Antibacterial Effect of Grapefruit Seed Extract against Multidrug-Resistant Bacteria and Application to Dental Materials

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Introduction

- Nosocomial infections which are mainly caused by multidrug-resistant (MDR) bacteria have been gradually increasing in worldwide, including dental hospitals.
- Other antibiotics should be used to treat these infections, which will continue to increase the antibiotic-resistant bacteria.
- it is important to find new substances that can target the MDR bacteria.
- 12 plant extracts were examined to find new compounds that inhibit the growth of MDR bacteria.

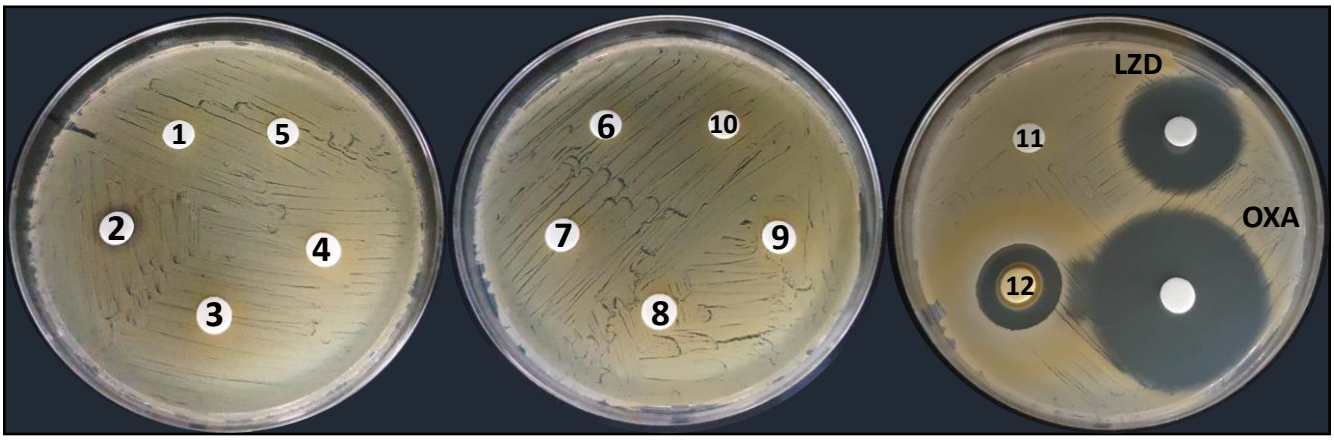
Results

Table 1. List of plant extracts used for antibacterial activity test

Number	Plant extracts from
1	Bamboo
2	Refined wood vinegar
3	Rosemary
4	Pinus densiflora leaf
5	Sophora
6	Cinnamomum cassia bark
7	Hibiscus sabdariffa flower
8	Chamomilla recutita (Matricaria) flower
9	Centella asiatica
10	Hottuynia crodata
11	Yucca
12	Grapefruit seed

Disc diffusion test - screening

S. aureus ATCC 6538 (MSSA)



MSSA - methicillin-susceptible *S. aureus;* LZD - linezolid; OXA - oxacillin

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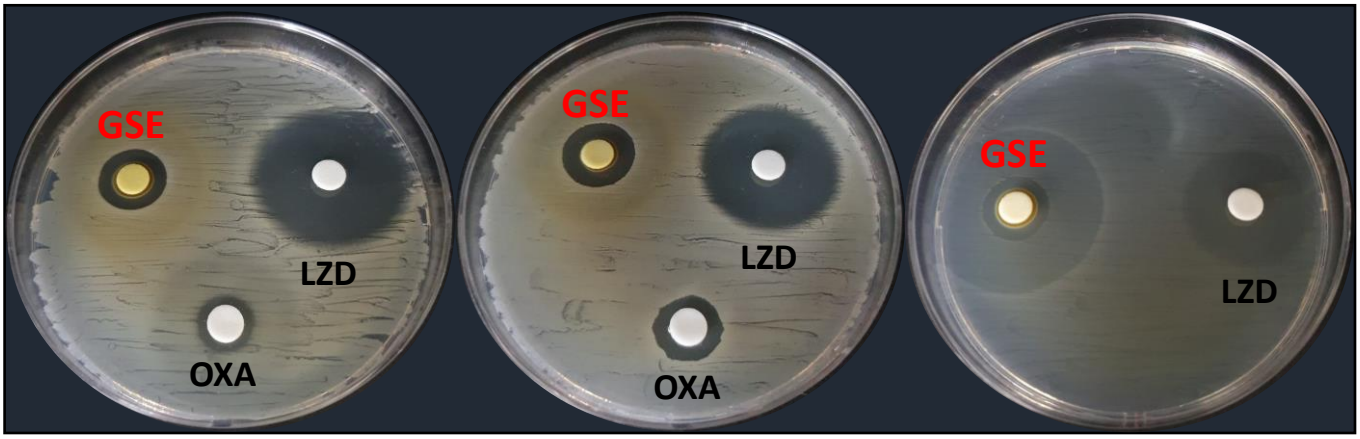
Results

