

## The antibacterial activity of *Zataria multiflora* Boiss and *Carum copticum* on IMP-type metallo-beta-lactamase-producing *Pseudomonas aeruginosa*- Fatemeh Fallah- Shahid Beheshti University

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Aim: Carbapenem resistance due to acquired metallo-beta-lactamases (MBLs) is considered to be more serious than other resistance mechanisms. The aim of this study was to evaluate the antibacterial activity of *Zataria multiflora* Boiss and *Carum copticum* plants on IMP-producing *P. aeruginosa* strains. This experimental study was carried out on hospitalized burn patients during 2011 and 2012. Antibiotics and extracts susceptibility tests were performed by disc diffusion and broth microdilution methods. MBL detection was performed by combination disk diffusion test (CDDT). The bla(VIM) and bla(IMP) genes were detected by PCR and sequencing methods. Using combination disk diffusion test method, it was found that among 83 imipenem resistant *P. aeruginosa* strains, 48 (57.9%) were MBL producers. PCR and sequencing methods proved that these isolates were

positive for blaIMP-1 genes, whereas none were positive for bla(VIM) genes. The mortality rate of hospitalized patients with MBL-producing *Pseudomonas* infection was 4/48 (8.3%). It was shown that *Zataria multiflora* and *Carum copticum* extracts had a high antibacterial effect on regular and IMP-producing *P. aeruginosa* strains in 6.25 mg/ml concentration. The incidence of MBL-producing *P. aeruginosa* in burn patients is very high. In our study, all MBL-producing isolates carry the blaIMP-1 gene. Therefore, detection of MBL-producing isolates is of great importance in identifying drug resistance patterns in *P. aeruginosa*, and in prevention and control of infections. In this study, it was shown that extracts of *Z. multiflora* and *C. copticum* have high antibacterial effects on  $\beta$ -lactamase producing *P. aeruginosa* strains.