Mitochondrial respiration inhibitors, breaking the dogma for a success story in fungicides discovery

Jean-Pierre Vors, Bayer SAS, Lyon
jean-pierre.vors@bayer.com

**Keywords**: Agrochemistry, fungicides, mitochondrial respiration, fluorinated Heterocycles

Firstly, the background of the current crop protection market will be swiftly presented, and the importance of crop protection compounds will be highlighted.

Bayer CropScience and its small molecules active ingredient Research methodologies will be briefly introduced with analogies to the Pharmaceutical Industry. The emphasis will be put on the (eco)toxicological hurdles to overcome to be able to register such compounds.

The extreme importance of fluorinated heterocycles in crop protection compounds will be highlighted. The need to constantly find new fluorine substituted synthons will be expressed and many structures will be displayed.

Main phytopathogenic fungi will be shortly described. The rationale to search for new fungicides active either on the mitochondrial respiration at the complex II level will be given.

The Structure Activity Relationship will be highlighted linked to the interaction of the compounds with their biochemical targets. Key physico-chemical parameters enabling the structure to reach the target and interact with it will be shown.

Examples of bioactive structures will be given with a focus on fluorine substituted pyrazoles, like bixafen and “magic pyridine” ((3-Chloro-5-trifluoromethyl)-2-pyridinyl) substituted compounds, like fluopyram.

Several synthetic pathways to these noteworthy scaffolds will be shown at the bench and at the industrial scale.

![Bixafen](image1.png) ![Fluopyram](image2.png)

Bixafen  Fluopyram