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Growth Pattern and *in vitro* Antibacterial Activity of Some Cultivated Herbs against Fish Pathogenic and Food Poisoning Bacteria

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ABSTRACT

The global concerns on the deleterious effect of synthetic antimicrobials in the production of food animals call for suitable and sustainable natural alternatives, one of which is the use of herbal products. This study aimed to investigate the growth pattern of some herbs of medicinal values and their antibacterial potentials against some fish pathogenic and food poisoning bacteria, compared with Aquamedics (a synthetic antibiotic) using agar well diffusion assay. The results showed that the number of leaves produced in *Euphorbia hirta* was more than the leaves produced in *E. hererophylla;* notwithstanding, *E. heterophylla* was higher than *E. hirta*. *Ocimum gratissimum* showed similar pattern of growth with *E heterophylla* during the first 8 weeks while *Phyllanthus amarus* is characterized with production of higher number leaflets at the early growth stages. All the herbal extracts investigated showed presence of flavonoids and tannins. The ethanol *E. hirta* extract (EHE) and *Jatropha gossypiifolia* extract (JGE) exhibited significantly higher ($P < 0.05$) zone of inhibition against *Pseudomonas aeruginosa* and *P. fluorescens*, compared to other extracts and Aquamedics. The JGE also had higher zone of inhibition against *Aeromonas hydrophila* (26.67mm), and *Streptococcus agalactiae* (25.67mm) compared to Aquamedics (22.33mm) and other extracts while EHE, *E. heterophylla* and *Moringa oleifera* exhibited similar zones of inhibition, 23.67mm, 23.00mm, 21.67mm, respectively, compared with 22.33mm obtained for Aquamedics against *A. hydrophila* . The methanol extracts of JGE, EHE and *P. amarus* extract also exhibited higher zone of inhibition against *P aeruginosa*, compared to other extracts and the synthetic antibiotic. However, the synthetic antibiotic demonstrated

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higher zone of inhibition than the aqueous extracts of the herbs, except EHE which had similar inhibitory activity with Aquamedics against *P. fluorescens*. On the over all, the ethanol extracts seemed to have more potent antibacterial activity than other extracts. The present study has demonstrated the moderately inhibitory activities of the ethanol and methanol extracts of *Euphorbia* species, *J. gossypiifolia* and *P. amarus* against the food poisoning *Pseudomonas* species and pathogenic *A. hydrophila* and *S. agalactiae*. These extracts are therefore recommended for utilization and further *in vivo* study as herbal antibacterial agents for fish health management and fish preservation.

Keywords: Growth pattern of herbs, phytochemicals, fish pathogens, zone of inhibition

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