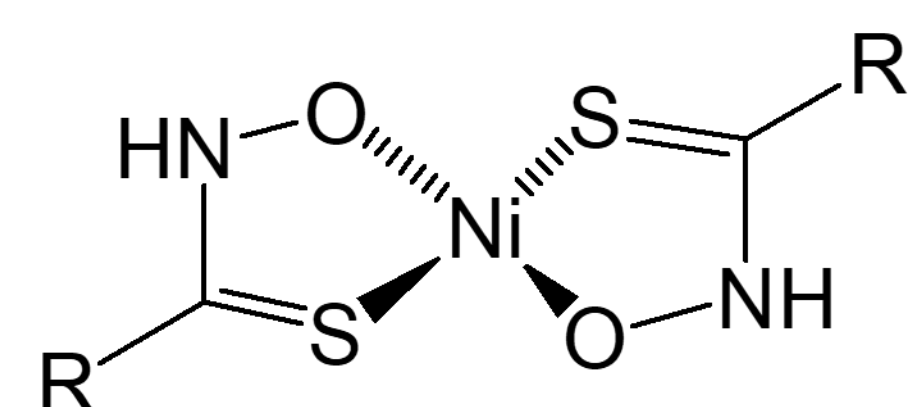


Thiohydroximates as Ligands for Nickel Complexes

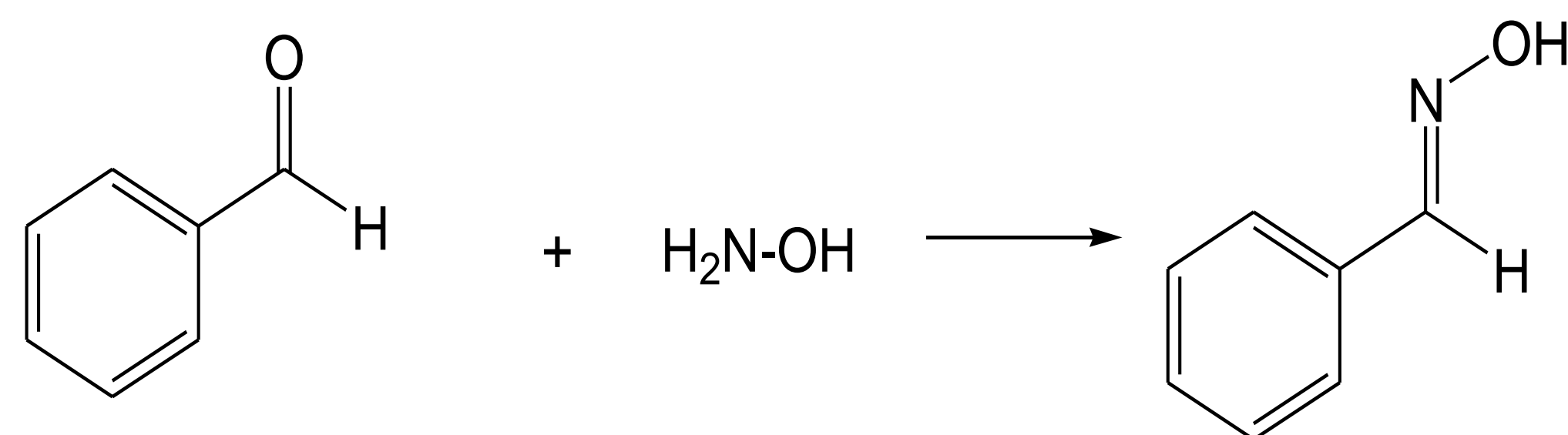
Claire Rettig and James F. Dunne

Goal – synthesize and test Ni(II) thiohydroximates as potential antimicrobial agents

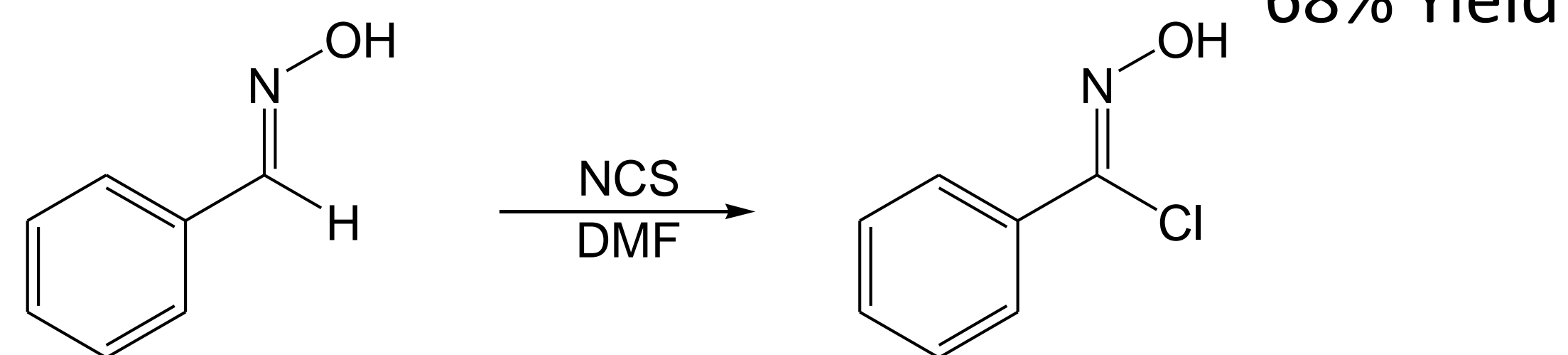


- Bidentate binding mode
- Square planar geometry

Industrial Conversion of Benzaldehyde to Oxime:

