

Antibacterial and Anti-Diarrheal Potential of Andaliman (*Zanthoxylum acanthopodium* DC) Methanol and Nanoemulsion Extract

ABSTRACT

Background: Diarrhea, a prevalent global health issue, continues to pose a significant burden on communities worldwide. While conventional treatments exist, the quest for novel and effective therapeutic agents has led to the exploration of traditional medicinal plants. This study focuses on Andaliman (*Zanthoxylum acanthopodium*), a spice native to the North Sumatra region of Indonesia, renowned for its unique flavor profile and potential medicinal properties.

Objective: This study aimed to confirm the antibacterial and anti-diarrheal potency of Andaliman (*Zanthoxylum acanthopodium*) methanol and nanoemulsion extract.

Methods: Antibacterial activity against *E. coli* was assessed using the disk diffusion method with Andaliman (*Zanthoxylum acanthopodium*) methanol extract (50-350 mg/mL) and microdilution method (500 mg/mL) to determine Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentrations (MBC). The anti-diarrheal study involved 30 male wistar rats with Andaliman (*Zanthoxylum acanthopodium*) nanoemulsion extract (25-75 mg/kgBW). The rats are induced with castor oil, and the frequency of defecation and watery stool were observed within an hour. Afterward, the rats were given activated charcoal as a marker and left for an hour before undergoing surgery to measure the length of the intestine, weight of the feces, and distance of charcoal displacement.

Results: Andaliman (*Zanthoxylum acanthopodium*) methanol extract showed a moderate inhibitory effect against *E. coli*, with MICs and MBCs at 55.56 mg/mL. In anti-diarrheal potency, significant differences were observed at 50mg/kgBW of Andaliman (*Zanthoxylum acanthopodium*) nanoemulsion extract for frequency and watery stool. However, no significant differences were found in gastrointestinal and entero-pooling results.

Conclusion: Both Andaliman (*Zanthoxylum acanthopodium*) methanol and nanoemulsion extracts demonstrated antibacterial activity against *E. coli* and exhibited anti-diarrheal potency.

Keywords: Antibacterial, Anti-diarrhea, Andaliman, *E. coli*, *Zanthoxylum a.*