

In vitro control of *Staphylococcus aureus* (NCTC 6571) and *Escherichia coli* (ATCC 25922) by *Ricinus communis* L.

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Abstract

Objective: To evaluate antibacterial activity of hot and cold ethanol and methanol leaf extracts of *Ricinus communis* L (*R. communis*) against *Staphylococcus aureus* (*S. aureus*) (NCTC 6571) and *Escherichia coli* (*E. coli*) (ATCC 25922). **Methods:** Leaf powder of *R. communis* L. was extracted with hot (in Soxhlet) and cold ethanol and methanol, separately. The antibacterial activity of the extracts was determined by agar well diffusion and macro broth dilution methods. The extracts were also subjected to phytochemical analysis. **Results:** All the four test extracts showed inhibition on both *S. aureus* and *E. coli*. Hot and cold ethanol extracts revealed significantly ($P < 0.05$) higher inhibition on *S. aureus* than methanol extracts, and the hot ethanol extract had the lowest minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values (5 mg/mL and 10 mg/mL, respectively). *E. coli* was highly inhibited by hot extracts of both ethanol and methanol with the MIC and MBC of 40 mg/mL and 80 mg/mL, respectively. Phytochemical analysis revealed the presence of saponins, cardiac glycosides, tannins, flavonoids and terpenoids in all test extracts. **Conclusions:** This study demonstrates that the hot and cold methanol and ethanol extracts are potential sources for control of *S. aureus* and *E. coli*. Especially, the hot and cold extracts of ethanol are more inhibitive against *S. aureus* even at lower concentration. Further study is needed to identify the specific bioactive compounds, their mode of action and their nontoxic nature in vivo condition.

Author keywords

Antibacterial activity; *Escherichia coli*; Extract; Minimum bactericidal concentration; Minimum inhibitory concentration; *Ricinus communis*; *Staphylococcus aureus*

Indexed keywords

EMTREE drug terms: alcohol; cardiac glycoside; cold water; flavonoid; hot water; methanol; *Ricinus communis* extract; saponin; streptomycin; tannin derivative; terpenoid derivative; unclassified drug; water

EMTREE medical terms: agar diffusion; antibacterial activity; article; bacterial strain; broth dilution; concentration response; controlled study; *Escherichia coli*; in vitro study; minimum bactericidal concentration; minimum inhibitory concentration; nonhuman; pharmacological parameters; phytochemistry; plant leaf; powder; priority journal; qualitative analysis; Soxhlet extraction; *Staphylococcus aureus*