



FKKT

UNIVERZA V LJUBLJANI
Fakulteta za kemijo in kemijsko tehnologijo

VABILO NA PREDAVANJE
V OKVIRU DOKTORSKEGA ŠTUDIJA
KEMIJSKE ZNANOSTI / INVITATION TO THE
LECTURE WITHIN DOCTORAL PROGRAMME IN
CHEMICAL SCIENCES

Dr. habil. Pablo Domínguez de María

Sustainable Momentum SL, Spain

z naslovom / title:

**Estimating the CO₂ production during
(bio)catalytic reactions**

v sredo, 12. 2. 2025 ob 15. uri
v predavalnici 1 v 1. nadstropju Fakultete za kemijo
in kemijsko tehnologijo, Večna pot 113 /
on Wednesday, 12. 2. 2025 at 15.00
in lecture room 1, 1st floor at the Faculty of
Chemistry and Chemical Technology, Večna pot 113

Vljudno vabljeni! / Kindly invited!

Abstract:

Biocatalysis, utilizing enzymes or microbial cells, offers eco-friendly alternatives to traditional chemical synthesis. However, like any synthetic process, (bio)catalytic reactions require mass and energy, which inevitably result in CO₂ production. Estimating CO₂ emissions is essential for understanding their environmental impact and optimizing sustainable bioprocesses, enabling the identification of conditions that balance sustainability with commercial viability. This talk explores a rapid method to estimate the "Global Warming Potential (GWP)"—expressed as kg CO₂ per kg of product—using deduced equations based on reaction parameters such as conversion, substrate loading, reaction time, and temperature. These tools facilitate precise estimations and comparisons, empowering the selection of optimal conditions for enzymatic synthesis. By identifying key CO₂-producing steps and minimizing emissions, this approach supports greener manufacturing while preserving the efficiency of biocatalytic systems.

Further reading:

- P. Domínguez de María. "Biocatalysis, sustainability and industrial applications: Show me the metrics". *Curr. Op. Green Sust. Chem.* **2021**, *31*, 100514.
- P. Domínguez de María. "On the need for gate-to-gate environmental metrics in biocatalysis: fatty acid hydration catalyzed by oleate hydratases as a case study". *Green Chem.* **2022**, *24*, 9620.
- P. Domínguez de María, S. Kara, F. Gallou. "Biocatalysis in water or in non-conventional media? Adding the CO₂ production for the debate". *Molecules* **2023**, *28*, 6452.
- P. Domínguez de María. "General equations to estimate the CO₂ production of (bio)catalytic reactions in early developments stages". *RSC Sustainability* **2024**, *2*, 3817.