Disc diffusion test against MDR bacteria

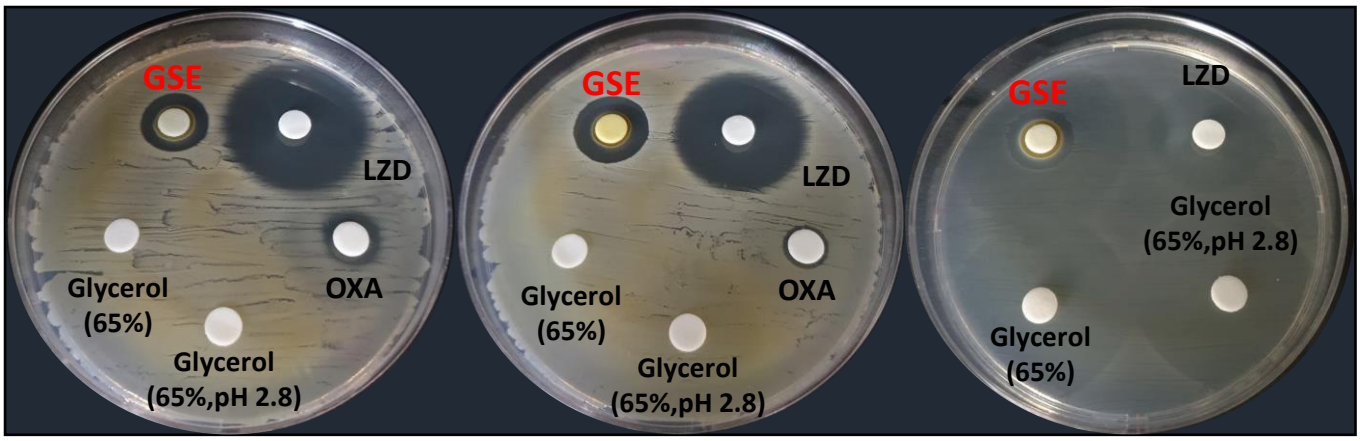
MRSA (ATCC 33591) **MRSA (CCARM 3795)** **VRSA 48**



MRSA - methicillin-resistant *S. aureus*; VRSA - vancomycin-resistant *S. aureus*; GSE - grapefruit seed extract; LZD - linezolid; OXA - oxacillin

Disc diffusion test with additional two factors

MRSA (ATCC 33591) **MRSA (CCARM 3795)** **VRSA 48**



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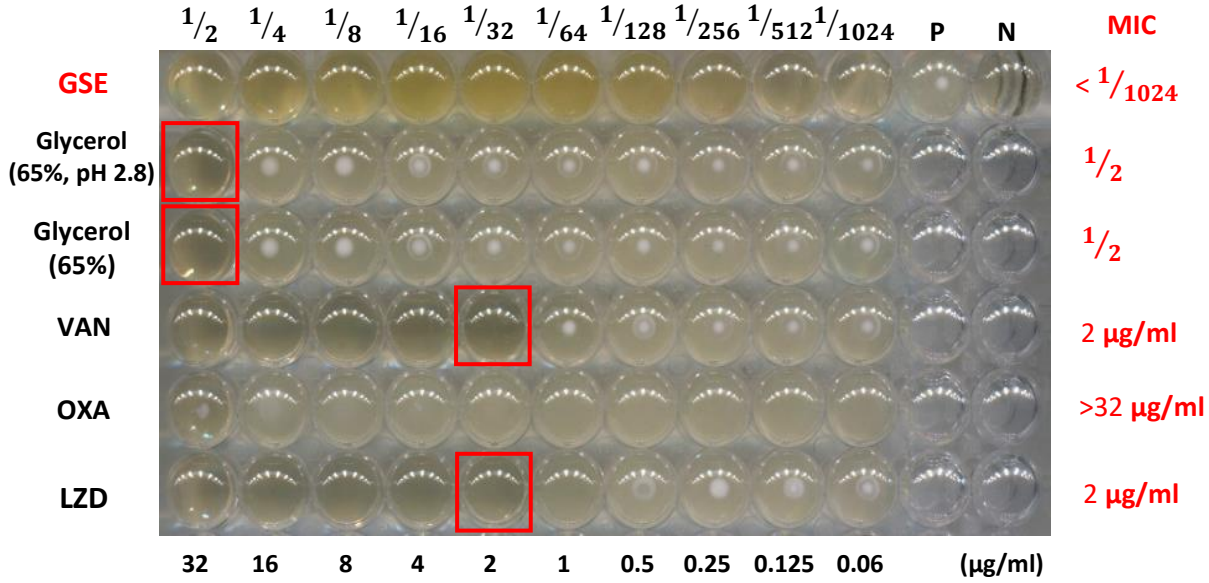
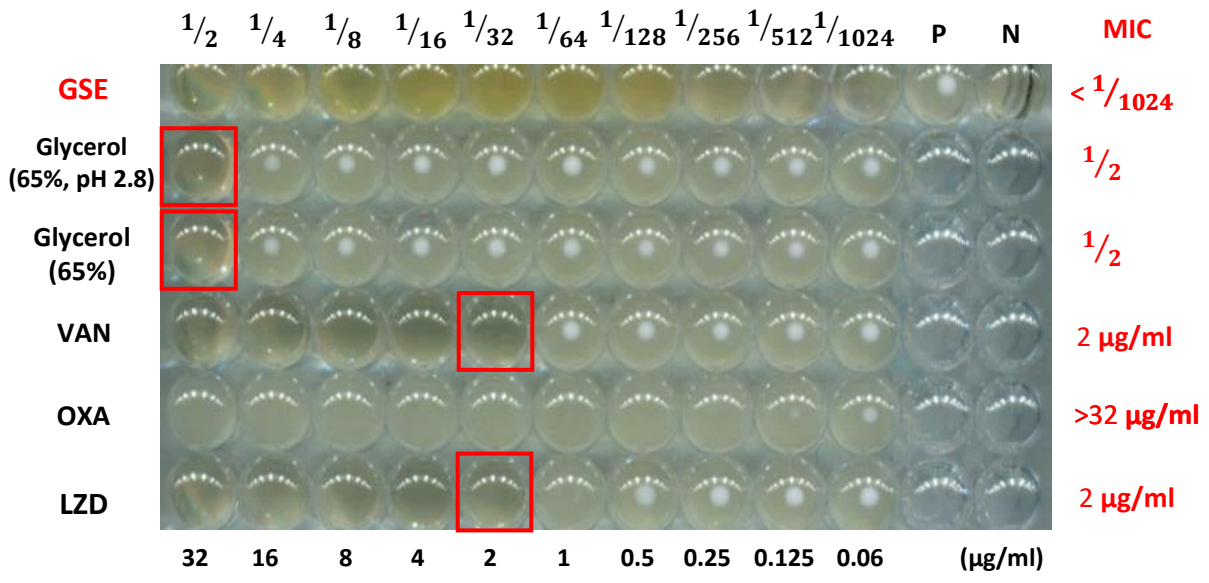
Results

