

Área: INO

Synthesis, Antimicrobial Activity, and Toxicity Assessment of a Metal-abietate Complex

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Highlights

A M-abietate complex was successfully synthesized; It showed vigorous antibacterial and moderate antifungal activity; Toxicity tests in *Drosophila melanogaster* revealed it to be safe and promising for antimicrobial applications.

Abstract

The synthesis of metal complexes represents an effective strategy for developing novel antimicrobial agents, based on drugs such as Pepto Bismol. This work presents a complex with a naturally occurring ligand that has been synthesized and characterized using IR and other techniques. The infrared spectrum reveals a shift in the carboxylate band from the spectrum of the ligand (Na-abietate; ν_{asym} 1544 cm^{-1} , ν_{sym} 1397 cm^{-1}) to that of the complex (M-abietate; ν_{asym} 1693 cm^{-1} , ν_{sym} 1384 cm^{-1}), confirming the coordination of the ligand to the metal center (Figure 1a).

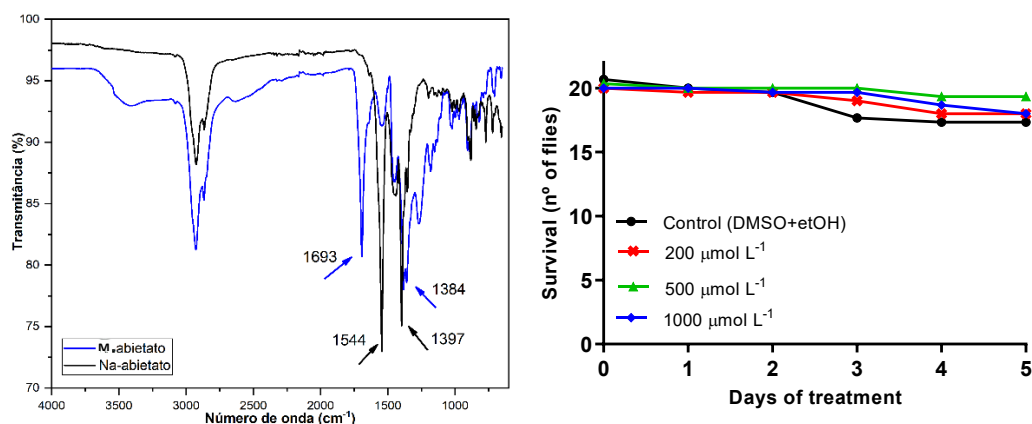


Figure 1. (a) FTIR of M-complex and Na-abietate ligand; (b) Survival of flies in the M-abietate tests.

In biological assays, the complex exhibited a MIC of 7.8 $\mu\text{mol/L}$ against the Gram-positive bacteria *S. aureus* and *L. monocytogenes*, as well as against the Gram-negative *S. enterica* T. For *E. coli*, a MIC of 62.5 $\mu\text{mol/L}$ was observed. Regarding yeasts, MIC values of 31.25 $\mu\text{mol/L}$ were obtained for *C. albicans* and *C. tropicalis*. The toxicity was also evaluated using *Drosophila melanogaster*. No high mortality rate was observed at 200, 500, and 1000 μmol concentrations, as shown in Figure 1b. Based on the results, it can be concluded that the M-abietate complex exhibits promising antimicrobial activity while maintaining low toxicity in *D. melanogaster*.

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