In vitro antibacterial activity of Myrtus communis L. against Morganella morganii

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ABSTRACT: Development of microbial resistance to antibiotics is a global concern. The present study was carried out to determine the potential antibacterial agent of ethanol extracts of Myrtus communis L. against Morganella morganii isolation of urinary tract infections. The result show that levels of MIC and MBC were observed ranges from 2.5 and 5 mg/ml in radius respectively.

Key word: Myrtus communis L., Morganella morganii, Antibacterial activity, Extract plant

INTRODUCTION

Recently, there has been a profound interest in the antimicrobial properties of extracts from aromatic plants, particularly essential oils (Milhau et al., 1997). Myrtus communis L. (Myrtaceae), commonly known as Myrtle, is an evergreen shrub widely distributed in Europe, Asia, Africa and America (Polunin and Huxley, 1972). The plant have been used internally as astringent, antimicrobial, for constipation, antihemorrhagic, appetizing, against diabetes and externally for wound healing in Turkish folk medicine (Baytop., 1984). It is traditionally used as an antiseptic, disinfectant drug and hypoglycaemic agent (Elfellah et al., 1984). In folk medicine, a decoction of leaves and fruits is used as stomachic, hypoglycaemic, antimicrobial, cough and oral diseases, for constipation, appetizing, antihemorrhagic and externally for wound healing (Serce et al., 2010). The Gram-negative anaerobic rod Morganella morganii is the only species in the genus Morganella, which belongs to the tribe Proteaeae of the family Enterobacteriaceae. Despite its wide distribution, it was considered as an uncommon cause of infections in human beings (O’Hara et al., 2000). The aim study evaluation of antimicrobial activity of the leaf extract of Myrtus communis L. against Morganella morganii isolation from urinary tract infections.

PLANT MATERIAL

The leaeof Myrtus communis L was purchased from Municipal market at Zahdan-Iran during February, 2012 and kept in sterilized screw-cap glass container. Samples were crashed and transferred into glass container and preserved it until extraction procedure in the laboratory. Twenty gram of grinded powders from each plant was soaked in 60 ml organic solvents i.e. ethanol (95 %v/v) and methanol with occasionally shaking. After one day of dissolving materials were filtered through a Whatman no. 1 filter paper. Then the filtrates were evaporated using rotary evaporator. At last, 0.97 g of dried extracts was obtained and then stored at 4°C in air tight screw-cap tube (Hanafy and Hatem, 1999).

Bacterial strains

Clinical isolate of Morganella morganiwas isolated from urine culture of hospitalized patients (Boo-Ali Hospital, Zaheden, south-eastern Iran) suffered from urinary tract infections during the years 2010 and 2011.

Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC)

The broth microdilution method was used to determine MIC and MBC. All tests were performed in Mueller Hinton broth supplemented with Tween 80 at a final concentration of 0.5% (v/v). Briefly, serial doubling dilutions of the extract were prepared in a 96-well microtiter plate ranged from 0.3 mg/ml to 10.00 mg/ml. To each well, 10 μl of indicator solution (prepared by dissolving a 10-mg extract in 2 ml of DMSO) and 10 μl of
Mueller Hinton Broth were added. Finally, 10 μl of bacterial suspension (10^6 CFU/ml) was added to each well to achieve a concentration of 10^4 CFU/ml. The plates were wrapped loosely with cling film to ensure that the bacteria did not get dehydrated. The plated were prepared in triplicates, and then they were placed in an incubator at 37°C for 18-24 hours. The color change was then assessed visually. The lowest concentration at which the color change occurred was taken as the MIC value. The average of 3 values was calculated providing the MIC and MBC values for the tested extract. The MIC is defined as the lowest concentration of the extract at which the microorganism does not demonstrate the visible growth. The microorganism growth was indicated by turbidity. The MBC was defined as the lowest concentration of the extract at which the incubated microorganism was completely killed.

RESULT

Results from the antimicrobial screening tests were shown in Table 1. The plant extracts showed inhibitory activity against Morganella morganii with varying magnitudes and these effects were dose dependent manner. The levels of MIC and MBC were observed ranges from 2.5 and 5 mg/ml in radius respectively.

DISCUSSION

In the study, the levels of MIC and MBC were observed ranges from 2.5 and 5 mg/ml in radius respectively. It has been reported that the essential oil of M. communis is strongly active against Salmonella typhimurium (Gündüz et al., 2009). The study of Mert, N-hexane, methanol, ethanol, ethyl acetate and water extracts of Myrtus communis L. inhibited the growth of Escherichia coli ATCC 29999. Escherichia coli ATCC 11230, Staphylococcus epidermidis ATCC 12228, Salmonella typhimurium CCM 5445and Pseudomonas aeruginosa ATCC 27853 (Mert et al., 2008). The occurrence of antibacterial activity against specific pathogen bacteria of human diseases in leaf extract of Myrtus communis was previously reported by Rotstein et al. (1974), Mansouri et al. (2001) and Bonjar (2004). Yadegarinia et al.(2006) have demonstrated the activity of M. communis L. essential oil against E. coli, S. aureus and Candida albicans. The study of Rasooli, dilution 1/2 of showed M. communis L. essential oil deadly effect against E. coli, B. subtilis, B. licheniformis, C. albicans, and S. cerevisiae. 1/4 dilution was bacteriostatic against E. coli (Rasooli et al., 2002). In conclusion, the screening of crude extract made from tested medicinal plant has demonstrated that most of the screened plants are potential rich sources of antibacterial agents.

Table 1. MIC and MBC values of ethanol extract

<table>
<thead>
<tr>
<th>Clinical bacteria</th>
<th>Extract plants (MIC/MBC)</th>
<th>Antibiotic resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morganella morgani</td>
<td>2.5/5</td>
<td>Ciprofloxacin, ceftriaxon, gentamicin, cotrimoxacol, nalidixic acid</td>
</tr>
</tbody>
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REFERENCES


typhimurium on fresh produce” Int. J. Food Microbiol., 130, 147-150