

Pyrogallol is the main antibacterial compound in the aqueous extract of *Boswellia dalzielii* bark

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Plants belonging to the genus *Boswellia* (Burseraceae) have long been appreciated for their pharmacological properties such as anti-inflammatory, antioxidative and anticancer activities¹. In the Northern part of Nigeria, the bark of *B. dalzielii* Hutch. is an important ingredient for the treatment of infections².

To identify water-soluble antibacterial compounds, powdered bark was macerated in water for 6 to 24h at a range of temperatures. The aqueous extracts were subsequently fractionated by column chromatography, and the fractions were initially screened against wild type and methicillin resistant strains of *Staphylococcus aureus*. Then, minimum inhibitory concentrations of purified fractions were determined using series of concentrations from 2 mg/mL to 8 µg/mL. Results showed that longer maceration resulted in stronger antibacterial activity. With the aid of NMR and accurate mass analysis, pyrogallol was identified as the main antibacterial agent, with MIC values ranging from 24–28 µg/mL for MRSA to 34–36 µg/mL for wild-type *S. aureus*. Gallic acid was found to play a lesser role (MIC >200 µg/mL).

Pyrogallol was found not to be a plant secondary metabolite, but a metabolic product from microbial degradation of gallic acid from the bark. Only two bacterial species could be isolated from the plant material, which were identified as *Raoultella planticola* and *Enterobacter cloacae*. Of these two micro-organisms, *R. planticola* was shown to be responsible for the production of pyrogallol. This is an example of bacterial allelopathy, which results in an increased efficacy of the aqueous extract.

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Keywords: Pyrogallol; *S. aureus*; MRSA; *R. planticola*; MIC

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