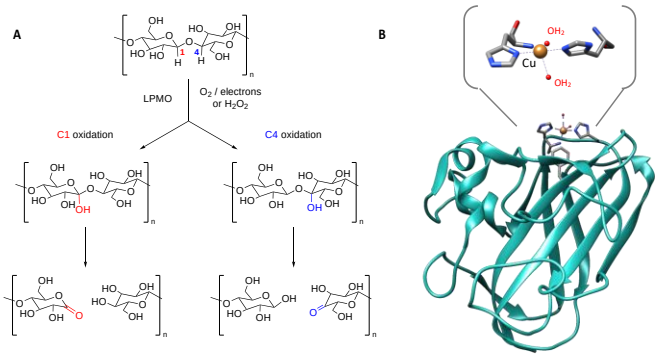
# *Structural and catalytic peptide models of the Cu-LPMO enzyme*




Lignocellulosic biomass is increasingly considered as a renewable feedstock to produce bio-sourced chemicals, biomaterials and advanced biofuels. In this context, Copper-dependent Lytic Polysaccharide Monooxygenases (Cu-LPMO), discovered in 2010, have attracted attention given their ability to initiate the degradation of recalcitrant polysaccharides from biomass. Cu-LPMO enzymes are indeed able to promote extended polysaccharides cleavage (e.g. cellulose or chitin) using oxidative mechanisms. More precisely, LPMO catalyzes the hydroxylation of an inert C-H bond at the glycosidic linkage (either at C1 or C4 position) at the surface of recalcitrant polysaccharide polymers further leading to glycosidic bond cleavage (Fig A).

A new and promising research line in the host team is the design, structural and functional study of bioinspired catalysts. In this context, we have recently started to design and characterize peptide-based models of Cu-LPMO. The peptide scaffold chosen, although quite simple in design, is able to reproduce the key features of the Cu(II) coordination site (shown in Fig. 1B) in the enzymes and the Cu-peptide complexes thus obtained show promising activity towards model substrates. The aim of the project is to widen the peptide families, with rationale modifications to improve the catalytic activity of the Cu-peptide complexes.

The PhD will be involved in a multidisciplinary project, going from peptide synthesis to the measurements of catalytic activity via the in-depth characterization the Cu-peptide bioinspired complexes and investigations of the reaction mechanism at play using a variety of spectroscopic tools (UV-Vis, NMR, EPR, Circular dichroism, Fluorescence, …).

**Environment:** The successful candidate will work in a dynamic and international environment at the Laboratoire de Chimie de Coordination (CNRS) in Toulouse, in the ALAMBIC team. The technical and scientific environment of the laboratory and of the host team is ideally suited to the project. The successful candidate will be trained in peptide synthesis and characterization by advanced spectroscopic techniques such as NMR, EPR, UV-Visible, circular dichroism, fluorescence.

**We are looking for either a PhD student or a post-doctoral fellow.**

**Profile:** We are looking for a highly motivated student with a background in molecular and inorganic chemistry and excellent grades. Candidates should have a keen interest in multidisciplinary projects in the field of bioinorganic chemistry. They should also be able to work autonomously and as part of a team.

**Salary:** approximately €1,800 net per month (PhD) or €2,400 (Post-doc), in the framework of the ANR-funded project "LPMO-PEPS". **Duration:** 36 months (PhD) or 24 months (Post-doc). The position is available as soon as possible, with an ideal starting date in September 2026. **Application deadline :** 30th June 2026.

**Supervision/contacts:** Drs. Enrico Falcone enrico.falcone@lcc-toulouse.fr and Christelle Hureau (christelle.hureau@lcc-toulouse.fr). Please attach to your application a complete CV summarizing your research experiences and including the names of two references.

**Bibliography:**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