Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA
agritech National Research Center for Technology in Agriculture

CHEMOENZYMATIC CATALYSIS FOR BIOMASS VALORIZATION FROM THE VEGETABLE SEED OIL REFINING

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SPOKE, WP, TASK DI APPARTENENZA

Spoke 8, WP1 – Producing new products to upgrade waste value

VALORIZATION OF VEGETABLE SEED OIL WASTE

High-oleic sunflower oil

Raw seed oil → Degumming → Neutralization → Winterization → Washing → Bleaching → Refined oil

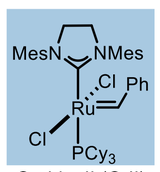
Degumming → Gums → Biodigestion
Neutralization → Soapstock → Splitting → Oleins
Splitting → Biodigestion

Crude oil refining process

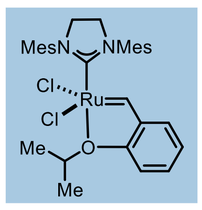
Eversa 2.0 (1% weight), H_2O, 40°C,15 h → oleic acid, 27% yield w/w (87% purity)
Eversa 2.0 (1% weight), MeOH, 40°C, 15 h → methyl oleate, 30% yield w/w (87% purity)
Eversa 2.0 (5% weight), bioEtOH, 40°C, 48 h → ethyl oleate, 29% yield w/w (90% purity)

Lipase-catalyzed hydrolysis and transesterification under mild and scalable conditions

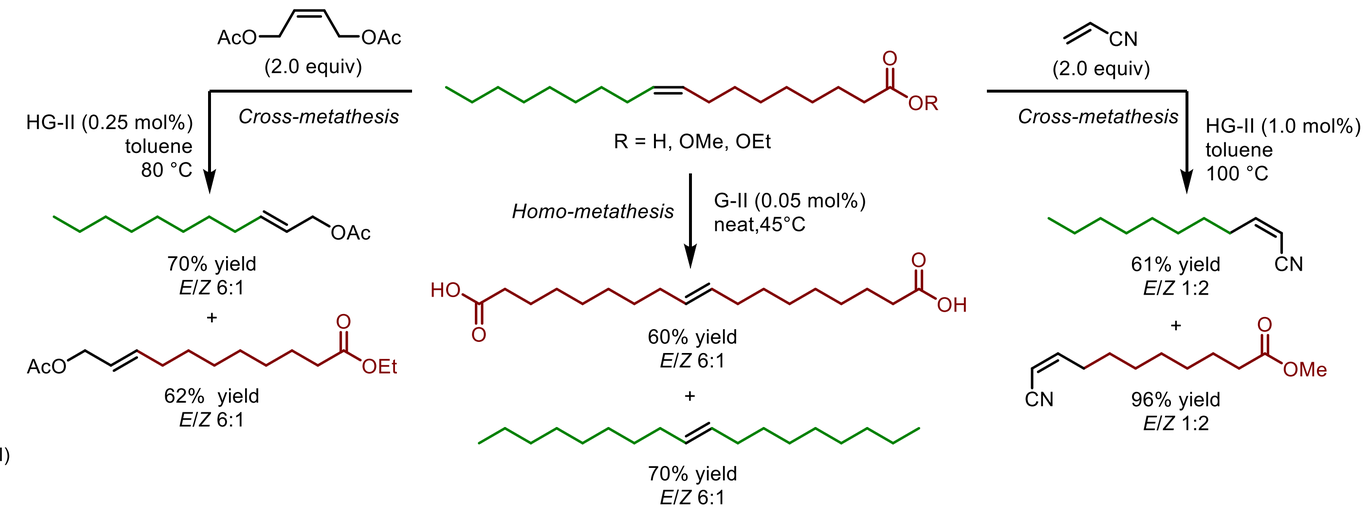
RUTHENIUM-CATALYZED ALKENE METATHESIS



Grubbs II (G-II)



Hoveyda-Grubbs II (HG-II)

