

Micropropagation of lemongrass *Cymbopogon citratus* L. and evaluation the effectiveness of methanolic leaves extract and its antibacterial activity in inhibiting three species of bacteria that cause bacterial gill disease in common carp fish

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Abstract

The current study was conducted in the laboratories of the Marine Science Center at the University of Basrah. In order to propagate lemongrass using plant tissue culture technology and test the effectiveness of leaves methanolic extract in concentrations (2.5%, 5%, 7.5%, and 10%), to demonstrate its effect in inhibiting three species of bacteria (*Aeromonas sobria*, *Sphingomonas paucimobilis*, and *Sphingomonas paucimobilis* Isolated from common carp (*Cyprinus carpio*) infected with bacterial gill disease, The bacterial types were collected from infected fish at a local fish farm in Basrah Governorate, southern Iraq, The bacterial isolates were identified chemically using VITEK II system cards, as well as genetically using 16s rRNA. The results showed that the 10% extract exhibited the highest antibacterial efficacy, while the 2.5% concentration showed the weakest activity. Notably, *Aeromonas sobria* strain demonstrated the greatest sensitivity to the lemongrass extract, whereas *Sphingomonas paucimobilis* showed complete resistance across all tested concentrations. The results of GC MS analysis indicated that the lemongrass extract contained many active compounds, including Itaconate and Eugenol, which have an antibacterial effect, Citral, Curlone, hydrazine, saponin, and all concentrations of the extracts showed varying degrees of activity against these tested bacterial species, comparable to their effectiveness with the standard antibiotic oxytetracycline.

Keywords: lemongrass, Micropropagation, Phytochemical, methanolic leaves extract, antibacterial activity



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