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Radin Sadre

PRESENT ADDRESS:

Department of Biochemistry and Molecular Biology
Michigan State University
Biochemistry Building
603 Wilson Rd, Rm. 210
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EDUCATION

Dr. rer. nat. (equiv. PhD) in Plant Biochemistry/Biotechnology, RWTH Aachen University, Germany

Dipl.-Biol. (equiv. MSc), Molecular Biology (major), RWTH Aachen University, Germany

PROFESSIONAL & RESEARCH EXPERIENCE

2021-Present Senior Research Associate, Michigan State University, Dpt. Biochemistry and Molecular Biology; advisor: Dr. Erich Grotewold
Project: Molecular mechanisms underlying the biosynthesis and accumulation of flavonoids and other phenolics

2018-2021 Senior Research Associate, Michigan State University, Dpt. Horticulture and Dpt. Biochemistry and Molecular Biology; advisors: Dr. Cornelius Barry and Dr. A. Daniel Jones
Project: Nortropane alkaloid biosynthesis in Solanaceae

2016-2018 Senior Research Associate, Michigan State University, Dpt. Biochemistry and Molecular Biology & the DOE Great Lakes Bioenergy Center;
advisors: Dr. Christoph Benning (project lead) and Dr. Bjoern Hamberger
Projects: Metabolic engineering and synthetic biology for co-production of terpenoids and oil in plants; Medicinal terpenoids

2011 – 2016 Research Associate, Michigan State University, Dpt. Biochemistry and Molecular Biology; advisor: Dr. Dean DellaPenna
Project: Monoterpene indole alkaloid biosynthesis in *Camptotheca acuminata*

2007 – 2011 Research with external, independent funding, project lead, lecturer; Institute for Biology I, RWTH Aachen University (Frentzen laboratory, Germany) and Syngenta Jealott's Hill International Research Centre (UK)
Independent research projects: Mode of action studies on novel herbicides; Convergent evolution of plastoquinone-9 pathways in cyanobacteria and plants

PATENT

WO/2020/033705 - Improved production of terpenoids using enzymes anchored to lipid droplet surface proteins.

PUBLICATIONS

Sadre, R., Anthony, T., Grabar, J., Bedewitz, M., Jones, A.D., and Barry, C. (2021, in preparation) Metabolomics-guided discovery of cytochrome P450s involved in pseudotropine-dependent biosynthesis of modified tropane alkaloids

Sadre, R.*, Kuo, P., **Chen, J.**, Yang, Y., Banerjee, A. Benning, C., and Hamberger, B.* (2019) Cytosolic lipid droplets as engineered organelles for production and accumulation of terpenoid biomaterials in leaves. *Nat. Comm.* 10, 853-865.
DOI: 10.1038/s41467-019-08515-4 (*corresponding authors)

Johnson, S.R., Bhat, W.W.*, **Sadre, R.***, Miller, G.P., Garcia, A.S., and Hamberger, B. (2019) Promiscuous terpene synthases from *Prunella vulgaris* highlight the importance of substrate and compartment switching in terpene synthase evolution. *New Phytol.* 223, 323-335
DOI: 10.1111/nph.15778 (*contributed equally)

Sadre, R., Magallanes-Lundback, M., Pradhan, S., Salim, V., Mesberg, A., Jones, A.D., and DellaPenna, D. (2016) Metabolite diversity in alkaloid biosynthesis: A multilane (diastereomer) highway for camptothecin synthesis in *Camptotheca acuminata*. *Plant Cell* 28, 1926-44.
DOI: 10.1105/tpc.16.00193

Pfaff, C., Glindemann, N., Gruber, J., Frentzen, M., and **Sadre, R.*** (2014) Chorismate pyruvate-lyase and 4-hydroxy-3-solanesylbenzoate decarboxylase are required for plastoquinone biosynthesis in the cyanobacterium *Synechocystis* sp. PCC6803. *J. Biol. Chem.* 289, 2675-86.
DOI: 10.1074/jbc.M113.511709 (*: senior and corresponding author)

Sadre, R.*, Pfaff, C., and Buchkremer, S. (2012) Plastoquinone-9 biosynthesis in cyanobacteria differs from that in plants and involves a novel 4-hydroxybenzoate solanesyltransferase. *Biochem. J.* 442, 621-629. DOI: 10.1042/BJ20111796 (*: corresponding author)

