

Screening for antimicrobial potential of three different species of *Piper*: A possible alternative for the treatment of ear infections (otitis externa)

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The genus *Piper* has more than 700 species but the most well known species are *Piper betel*, *P. longum*, *P. nigrum*. All these species are used in indigenous system of medicine for curing different ailments in India. Crude organic (ethanol, methanol and acetone) and aqueous (hot and cold) extracts from these three species of *Piper* were tested against five bacterial (*Staphylococcus aureus*, *Proteus mirabilis*, *Escherchia coli*, *Pseudomonas aeruginosa*, *Acinetobacter sp.*) and one fungal (*Candida albicans*) ear pathogen through agar well diffusion method. Crude organic extracts of *P. longum* and *P. nigrum* showed moderate activities against the tested bacteria and fungi with zone of inhibition ranging from 13.6mm to 18.3mm while aqueous extract do not exhibit any activity. On the other hand, organic leaves extract of *P. betel* displayed good activity against all the tested ear pathogens while aqueous extracts showed activity against bacteria only. *S. aureus* was found most sensitive with maximum zone of inhibition of 31.6 mm followed by *Acinetobacter sp.* (27.3 mm), *P. mirabilis* & *C. albicans* (25.3 mm), *E. coli* (24.3 mm) and *P. aeruginosa* (22.3 mm). The MIC value for *P. betel* leaves extracts ranged between 1.56 mg/ml and 12.5 mg/ml. The lowest MIC of 1.56 mg/ml was found against *S. aureus* and *Acinetobacter sp.* Methanolic extract of *P. betel* was found best among all the tested solvents. Methanolic extract of *P. betel* was further fractionated using different chromatographic techniques as TLC, HPLC and Column chromatography. Column chromatography of *P. betel* methanolic leaves extract furnished 14 purified subfractions, out of which two subfraction displayed good antimicrobial activity, which were identified through spectroscopic techniques as NMR, IR and MS. These two bioactive phytochemicals were characterized as hydroxychavicol and protocatechualdehyde. This study showed that of the three tested *Piper species*, *P. betel* leaves extract can be further explored as an antimicrobial agent. However, detailed studies such as *in vivo* testing of this plant to determine its toxicity and its pharmacokinetics properties are needed to develop an effective phytochemical into an exploitable herbal product which can be used in treating otitis externa infections.

Biography

Chetan Sharma has completed his Ph.D. in Microbiology from Kurukshetra University, India (2012). His primary field is medical, herbal and environmental microbiology with research emphasis on antimicrobial potential of plants and chemical compounds against the human pathogens. Presently, he is working as Assistant Professor and Course Co-ordinator in Department of Microbiology, Guru Nanak Khalsa College, India. He has published over 40 research papers in peer reviewed journals. He is serving as Regional Editor and reviewer of five journals of Science alert, USA; editorial member in International Journal of Pharmacy and Pharmaceutical Sciences; International Research Journal of Pharmacy, India and serves as a reviewer for Microbiology Research (Bio info publications), Jundishapur Journal of Microbiology, Journal of infection and public health (Elsevier), International Journal of Biochemistry Research and Review (Science Domain International) and Mini-Reviews in Medicinal Chemistry (Bentham Science).

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