Review of: "Synthesis and Antibacterial Screening of Cefradine Schiff Bases and Their Metal Salts"

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Potential competing interests: No potential competing interests to declare.

The paper entitled “Synthesis and Antibacterial Screening of Cefradine Schiff Bases and Their Metal Salts” contains results about the synthesis of cefradine-based Schiff bases and their antibacterial potential.

The paper is written about the synthesis of these derivatives would be interesting, but it contains a very low level of scientific information. First of all, the IR and NMR data practically are listed only, without serious evaluation. The spectroscopic evaluation was limited to confirmation of the lack of amino and carboxylic OH groups. Only two bacterial strains were studied. There are no comparisons with references of similar compounds, to confirm the statement about the role of steric effects in low biological activity.

The NRM and IR data of each group should be used to confirm the presence/lack of the coordination of S atom to silver because silver is a sulfidofil element. Comparison of the NMR data of 4 and 17 (SCH2 group signals) shows the lack of shifting and coordination of Ag-ion to sulfur. It should be done for all free ligand/silver complex pairs.

The IR bands of the amide and carboxylate bands should try to separate e.g. with curve analysis, and if the symmetric and antisymmetric C=O bands become assignable, the difference between their position can give information about the bonding mode (ionic, coordinated (for Ag), if coordinated then about the coordination mode (monodentate, bidentate, chelating, etc) (See Nakamoto,K. IR and Raman spectra of coordination compounds). It should be started from IR evaluation of the free cefradine and its Schiff base derivatives.

Since the IR bands are mainly attributed to the ligands, therefore the salts spectra are very similar except for the carboxylate modes range, and the materials are crystalline, if the authors can manage, at least powder XRD data should be given (d values, indexes, crystallite sizes, lattice constants, etc). It would assign these compounds and give the authors a chance to confirm their purity and identity. There are no elemental analysis data, which also should be done.

Because these would be antibacterial agents, their solubility – which has importance in this point of view should be measured. A simple conductivity measurement also would give some information about the association of alkali and alkaline earth salts and the dissociation/coordination of Ag ion content.

If the barium salt is soluble, that means a strong toxicity. It should explain how this could be used this Ba-salt as an antibacterial agent. Only two bacteria strains were studied, several more bacterial strains should be tested to reach a conclusion about their efficiency.

The silver salt was recrystallized, but the yield has not been given. The recrystallization mode has not been given (evaporation to concentrate, cooling in a fridge, or both?)

The melting /decomposition points should also be given.

There are typing mistakes in many places.

There are similar papers, about Cefradine Schiff bases, the contents of these should be evaluated with their own results, and should be f9olow their methodology to give as more information about new derivatives as possible.

(e.g. Synthesis, characterization, SAR, antioxidant, antiacetylcholinesterase and anti-butyrylcholinesterase activities of cephradine Schiff bases), Source: Pakistan Journal of Pharmaceutical Sciences . 2021 Supplement, Vol. 34, p1989-1994. 6p., Author(s): Quratulain; Khan, Mohsin Abbas; Ahmad, Irshad; Hamad, Asad; Ashraf, Muhammad; Hussain, Safdar

and another attached paper.

This paper contains a minimal scientific evaluation, which should have been done, and more measurements also need to characterize a compound, to confirm their composition, a tool to assign them (XRD), and some correct reference collection and comparison of the new results with the older ones.

In summary, the prepared materials have not been characterized sufficiently, and these missing things should be done. More biological studies should also be done to test their activity and evaluate the results in light of the results of similar Schiff bases of cefradine.

This paper can be published only after a major revision and re-writing.