Review of: "Investigation and Synthesis of Benzothiazole-Derived Schiff Base Ligand Against Mycobacterium tuberculosis"

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Potential competing interests: No potential competing interests to declare.

Reviewer's comments

1. The synthesis of the **Schiff base ligand (MTA)** using a standard condensation reaction between 6-methyl-benzothiazol-2-ylamine and Diphenyl-methanone is well-executed. However, I would recommend elaborating on the reaction mechanism, particularly the role of the solvent (ethanol) in the nucleophilic addition step and water elimination. Mentioning why ethanol was preferred over other possible solvents and its influence on the reaction yield would add depth to this section. Moreover, while the reflux at 65°C is typical, more details on optimizing reaction conditions, such as time or varying concentrations of reagents, could be beneficial. Did you attempt any variations, and if so, how did they affect the yield or purity of the ligand? This would be important for readers who may want to reproduce or modify your procedure.
2. You might consider discussing whether any shifts in the absorption bands were observed when compared to typical Schiff base ligands. A brief comparative analysis with other Schiff bases could strengthen this section.
3. It would be helpful to provide more explanation of the signal splitting (multiplets or coupling constants) and what that indicates about the electronic environment around specific protons in 1H-NMR. For instance, how do the chemical shifts compare to other Schiff bases? Does the methyl group on the benzothiazole moiety shift the chemical environment significantly compared to unsubstituted analogs?
4. Were any impurities detected in the spectroscopic data, and if so, what might their origins be? Including a melting point range or purity percentage from HPLC or similar techniques would help gauge the success of your purification process.
5. Could the Schiff base's tautomeric forms or resonance structures impact docking results?
6. Additionally, expanding on the electronic properties of the Schiff base and its influence on biological activity could strengthen the connection between structure and function.
7. Justify the superscripts/subscripts.

With some refinements, this paper could serve as an excellent reference for the synthesis of bioactive Schiff bases.