Therapy and prevention of nosocomial infections caused by MDR strains

Luminita Roman¹, Mihaela Chelariu¹, Horatiu Roman², Gheorghe Ciucă³, Carmen Mariana Chițiriu¹, Grigore Mihăescu¹  
¹Faculty of Biology, University of Bucharest, ²Faculty of Geology, University of Bucharest, ³Faculty of Electrical Engineering Bucharest

ABSTRACT: *Syzygium aromaticum* belongs to the family Myrtaceae, is an aromatic tree, originally from Indonesia used as a condiment. Property antibacterial, antifungal and anthelmintics are known from ancient. A total of 80 strains of Gram negative and Gram positive MDR from nosocomial infections were tested for virulence factors ESBL and soluble virulence factors in specific medium. Ethanolic extracts and essential oil of clove were tested for antibacterial activity against these strains. The active compounds of *S. aromaticum* buds were identified by GC-MS. Eugenol was predominantly compound, accounting for 87% of the total weight. The extracts were action against all strains concentration ranging between 62.5 µl/ml and 7.8 µl/ml.

MATERIALS AND METHODS: Gram negative and Gram positive strains isolated from nosocomial infections were acquired from the hospital Theodor Burchele Bucures. Antibiotic resistance was made with disc-diffusion method. To test the virulence factors genotypic resistance to β-lactam antibiotics, we used PCR method. Phenotypic resistance factors (exotoxinsandpore-forming enzymes) were tested on specific growth media. For testing the antimicrobial activity of extracts of ethanol (in the ratio 1:4), and oil of clove (in a ratio of 1:1 DMSO), we used the disc diffusion method according to the protocol. The minimum inhibitory concentration (MIC) was made by decimal dilutions in 96-well plates in BHI medium. Gas chromatograph used to identify compounds in the extracts of clove was Fisons Instruments GC 8000 coupled with mass spectrometer ionization quadrupole analyzer im chromatograph used to identify compounds in the extracts of clove was Fisons Instruments GC 8000 coupled with mass spectrometer ionization quadrupole analyzer im chromatograph used to identify compounds in the extracts of clove was Fisons Instruments GC 8000 coupled with mass spectrometer ionization quadrupole analyzer im.

RESULTS AND DISCUSSION: *bla*TEM was detected for 12 strains (10 *E. coli* and 2 *E. faecalis*). *bla*CTX-M has been detected for 29 strains (18 *E. coli*, 1 *A. baumannii* 8 *K. pneumoniae*, 1 *E. faecalis* and 1 *Proteus mirabilis*). *bla*IMP for a strain (Ps. aeruginosa) and *bla*OXA48 for 5 strains of *K. pneumoniae*. High resistance to carbapenems showed strains of Ps. aeruginosa. *A. baumannii*, *E. faecalis*, *K. pneumoniae* and *E. coli*. had resistance for IV generation cephalosporins. 60.25% of the bacteria tested showed one or more soluble virulence factors. Out of 80 strains showed 80% ESBL virulence factors, 40.65% pore forming 54.5% of exotoxins and 71.29% adhesion to the substrate. By GC-MS we identified several compounds, of which 4 had greater significance. MIC values are between 7.8 ml / ml for ethanolic extracts and 6.25 ml / ml for oil extracts of *S. aromaticum*.

CONCLUSION: The antibacterial activity against Gram negative and Gram positive strains of ethanolic and oil extracts of *S. aromaticum* proved concerted activity of terpenes, isoﬂavonoids, poliphenols and volatile oils. Ethanolic extracts and essential oil can be used successfully in infections caused by bacteria with resistance to β-lactams.

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