Sadre, R.*, Frentzen, M., Saeed, M., and Hawkes, T. (2010) Catalytic reactions of the homogentisate prenyl transferase involved in plastoquinone-9 biosynthesis. *J. Biol. Chem.* 285, 18191-18198.
DOI: 10.1074/jbc.M110.117929 (*: corresponding author)

Sadre, R.*, and Frentzen, M. (2009) Lipids in Plant Mitochondria, in *Lipids in Photosynthesis* (Wada, H. and Murata, N., eds.), pp. 57-76, Springer, Dordrecht.
DOI: 10.1007/978-90-481-2863-1_4 (*: corresponding author)

Sadre, R.*, Gruber, J., and Frentzen, M. (2006) Characterization of homogentisate prenyltransferases involved in plastoquinone and tocochromanol biosynthesis. *FEBS Lett.* 580, 5357-5362.
DOI: 10.1016/j.febslet.2006.09.002 (*: corresponding author)

Raclaru, M., Gruber, J., Kumar, R., **Sadre, R.**, Lühs, W., Zarhloul, M.K., Friedt, W., Frentzen, M., and Weier, D. (2006) Increase of the tocochromanol content in transgenic *Brassica napus* seeds by overexpression of key enzymes involved in prenylquinone biosynthesis. *Mol. Breeding* 18, 93-107. DOI: 10.1007/s11032-006-9014-5

Kumar, R., Raclaru, M., Schüßeler, T., Gruber, J., **Sadre, R.**, Lühs, W., Zarhloul, K.M., Friedt, W., Enders, D., Frentzen, M. and Weier, D. (2005) Characterisation of plant tocopherol cyclases and their overexpression in transgenic *Brassica napus* seeds. *FEBS Lett.* 579, 1357-1364.
DOI: 10.1016/j.febslet.2005.01.030

Sadre, R., Paus, H., Frentzen, M., and Weier, D. (2003) Characterisation of enzymes involved in tocopherol biosynthesis, in *Advanced Research on Plant Lipids*: Proceedings of the 15th International Symposium on Plant Lipids (N. Murata, ed.), pp. 253-256, Kluwer Academic Publishers, Dordrecht. DOI: 10.1007/978-94-017-0159-4_59

SELECTED ORAL PRESENTATIONS

Sadre, R., Anthony, T., Grabar, J., Bedewitz, M., Jones, A.D., and Barry, C. (2021) The Beautiful Lady's secret: untargeted metabolomics uncovers the roles of cytochromes P450 in a pseudotropine-dependent branch of modified tropane alkaloid biosynthesis. 60th Annual Meeting of the Phytochemical Society of North America, Canada, virtual, July 25-30, 2021
https://psna2021.ca/program/

Sadre, R., Anthony, T., Grabar, J., Bedewitz, M., Jones, A.D., and Barry, C. (2020) An untargeted metabolite profiling-based approach identifies cytochromes P450 involved in the biosynthesis of modified tropane alkaloids in *Atropa belladonna*. Metabolomics Association of North America, 2nd Annual MANA Conference, September 14-16, 2020 – virtual [**keynote session speaker**]
https://www.mana2020.org/program/detailed-program

Sadre, R., Kuo, P., Chen, J., Yang, Y., Banerjee, A., Benning, C., and Hamberger, B. (2019) Synthetic lipid droplets for production and accumulation of high-value compounds in plant leaves. Plant Synthetic Biology 2019 (ASPB), San Jose, CA, August 7-9, 2019 [https://plantsyntheticbiology.org/]

Sadre, R., Kuo, P., Banerjee, A., Benning, C., and Hamberger, B. (2018) Boosting terpenoid and oil production in photosynthetic tissues of plants. Keystone Symposium on Natural Products and Synthetic Biology: Parts and Pathways, Olympic Valley, CA, January 21-24, 2018
https://www.keystonesymposia.org

Sadre, R., Kuo, P., Benning, C., and Hamberger, B. (2017) Boosting the production of terpenoids in lipid droplet-accumulating photosynthetic tissues. 56th Annual Meeting of the Phytochemical Society of North America, Columbia, MO, August 5-9, 2017
Program PSNA 2017

MEMBERSHIPS

American Society of Plant Biologists
Metabolomics Association of North America
Phytochemical Society of North America