

Substituted Salicylaldehydes as Potential Antimicrobial Drugs: Minimal Inhibitory and Microbicidal Concentrations

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Z. Naturforsch. **66c**, 571–580 (2011), received February 1/September 20, 2011

Substituted salicylaldehydes are potent antibacterial and antifungal agents and may have chemotherapeutic potential. In the clinical setting, the minimal inhibitory concentration (MIC) as well as the minimal bactericidal and fungicidal concentrations (MBC and MFC, respectively) are of fundamental interest. Therefore, we have now, using a panel of five microbial species (*Bacillus cereus*, *Candida albicans*, *Escherichia coli*, *Saccharomyces cerevisiae*, and *Staphylococcus aureus*), determined the MIC and MBC/MFC values of a total of 22 aromatic aldehydes, including 19 substituted salicylaldehydes and the unsubstituted parent compounds benzaldehyde and salicylaldehyde (2-hydroxybenzaldehyde). The results clearly indicate that both of the yeasts studied are remarkably sensitive to various salicylaldehydes and, especially, to halogenated ones. Some congeners clearly merit consideration as potential therapeutic agents for *Candida* infections. The MIC values of the most potent congeners are of roughly the same magnitude as that of amphotericin B, and the results of the MFC measurements indicate that the compounds are fungicidal. All of the bacteria studied are also sensitive to at least some of the compounds tested but, clearly, this class of antimicrobials has superior activity against yeasts. Structure-activity relationships are discussed for each microbial species and compared with each other. The comparison of the results of MIC and MBC/MFC measurements with those of agar diffusion tests revealed aspects that are of interest concerning the methodology of antimicrobial activity screening. Unexpectedly, it was found that some compounds that are completely devoid of activity in agar diffusion tests had potent activity in MIC tests, indicating that if only agar diffusion methodology is used in drug discovery, some highly active compounds may be missed.

Key words: 2-Hydroxybenzaldehydes, Minimal Inhibitory Concentration, Minimal Bactericidal Concentration, Minimal Fungicidal Concentration