

ANTIFUNGAL ACTIVITIES OF LEMONGRASS (*Cymbopogon citratus*) ESSENTIAL OIL - β -CYCLODEXTRIN INCLUSION COMPLEX INCORPORATED IN COMMERCIAL FISH FEEDS

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ABSTRACT

During the wet season in the Philippines, fish feeds can be contaminated with mycotoxins affecting fish production. The addition of essential oil (EO) is one of the ways to prevent this but it is prone to physical and chemical reactions. Thus, this study aims to encapsulate lemongrass essential oil (LGEO) in β -cyclodextrin (β -CD) to produce an inclusion complex (IC) that can be used as an additive in commercial tilapia feeds to prevent or minimize fungal contamination. The inclusion complex was made using the co-precipitation method and was characterized by Fourier Transform Infrared (FTIR) Spectroscopy. The spectrum was similar to that of citral, a major component of lemongrass essential oil that is responsible for inhibiting fungi. The antifungal activities of pure and encapsulated LGEO at varying concentrations against *Aspergillus* species were carried out by Agar Well Diffusion assay. Results showed that *A. flavus* was more susceptible in LGEO and IC compared with *A. fumigatus*. The tested concentration of EO could inhibit both fungi. However, it would take 50% IC to effectively inhibit the growth of both fungi. The stability of the inclusion complex in commercial fish feeds was also evaluated. The feeds were stored in an area with the appropriate conditions that could promote the growth of molds such as temperature ($>27^{\circ}\text{C}$), moisture levels (14%), and relative humidity levels ($>70\%$). The results showed that the encapsulated LGEO was effective in extending the shelf life of the feeds and best observed at a concentration of 5 g kg^{-1} IC. The oil remained active for nine days wherein about 10-40% of the feeds with 5 g kg^{-1} IC were covered with molds. On the other hand, about 70-100% of the surface of the feeds with essential oil was contaminated with molds after nine days which indicated that encapsulation of EO was needed to maintain its effectiveness as an antifungal agent.