped me with bioinformatics. Nicolas Boyer helped me take care of the plants and Florence Gros helped a lot with my accommodation in Saint-Etienne. I would thank Catherine Soler, who helped me a lot in the first year. She helped me translate all the French documents into English and helped me find accommodation. Without her help, my first-year life in France would have been impossible. I would like to thank my student Katya Lobanova as well because she helped me with analysing the GC-MS data.

From UvA, I would like to thank Ludek Tikovsky, who is excellent in taking care of the plants. Under his care, all my roses were kept wonderfully healthy and blooming. I would also like to thank Paula van Kleeff, Suzanne Alves Afliots-Hoogstrate, Aldana Ramirez, Jiesen Xu, Silke Allmann and Yanbang Li. Paula and Suzanne offered a lot of help and ideas for the experiments. Besides, their cheerful personalities really brightened my life on a daily basis. Aldana helped me greatly with confocal microscopy and she also often shared her work and life experiences with me. Jiesen helped me with the promoter and transcription factor experiments. Silke taught me Western Blot and Yanbang shared his protoplast extraction protocol. I would also like to thank Lu Zhang, a friend in China, who designed and drew the thesis cover for me.

Many other friends and colleagues, though they did not participate in my project directly, I am still deeply grateful for their constant company, encouragement, support and help. They are Edouard Boex-Fontvieille, Bernard Blerot, Yolande Despinasse, Loïc Sarrabère, Laure Martinelli from UJM and Qianqian Zhang, Linxue Cao, Aleksandra Muras, Maaike Boersma, Ringo van Wijk, Dorota Kawa, Marc Galland and Ruy Kortbeek. Here, I would like to specially thank my partner, Alejandro, who in fact helped me tremendously on my thesis, including proof-reading, help with statistical analysis, data processing, how to use R, etc. Besides, he is always very patient and supportive. Although we lived apart, he was always around, listening and offering his help whenever and wherever I needed it. My accomplishment is largely thanks to him.

Last but not least, I am deeply grateful for the effort of my thesis committees, including two reporters, Danièle Werck-Reichhart (Université de Strasbourg) and Harro Bouwmeester (UvA) for giving their insightful comments on my thesis; other juries apart from my supervisors (Sylvie Baudino, Michel Haring and Rob Schuurink), Petra Bleeke and Jérémy Clotault, and an invited member, Philippe Hugueney, for their scientific contributions.