Study of the antibacterial activity of oils essentials of Origanum vulgare and Rosmarinus officinalis against strains of Enterococcus faecalis isolated from endodontic infections

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Introduction

Endodontic infection is characterized by mortification of pulp cells caused by several bacteria that colonize the root canals. Among these pathogens, *Enterococcus faecalis* is the most widespread and virulent microorganism (1) that is resistant to disinfectant solutions such as sodium hypochlorite and chlorhexidine. This highlights the importance of testing natural antimicrobial agents against this bacterium.

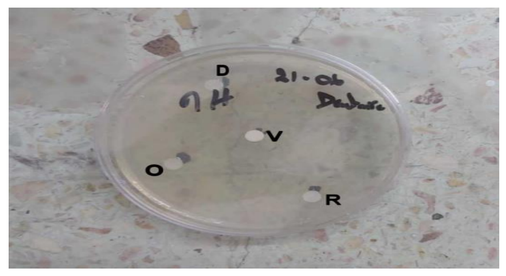
This study aims to test the antibacterial activity of Origanum vulgare and Rosmarinus officinalis against Enterococcus faecalis.

Materials and methods

The essential oils were extracted by hydrodistillation and their antimicrobial activities were studied by disc diffusion method and microdilution method according to the CLSI standards. The Dimethyl sulfoxide (DMSO) is used as a negative control.

Vancomycin is used as a positive control. The technique was repeated twice.

Quality control was carried out with ATTC *Staphyloccus aureus* 25923.



Results

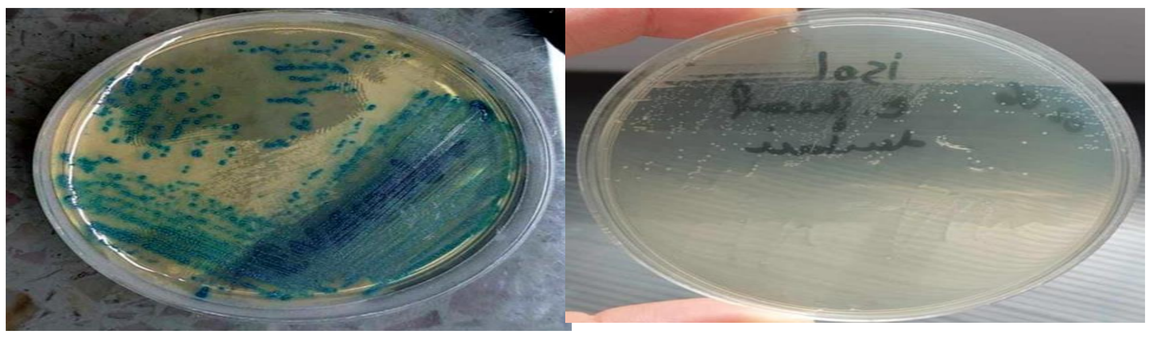


Figure 1 : isolation of *Enterococcus faecalis*

Figure 2 : Origanum vulgare sample

Figure 3 : Rosmarinus officinalis sample

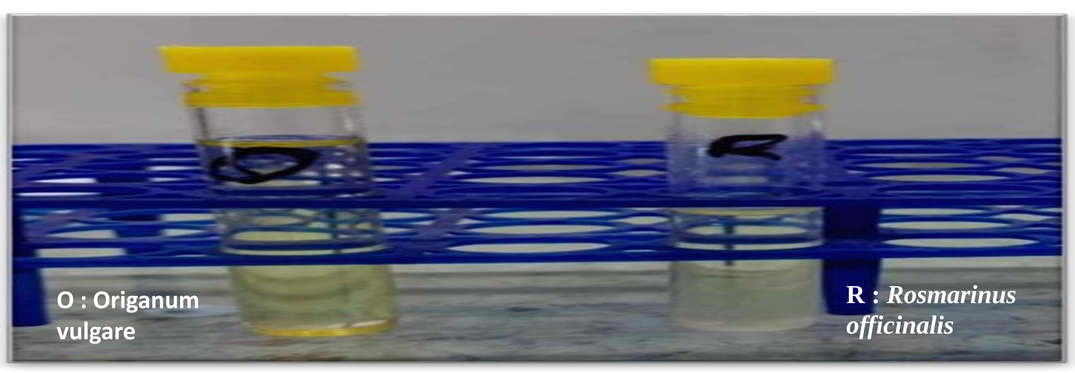


Figure 4: presentation of oils essentials of Origanum vulgare and Rosmarinus officinalis