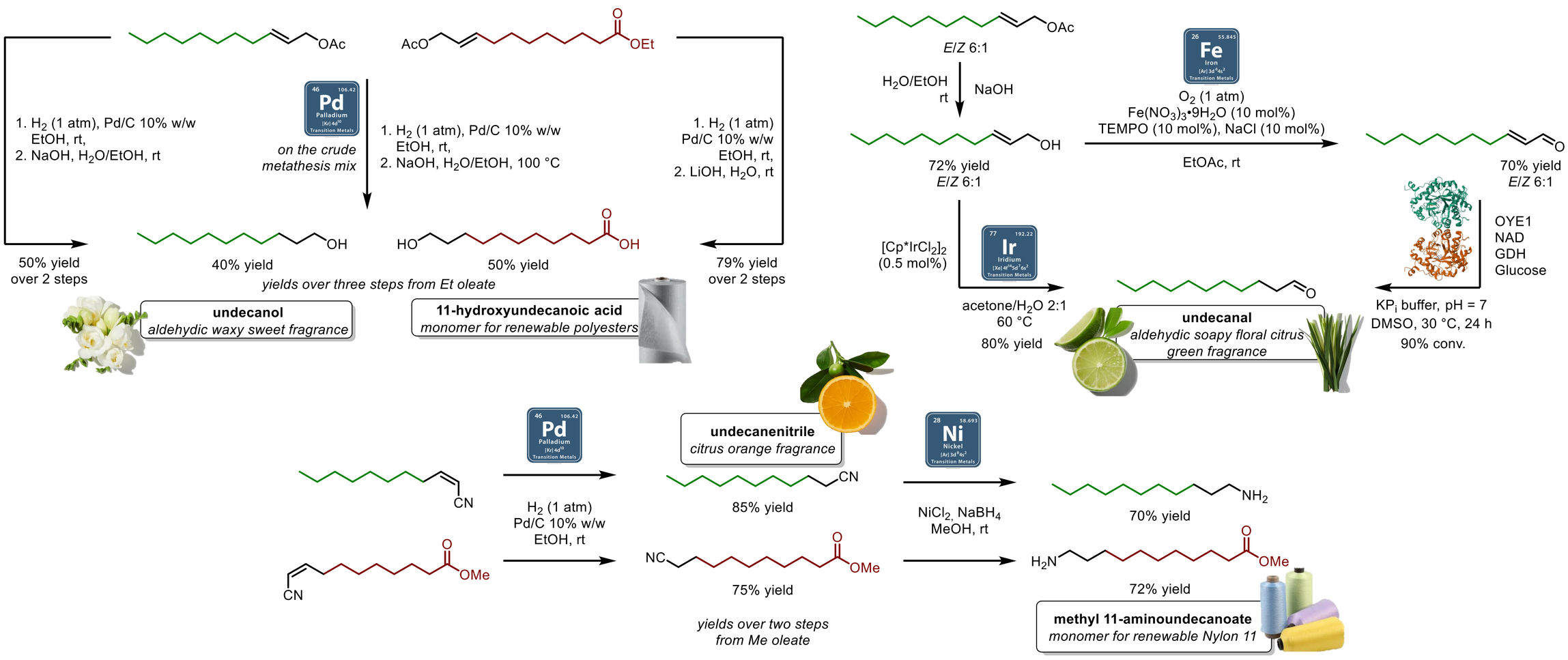


Catalysis performed on crude oleates derived from hydrolysis and transesterification

Catalyst loading as low as 0.05 mol%

Isolation by precipitation or distillation

C11 FRAGRANCES AND MONOMERS FROM WASTE



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This study was carried out within the Agritech National Research Center and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) – MISSIONE 4 COMPONENTE 2, INVESTIMENTO 1.4 – D.D. 1032 17/06/2022, CN00000022). This manuscript reflects only the authors' views and opinions, neither the European Union nor the European Commission can be considered responsible for them.