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In vitro evaluation of methylxanthines and some antibiotics: Interaction against Staphylococcus aureus and Pseudomonas aeruginosa

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Abstract

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Background: The development of resistance to antimicrobial agents is a major problem in chemotherapy. Finding agents which potentiate antimicrobial activity could be favorable. There are some reports that methylxanthines changed the inhibitory effect of antibacterial agents. Thus, possible synergistic effect of methylxanthines, aminophylline and caffeine on some antibiotics, carbenicillin, ceftizoxime and gentamicin, which are effective on *P. aeruginosa* and *Staphylococcus aureus*, were studied. **Method:** The interaction of methylxanthines and antibiotics were studied in vitro using a checkerboard method. **Results:** At concentrations of 0.25-4 mg/ml, aminophylline and caffeine decreased the MIC of the antibiotics 2-4 times against *P. aeruginosa* and *Staph. aureus*. Both methylxanthines also reduced the minimum bactericidal concentration of the antibiotics by up to 2 times. Caffeine and aminophylline had no antimicrobial effect themselves. **Conclusion:** The results of the present study reveal that aminophylline and caffeine potentiated the antimicrobial action of carbenicillin, ceftizoxime and gentamicin against *Staph. aureus* and *P. aeruginosa*.

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Author keywords

Aminophylline; Caffeine; Interaction; Pseudomonas aeruginosa; Staphylococcus aureus

Indexed Keywords

EMTREE drug terms: aminophylline; antibiotic agent; caffeine; carbenicillin; ceftizoxime; gentamicin; methylxanthine derivative

EMTREE medical terms: antimicrobial activity; article; drug potentiation; in vitro study; nonhuman; Pseudomonas aeruginosa; Staphylococcus aureus

Species Index: Pseudomonas aeruginosa; Staphylococcus aureus

Chemicals and CAS Registry Numbers: aminophylline, 317-34-0; caffeine, 30388-07-9, 58-08-2; carbenicillin, 17230-86-3, 4697-36-3, 4800-94-6; ceftizoxime, 68401-81-0, 68401-82-1; gentamicin, 1392-48-9, 1403-66-3, 1405-41-0

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