
Synergism between *Krameria lappacea* root extracts and gentamicin against Gram-Positive bacteria.

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Résumé

Over the past years, one major public health priority is to develop new antibacterial drugs due to rising resistance and few viable alternatives exist. One promising strategy is enhancing existing antibiotics through combination therapy, by pairing them with plant-derived extracts, which has gained increasing attention in recent decades (1).

Previous research demonstrated that *Krameria lappacea* root extracts, rich in neolignans, exhibit strong antibacterial activity, with MIC values of 0.5–2 µg/mL against Gram-positive bacteria (2). This study explored the synergistic antibacterial potential of *K. lappacea* root supercritical fluid extracts combined with conventional antibiotics, building on *LickanAntay* traditional medicinal knowledge.

Extracts were prepared using CO₂ as supercritical fluid and ethanol as co-solvent with 5% (KL5), 10% (KL10), and 20% (KL20). Chemical analysis via HPLC-PDA-HRMS/MS and the GNPS platform revealed as expected a rich composition of polyphenolic compounds, including neolignans, but also methoxy-catechins, phenylethyl-hexosides, and flavonolignan derivatives, coherent with previous analyses reported for *K. lappacea* (3).

Notably, neolignans dominated the less polar KL5 extract, while flavonolignans and other polar compounds prevailed in the more polar KL20 extract, with nine phenolic compounds identified for the first time in this species. *In vitro* tests showed that the KL5/gentamicin combination exhibited synergistic effects against *Bacillus spp.*, *Listeria spp.*, and *Staphylococcus spp.*, with FICI values ranging from 0.27 to 0.48. The major neolignan compound in KL5 was isolated and tested with gentamicin on *Staphylococcus spp.*, demonstrating a slight synergistic effect with FICI values around 0.8. These findings highlight the potential of *K. lappacea* extracts to enhance antibiotic efficacy and combat bacterial resistance.

*Intervenant

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