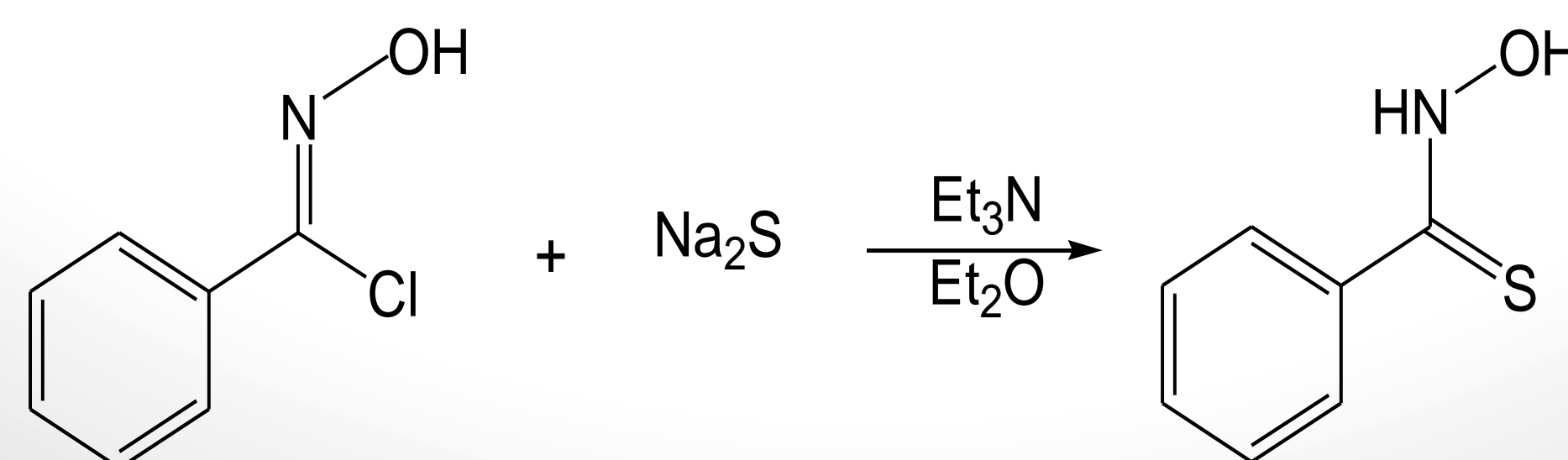


Chlorination of Oxime:



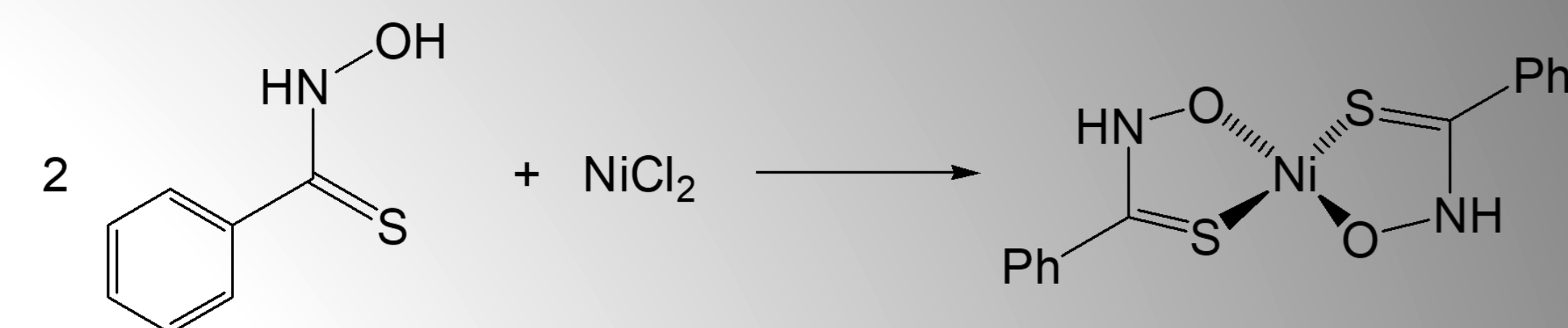
Kumar and co-workers. *Indian J. Chem.*, 2008, 47B, 740.

Conversion to Thiohydroximate:



Pierce and co-workers. *Org. Chem.* 2014, 79, 2321.

