

The effects of antibiotics combined with natural polyphenols against clinical methicillin-resistant *Staphylococcus aureus* (MRSA).

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Abstract

Novel therapies are needed to address the public health problem posed by methicillin-resistant STAPHYLOCOCCUS AUREUS (MRSA). In this study, we determined the effects of combinations of antibiotics and plant polyphenols against 20 clinical isolates of MRSA. The IN VITRO activities of 10 antibiotics and 15 natural polyphenols against the isolates were evaluated by determining minimum inhibitory concentrations (MICs). All isolates were susceptible to vancomycin and resistant to rifampicin, while susceptibilities to ciprofloxacin varied. Among the 15 natural polyphenols, kaempferol (3,4',5,7-tetrahydroxyflavone) and quercetin (3,3',4',5,7-pentahydroxyflavone) showed the lowest MICs. In checkerboard assays, combinations of rifampicin and either kaempferol or quercetin acted synergistically or partially synergistically against the clinical MRSA isolates. Rifampicin combined with kaempferol or quercetin exhibited good beta-lactamase inhibitory effects (57.8 % and 75.8 %, respectively) against a representative isolate according to nitrocefin analysis. The study results and ready availability and low toxicity of plant polyphenols warrant further investigations on the therapeutic potential of combination therapies for MRSA infections.