

Phytochemical analysis, identification and quantification of antibacterial active compounds in betel leaves, Piper betle methanolic extract

ABSTRACT

Background and objective: The problems of bacterial diseases in aquaculture are primarily controlled by antibiotics. Medicinal plants and herbs which are seemed to be candidates of replacements for conventional antibiotics have therefore gained increasing interest. Current study was performed to investigate the presence of phytochemical constituents, antibacterial activities and composition of antibacterial active compounds in methanolic extract of local herb, Piper betle. Methodology: Qualitative phytochemical analysis was firstly carried out to determine the possible active compounds in P. betle leaves methanolic extract. The antibacterial activities of major compounds from this extract against nine fish pathogenic bacteria were then assessed using TLC-bioautography agar overlay assay and their quantity were determined simultaneously by HPLC method. Results: The use of methanol has proved to be successful in extracting numerous bioactive compounds including antibacterial compounds. The TLC-bioautography assay revealed the inhibitory action of two compounds which were identified as hydroxychavicol and eugenol. The α -caryophyllene however was totally inactive against all the tested bacterial species. In this study, the concentration of hydroxychavicol in extract was found to be 374.72 ± 2.79 mg g⁻¹, while eugenol was 49.67 ± 0.16 mg g⁻¹. Conclusion: Based on these findings, it could be concluded that hydroxychavicol and eugenol were the responsible compounds for the promising antibacterial activity of P. betle leaves methanolic extract. This inhibitory action has significantly correlated with the amount of the compounds in extract. Due to its potential, the extract of P. betle leaves or its compounds can be alternative source of potent natural antibacterial agents for aquaculture disease management.

Keyword: HPLC; Piper betle; TLC; Antibacterial activity; Aquaculture; Eugenol; Hydroxychavicol; Methanolic extract; Phenolic compounds; Phyto-constituents; Quantification