

## Minimum Inhibitory Concentration(MIC) and Minimum Bactericidal Concentration (MBC) of henna leaf extracts (*Lawsonia inermis* L.) against *Enterococcus faecalis*

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**Introduction:** *Enterococcus faecalis* is a bacteria that is resistant to treatment and can cause secondary endodontic infections. The increase in antibiotic resistance and side effects of synthetic drugs increase research efforts to find alternative herbal ingredients that have antibacterial properties effective that can be used as a root canal irrigation. *Lawsonia inermis* Linn or Henna leaf is an ancient herbal medicine with antibacterial effects. This study aimed to investigate the antibacterial activity of henna leaf extracts (*Lawsonia inermis* L.) against *E. faecalis*.

**Methods:** This study was experimental with a post-test-only control group design. *E. faecalis* ATCC 29212 was exposed to henna leaf extracts at 45%, 40%, 35%, and 30% concentrations using Brain Heart Infusion Broth (BHIB). Value of MIC and MBC henna leaf extracts manually calculated the growth of bacteria colonies in Nutrient agar with CFU/ml results.

**Results:** At a concentration of 30%, the growth of bacteria was 9.1%, indicating that the bacteria grew less than 10%, which is considered as MIC value. At a concentration of 35%, the growth of *E. faecalis* colonies was not found, so this is considered an MBC value. The decrease in the *E. faecalis* colony was caused by the synergism of the function of the phytochemical content of henna leaf extracts. Lawsone (2-hydroxy-1,4 naphthoquinone) is an antibacterial, possibly due to the large number of free hydroxyl that attaches to the enzyme site and makes it inactive. Naphthoquinones may cause oxidative stress in cells resulting in lipid peroxidation of cell membranes and damage to the organization of cell membranes. Tannins are antibacterial by forming complex compounds with extracellular proteins through hydrogen bonds which interfere with the resistance of bacterial cell membranes. Saponins are phytochemicals that can damage cell membranes. Alkaloids interfere with the peptidoglycan constituent components in bacterial cells and cause changes in the structure and composition of amino acids that make up bacterial cell walls and DNA.

**Conclusion:** The henna leaf extracts have an antibacterial effect against *E. faecalis*. The MIC at 30% and MBC at 35% concentration.

**Keywords:** endodontic, root canal irrigant, herbal medicine, henna leaf, *Enterococcus faecalis*