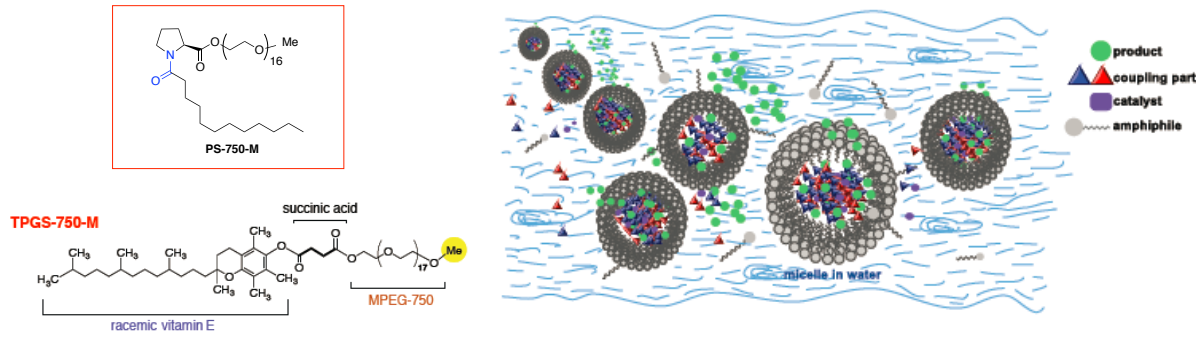
SUSTAINABILITY AS A DRIVER FOR INNOVATION

Fabrice Gallou

Novartis Distinguished Scientist, Chemical Development, Novartis, Novartis Campus, 4056 Basel, Switzerland

fabrice.gallou@novartis.com

During our evaluation of the potential of surfactant technology, we have identified a variety of straightforward and highly advantageous transformations and applied them successfully on-scale on various chemo and biocatalytic transformations.[1] Implementation of the technology typically results into significant benefits across our entire portfolio, not just from an environmental standpoint but also from an economic and productivity perspective. To name a few: reduction of organic solvent consumption, water use and cycle time, milder reaction conditions, improved yields and selectivities,[2] much greener footprint,[3] which all contribute to improved process performance and lower manufacturing costs.



Modern non-ionic surfactants for micellar catalysis in water.

These surfactant mediated reactions can be up-scaled in the already existing multi-purpose facilities of pharmaceutical or chemical organizations, using a catalytic amount of a combination of a non-ionic designer surfactant (e.g. TPGS-750-M, PS-750-M) in water, and a well-chosen organic co-solvent instead of traditional and undesirable organic solvents. We now start gaining insight onto the physical phenomena involved and the role of the various components of the reactions and utilize this know-how to design even better catalytic systems.[4]

---

[1] ACS *Sustain. Chem. Eng*. **2022**, 10, 5148. *Chem. Catal.* **2023**, 3, 100485. *Chimia* **2020**, 74, 538. *Chem. Rev.* **2023**, 123, 5263.
[2] *Green Chem.* **2016**, 18, 14. *Curr. Opin. Green Sust. Chem*. **2017**, 7, 13.
[3] *Chimia* **2019**, 73, 9, A681. *Org. Process Res. Dev.* **2021**, 25, 900.
4 *Curr. Opin. Colloids and Interface Sci*. **2021**, 56, 101506. *J. Colloid Interface Sci.* **2022**, 628, 819.