RECYCLING OF COPPER CONTAMINANTS FROM WASTEWATER AS NEW HYBRID CATALYSTS FOR THE SYNTHESIS OF VALUABLE PHARMACEUTICAL INTERMEDIATES

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The recycling of heavy-metals contaminants from wastewater as a source of valuable products perfectly fits in the principles of Circular Economy in view of restoring pollutants back into the system with new social and economic value. [1] To limit the release of heavy metals into the environment, national regulatory bodies impose effective wastewater treatments. Unfortunately, conventional methods, *i.e.* precipitation, coagulation, complexation, outcome often as inefficient or very expensive when contaminants are present in low concentrations. Biosorption, conversely, mediated by EPS (extracellular polymeric substances) [2-3], produced by several bacterial cells strains, is gaining a great deal of attention as an economic, efficient and sustainable green depolluting approach of wastewater from metal cations such as copper. *Serratia plymuthica* strain SC5II [4] proved as the best bacterial strain displaying copper adsorbing properties with a maximum Cu specific removal of 21.6 mg/g. Copper coordination to EPS components in both its oxidation states was thus deeply investigated by ^{1}H NMR titration, DLS, FT-IR analysis and SEM spectroscopy. The so obtained hybrid catalysts, merging the reactivity of copper with the stereoselectivity arising from EPS structures, were preliminarily applied to enantioselective β-borylation of α,β-unsaturated chalcones as useful intermediates in the synthesis of pharmaceutically related compounds. [5-6] (**Figure 1**)

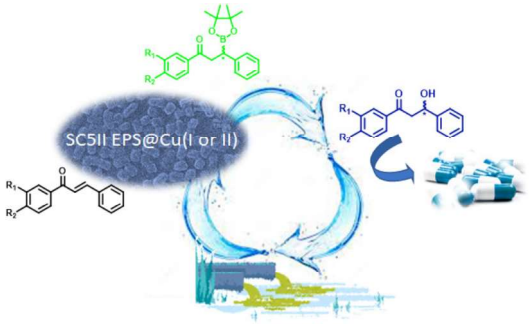

Figure 1. Bioremediation process of copper contaminants from wastewaters

• **Acknowledgements** Fondazione CARIPLO - Circular Economy 2020 supports the project through the grant num. 1069-2020

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