Carbohydrazones of Substituted Salicylaldehydes as Potential Lead Compounds for the Development of Narrow-Spectrum Antimicrobials

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Certain substituted salicylaldehydes are known to have highly potent antimicrobial activity against bacteria and fungi, but the mechanism underlying this remarkable activity is not known, and almost nothing has been reported on the effects of further modification of the structures, such as the formation of hydrazone-type derivatives. We report now a study on the antimicrobial properties of the carbohydrazone derivatives of several substituted salicylaldehydes. The compounds studied were synthesized from ring-substituted salicylaldehydes and carbohydrazide in the mole ratio 2:1. They were tested against *Aspergillus niger*, *Bacillus cereus*, *Candida albicans*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Saccharomyces cerevisiae* and *Staphylococcus epidermidis* using the agar diffusion method. The carbohydrazone derived from 2,3,4-trihydroxybenzaldehyde had distinctly higher activity than the parent aldehyde in the same molar concentration. This activity was limited to one test organism (*S. epidermidis*), while the free aldehyde had at least some (in some cases even high) activity against all of the microbes studied. All other ones of the effective carbohydrazone compounds were distinctly less active than the parent salicylaldehydes as such. The hydrazones studied had in general a narrower antimicrobial spectrum than the free aldehydes and are thus of interest as potential lead compounds for the development of narrow-spectrum antimicrobial drugs. The mechanism of action of the aldehydes as well as that of the carbohydrazones is discussed.

Key words: Antibacterial Antifungal Agents, Hydrazones, 2-Hydroxybenzaldehyde Analogues, Substituent Effects