Metalation of ligand:



Initial Antimicrobial Tests:

Microbial Species	Gram Stain	Zone of Inhibition
<i>Staphylococcus aureus</i>	Gram-Positive	Yes
<i>Escherichia coli</i>	Gram-Negative	No

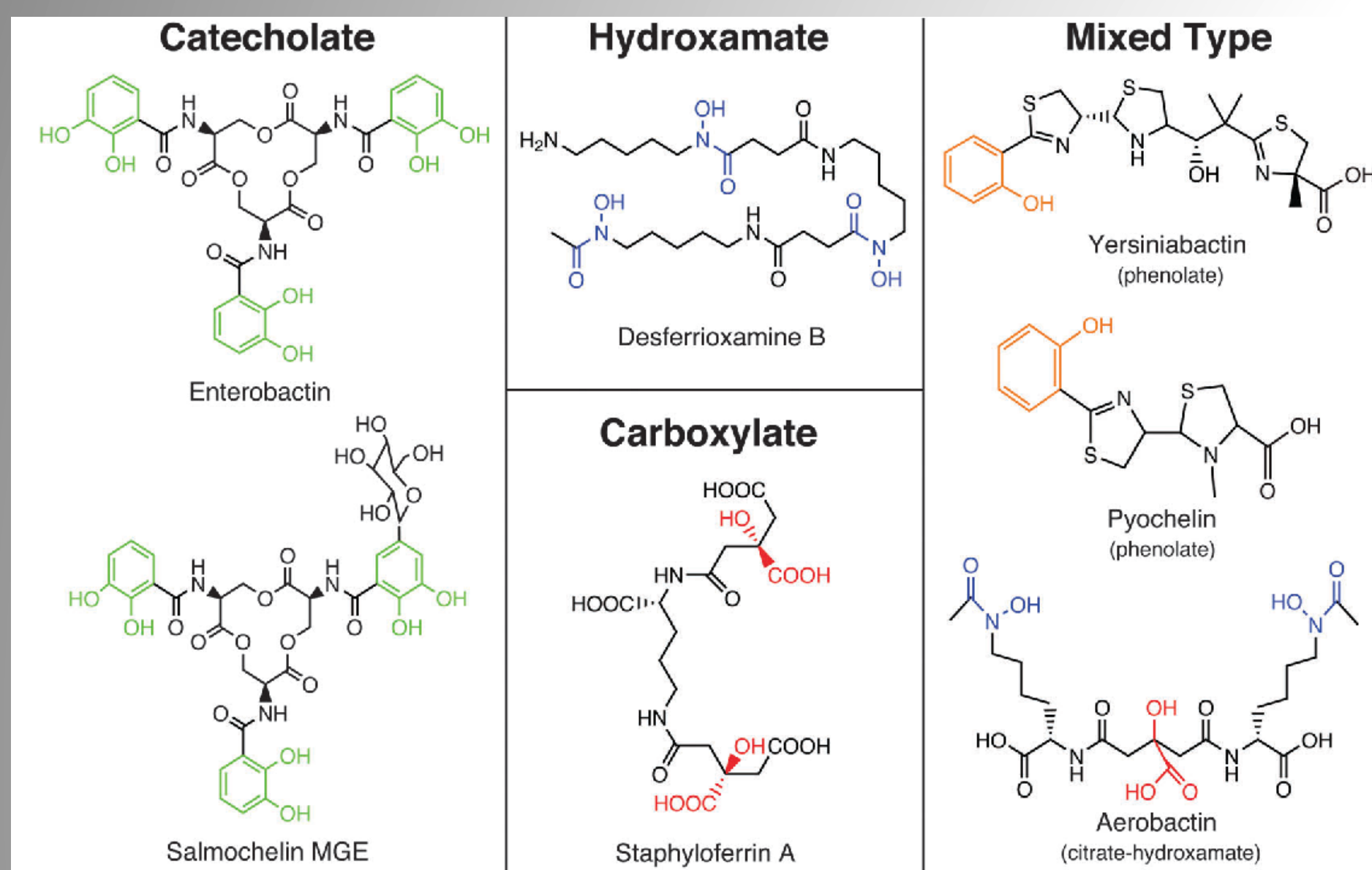


Future work:

- Solve solubility issues: Determine best solvent or quantify amount of Nickel in solution
- Fine-tune antimicrobial studies: Determine size of filter disks or scale-down quantity of dissolved ligand
- Standardize to verify antimicrobial observations

Introduction:

- Siderophores are used by microbes for the uptake of iron



Siderophores can be divided into structural families. Siderophores can be divided into three main structural families: catecholates, hydroxamates, and mixed type. Victoria I Holden and Michael A. Bachman *Metalomics: integrated biometal science* 2015, 76, 986.

Background:

- Thiohydroximates are structurally similar to hydroximates



- Structural similarity to hydroximates enables microbial uptake of thiohydroximate-bound metal centers
- Use of S atom as a binding site should facilitate strong binding of thiohydroximates to nickel centers