Kafia Aroua
(PhD Student)

Address: Laboratoire de Chimie des Processus Biologiques, Collège de France,
11 place Marcelin Berthelot, 75005 Paris,
France
Email: kafia.aroua@college-de-france.fr

RESEARCH INTERESTS

- Ubiquinone biosynthesis
- [4Fe-4S] proteins (UbiU/UbiV)
- Prephenate-dependent anaerobic hydroxylation
- O_2-idependant pathway
- Synthesis of UbiU-UbiV substrates analogues

SUMMARY

The project focuses on the synthesis and evaluation of prephenate derivatives designed to inhibit the O_2-independent pathway of ubiquinone biosynthesis. This anaerobic pathway relies on the [4Fe-4S] proteins UbiU and UbiV, which use prephenate as a biological oxygen donor during key aromatic hydroxylation reactions. Targeting this mechanism offers a promising strategy to disrupt ubiquinone production in bacteria.

The thesis involves preparing structurally modified prephenate analogues, particularly those preventing decarboxylation and aromatization, and characterizing them through organic synthesis, purification techniques, and analytical methods such as NMR and mass spectrometry. Their inhibitory activity will be assessed through in vitro assays and in vivo antibacterial tests, notably on *Pseudomonas aeruginosa*, a pathogen that depends strongly on this anaerobic biosynthetic route. This work integrates organic chemistry, enzymatic biochemistry, and microbiology within a multidisciplinary research framework.

EDUCATIONAL BACKGROUND

2024-2025: **Master's degree** (2nd year) in molecular chemistry, Sorbonne Université

2023-2024: **Master's degree** (1st year) in molecular chemistry, Sorbonne Université

2019-2023: **Bachelor's degree** in chemistry, major, Université Paris-Est Créteil

PREVIOUS RESEARCH ACTIVITY

2025: Second year master internship at Collège de France (Laboratoire de Chimie des Processus Biologiques) in Paris.
Study and synthesis of modified analogues of shikimate for the inhibition of the Ubiquinone biosynthesis

2024: First year master internship at Veolia WTI in Wissous (Essonne)
Analysis and study of water and effluents for industries

2023: Bachelor internship at ICMPE-CNRS (UMR 7182) in Thiais (Val-de-Marne)
Synthesis and C–H functionalization of tetrahydroisoquinoline derivatives through selective activation at the C1 position.