Microdilution MIC (minimum inhibitory conecntration) test

MRSA (ATCC 33591)



MRSA (CCARM 3795)



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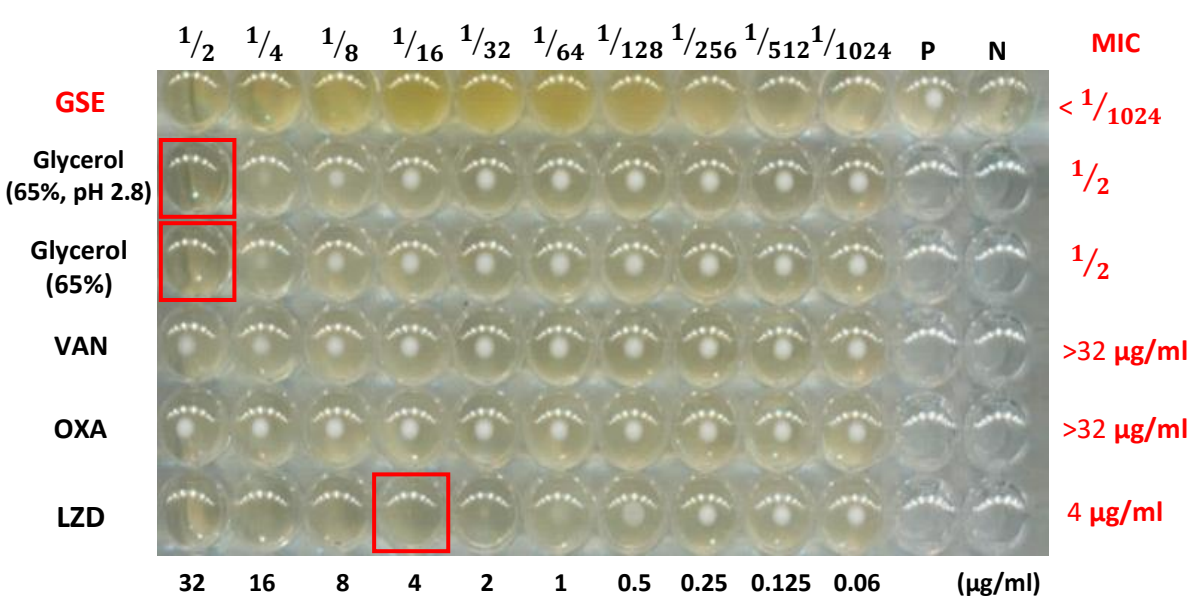
Results

Microdilution MIC test against MSSA and MDR bacteria



Summary & Conclusions

- GSE (grapefruit seed extract) showed antibacterial effects on disc diffusion and microdilution mic test against MSSA, MRSA and VRSA.
- In addition to glycerol and acidic condition, there are substances that affect the antibacterial activity of GSE.
- The flavonoids of GSE have antibacterial effects. In particular, GSE contains a large amount of naringin which is one of the flavonoids.
- Additional experiments are required after quantitative analysis.
- It is possible to use GSE in dental materials such as dental cement or resin.

References

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