



Original Cross-Coupling of Biosourced Chemicals

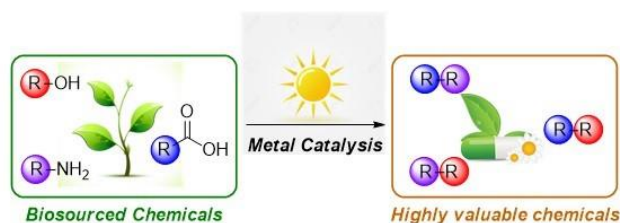
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Our civilization has been built on the use of fuel and non-renewable sources and we have become reliant on them. However, these resources are scarcer and scarcer. An important issue for society today is to look for alternative, eco-compatible and renewable sources, requiring major efforts from the scientific community. Organic chemistry and catalysis are also dependent upon these non-renewable feedstocks especially because coupling reactions often involve halogenated derivatives that are prepared from fossil-based resources using hazardous reagents; alternative processes comprising chemical derivatives from biomass feedstocks are therefore required.

The proposed master 2 internship aims to develop original cross-coupling reactions from abundant and biosourced carboxylic acid, amide,¹ amine and alcohol derivatives as coupling partners



involving light as the only source of activation. Indeed, the key single-electron transfer step will be conducted by photo-redox catalysts² to trigger the cross-coupling process with complete conservation of the chemical integrity of the natural product. These original cross-coupling reactions will lead to the syntheses of highly valuable chemicals such as drugs.

Skills used in the project: Organic syntheses, gas and liquid chromatography, NMR, manipulation using inert atmosphere technics (*use of schlenk line*), use of transition metal catalysts, use of photo-reactors, etc....

Duration: 6 months (started in beginning of 2021)

Funders: LCM

Laboratory: LCM, Ecole Polytechnique

¹ a) Dorval, C.; Dubois, E.; Bourne-Branchu, Y.; Gosmini, C.; Danoun, G. *Adv. Synth. Catal.* **2019**, *361*, 1777-1780 ; b) Bourne-Branchu, Y.; Gosmini, C.; Danoun, G. *Chem. Eur. J.* **2019**, *25*, 2663-2674 ; c) Bourne-Branchu, Y.; Gosmini, C.; Danoun, G. *Chem. Eur. J.* **2017**, *23*, 10043-10047.

² For reviews see: a) J. Twilton, C. Le, P. Zhang, M. H. Shaw, R. W. Evans, D. W. C. MacMillan, *Nat. Rev. Chem.* **2017**, *1*, 52; b) K. L. Skubi, T. R. Blum, T. P. Yoon, *Chem. Rev.* **2016**, *116*, 10035.