

ABSTRACT

The presence of mycotoxins in aquaculture feeds, especially aflatoxins that are formed by Aspergillus flavus, is a major risk to the health of fish, the quality of feed, and human health. This study compared the antifungal activities of the selected medicinal plants, which include clove (Syzygium aromaticum), moringa (Moringa oleifera), eucalyptus (Eucalyptus citriodora) and Allium fistulosum against A. flavus in vitro and in fish feed. Antifungal activity of crude extracts of all plants was screened by susceptibility assays and Minimum Inhibitory Concentration (MIC) tests. Clove was the most effective extract tested, with low MIC values (6.25 ± 5.4^b $\mu\text{g/ml}$) and high fungi growth suppression. Clove extract, when sprayed onto fish feed, led to a time-dependent decrease in aflatoxin concentrations: 29.5% at day 7, 87.8% at day 14 and upto 93.5% at day 21 relative to controls. The results prove the claim that clove extract could be a promising natural antifungal agent, which can significantly decrease aflatoxins biosynthesis in stored feed. Its ease and affordability as a delivery method also bode well against its feasibility in aquaculture supply chains. Although the results are strong, future studies must include usage in several fungal strains, assess eugenol interactions in feeds, and undertake palatability, toxicological, and field-scale validation experiments to demonstrate safe and efficient usage. All in all, this research has underscored the use of clove extract as one of the possible and plant-based solutions to enhance feed safety and contribute to the sustainability of aquaculture.