

Investigating the Antibacterial Properties of Mountain Tea Plant Extract and Danai Thyme in Controlling Gram-negative and Gram-positive Bacteria by Disc Diffusion and Well Methods



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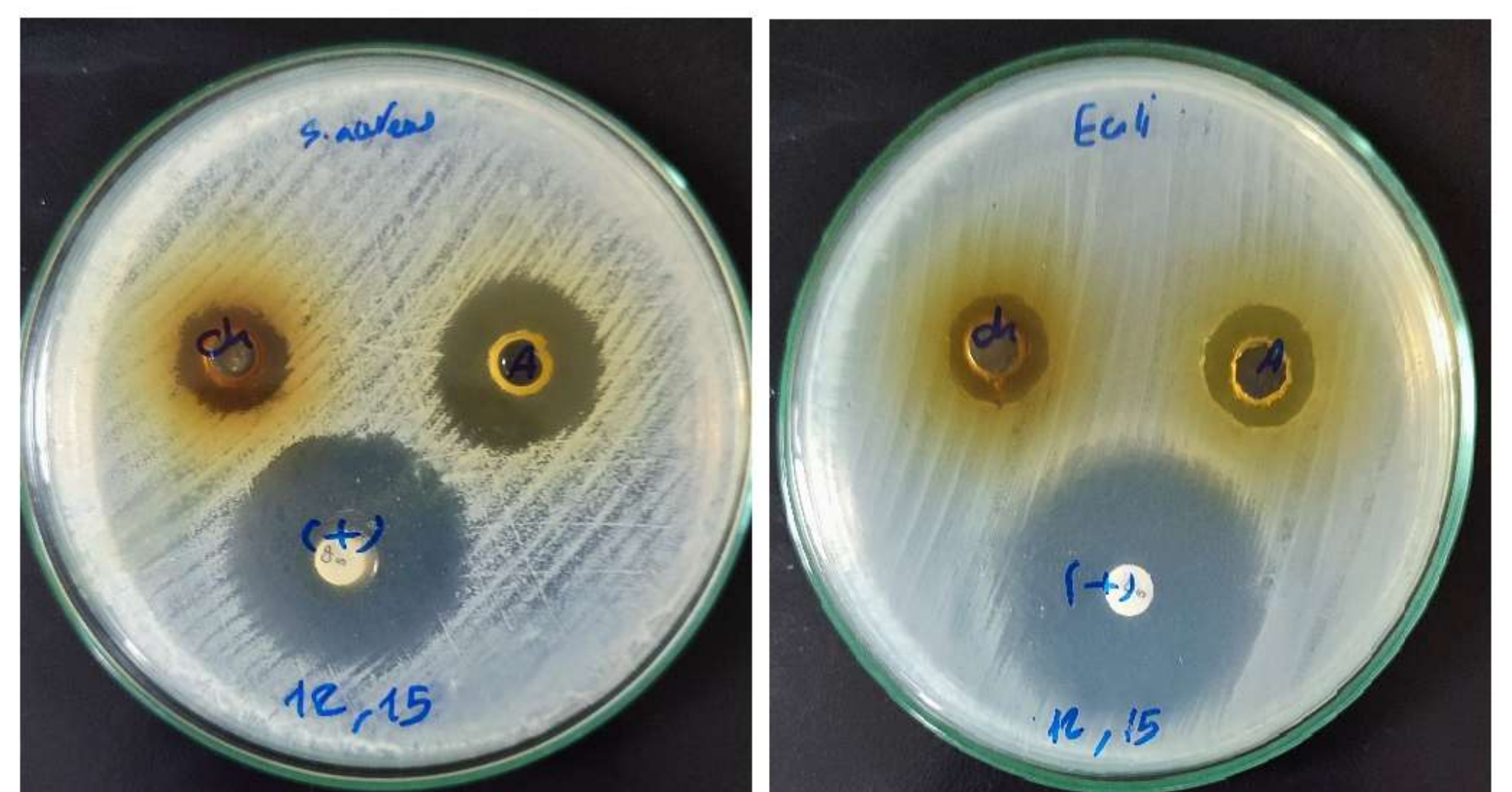
Nowadays, due to the increase in resistance to antibiotics and their various side effects, many studies were performed to prepare natural antibiotics and replace them with synthetic antibiotics. Investigating the antimicrobial effects of medicinal plants can guide us in reaching a sustainable product/method in controlling pathogenic agents. In this research, the antimicrobial effects of Mountain tea plant extracts and Danai thyme in controlling the growth of Gram-negative *Escherichia coli* and Gram-positive *Staphylococcus aureus* were investigated by disc diffusion and well methods.

In the methodology section, Mountain tea and Danai thyme was initially extracted using the Suxile, and then the antimicrobial properties of the extracts and their optimal concentrations were measured using disk diffusion and well methods on *Staphylococcus aureus* and *Escherichia coli* bacteria. Besides, the minimum inhibitory concentration (MIC) and the minimum lethal concentration (MBC) were determined for each extract. The results of this research showed that the extract of the Thyme plant had strong antibacterial properties compared to the extract of the Mountain tea plant. The optimal concentrations of 2-10 frim MBC and 3-10 from MIC test for hydroalcoholic extract of Thyme Denai is recorded. The strong bactericidal property of Danai thyme extract may is due to the presence of thymol and carvacrol.

The results of current study show that the extract of the *Thymus daenensis* had higher antibacterial property compared to the extract of the mountain tea plant. The strong bactericidal property of *Thymus daenensis* extract is due to the presence of thymol and carvacrol in the extract. The antibacterial properties of the methanolic extract of *Thymus daenensis* have been proven on gram positive and negative bacteria (Mojab et al. 2008).

From the results, mountain tea extract shown greater antibacterial effect on the gram-positive bacteria *Staphylococcus aureus*. In 2021, Ghaneialvar et al., showed that the strong antibacterial effect and inhibitory properties of mountain tea extract in controlling *Pseudomonas aeruginosa* and *Bacillus subtilis*, respectively. In this study, effectiveness on *Staphylococcus aureus* and *Escherichia coli* bacteria were in the next rank (Ghaneialvar et al. 2021).

Considering the increasing limitations of using antimicrobial chemicals such as side effects and drug resistance, there is a need to replace these substances with natural ingredients. According to the results obtained in this research, it can be stated that the extract of *Thymus daenensis* and mountain tea could be used to treat some infections while it of course requires research on laboratory animal samples.



MIC-MBC of Mountain Tea Extract					
Serial Dilution	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵
<i>E. coli</i>	0.423	0.185	0.215	0.495	0.618
<i>S. aureus</i>	0.413	0.147	0.082	0.090	0.128
MIC-MBC of <i>Thymus daenensis</i> Extract					
Serial Dilution	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵
<i>E. coli</i>	0.350	0.225	0.312	0.423	0.680
<i>S. aureus</i>	0.342	0.213	0.289	0.391	0.502

*Green well pointed MBC and the yellow well indicated MIC.