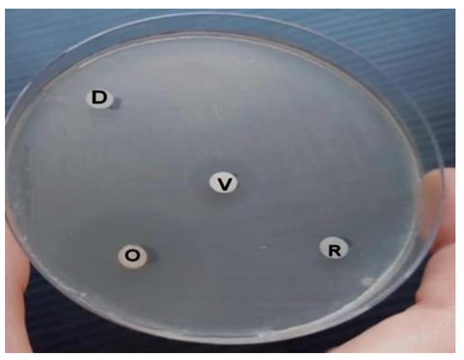


Figure 5: activity results antibacterial essential oils against Enterococcus faecalis

Molecule	Origanum vulgare oil	Rosemarinus officinalis oil	vancomycin	DSMO
Inhibition diameter (mm)	30	8	18	≤ 6

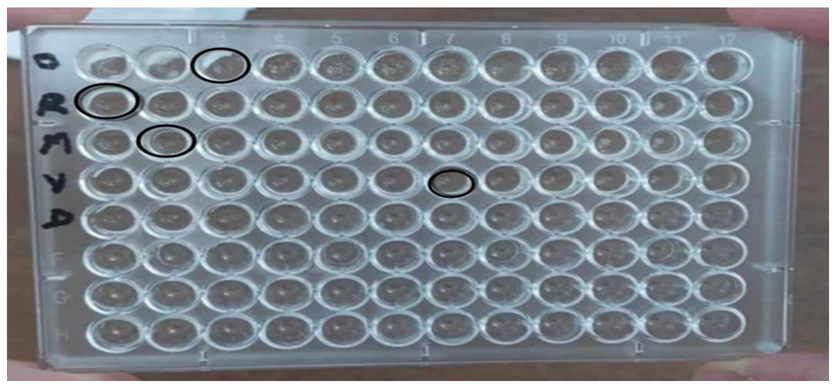


Figure 6: MIC results on microplates

Molecule	*Origanum Vulgare essential oil*	*Rosmarinus Officinalis essential oil*	The mixture of the two essential oils	Vancomycin
MIC	2,78 mg/ mL	11 mg/mL	2,78 mg/mL	0,002 mg/mL

Table I: essential oils yield

Plants	Plant mass (g)	Extraction mass (g)	The yield (%)
Rosemary	300	2.6346	0.87
Oregano	300	5.5952	1.86

Discussion

- Sensitivity to different essential oils is analyzed according to the diameter of the zones inhibition as follows: not sensitive (-) for diameter less than 6 mm; sensitive (+) fora diameter between 9-14 mm; very sensitive (+ +) for a diameter between 15-19 mm and extremely sensitive (+++) for diameter more than 20 mm according to (*Ponce and al*., 2003) (2).,According to our study results, Origanum vulgare essential oil demonstrated the greatest activity against Enterococcus faecalis, with a zone of inhibition measuring 30 mm.
- Regarding MIC, we observed that the MIC of the oil of Origanum vulgare was higher than that reported by (Janani, 2019), which was 25ug/ml (3), but Rosmarinus officinalis essential oil showed a lower MIC than indicated by (Silmara, 2019) which was 114mg/ml (4).

Conclusion

- The study shows that the essential oil of Origanum vulgare presents antibacterial activity against *Enteroccocus faecalis*.
- This result encourages us to prepare a disinfection solution based on this oil and test it against these strains of Enterococcus faecalis.

Bibliographic references

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