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### Progress Towards the Synthesis of Usnic Acid and its Analogs

Usnic acid is a naturally occurring product that has antibacterial properties against *Streptococci*, *Staphylococci*, and *Mycobacteria*. Syntheses of usnic acid have traditionally been quite low yielding, but it is readily available by extraction from various species of lichen. The idea behind this project was to attempt to synthesize usnic acid using a diamine template and determine if template coordination could help achieve a higher yielding synthesis. Along the way, interesting macrocyclic analogs would also be made that could be candidates for biological testing as novel antibacterials. The first step was to synthesize large quantities of 3'-methyl-2',4',6'-trihydroxyacetophenone for use in later steps. Following that, the second step was to create the template, which could couple to the methylated trihydroxyacetophenone via either imines/enamines. We have also investigated a readily synthesized analog of usnic acid (dehydrogenated usnic acid) and its reaction with isatin as a way to create new, more complex, and potentially bioactive molecules. More progress is needed on all facets of the project. The methylation reaction did not meet published standards, so the reaction would need to be optimized and the yield would need to improve. More work is needed to complete the synthesis of the diamine template and to achieve enough material to work with, before the templated synthesis can be attempted. To determine the extent of the success of the reaction between isatin and dehydrogenated usnic acid, attention is still directed to optimizing the reaction and characterizing its products.

#### References:

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**Bio:**

Justin Pantano is a senior double major in forensic science and chemistry. He is a lab assistant in the Department of Chemistry and Chemical Engineering, assisting for organic and analytical chemistry. He will continue this research for the rest of his undergraduate career, and is planning on pursuing a PhD in chemistry after graduating.

