

Antibacterial Activity of Simple Coumarins: Structural Requirements for Biological Activity*

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Z. Naturforsch. **54c**, 169–174 (1999); received November 11/December 8, 1998

Coumarins, Antibacterial Activity, Structure-Activity Relationships

The antibacterial activity of a series of simple coumarins was evaluated against 8 microorganisms, including three Gram-positive (*Staphylococcus aureus*, beta-hemolytic *Streptococcus* and *Streptococcus pneumoniae*) and five Gram-negative bacteria (*Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Proteus mirabilis* and *Haemophilus influenzae*), using the microdilution broth method. The coumarins tested showed broad diversity regarding growth inhibitory activity with minimum inhibitory concentrations ranging from 0.9 to >12.4 μM . This study, presenting the first systematic analysis of structure-activity relationships among this group of coumarins, revealed some interesting structural requirements. While coumarins with a methoxy function at C-7 and, if present, an OH group at either the C-6 or C-8 position are invariably effective against the spectrum of tested standard bacteria (Gram-negative microorganisms including the Gram-positive bacterium *Staphylococcus aureus*), the presence of an aromatic dimethoxy arrangement is apparently favourable against those microorganisms which require special growth factors (beta-hemolytic *Streptococcus*, *Streptococcus pneumoniae* and *Haemophilus influenzae*). A combination of these structural features, two methoxy functions and at least one additional phenolic group as reflected by the highly oxygenated coumarins, identify promising candidates with antibacterial broad-spectrum activity.

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