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Farmers’ and academia’s views”

Growth control of cyanobacteria strain LmTK01 using specific bacteria in laboratory (*in vitro*)

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Abstract

In recent years, algal blooms are worldwide problems in water resources, including in aquaculture ponds. Blue-green algae are one of the most common group that bloom in the water and affect the environmental safety, organism and human health. Cyanobacteria strain LmTK01 is a blue-green algae that has been found to bloom in shrimp ponds in Songkhla province, Thailand. Which is a problem in shrimp farming. The objective of this study was to use bacteria from aquaculture water to inhibit cyanobacteria strain LmTK01 growth. Morphology and identification of algicidal bacteria were studied based on phenotypic characteristics and 16S ribosomal RNA (rRNA) gene sequence. Cell density and algicidal modes of strongest algicidal bacteria on LmTK01 growth were measured by absorbance at 680 nm. A total of 53 strains of bacteria were isolated and screened which found that strain BP5 showed the highest algicidal activity at 99.94% on day 7 of the experiment. Results of morphology study of strain BP5 showed that strain BP5 was a gram-positive, rod-shaped, orange cream colony and endospore formation was observed. 16s rRNA gene revealed that strain BP5 was a member of the genus *Fictibacillus*. The optimal cell density of strain BP5 was 10^7 – 10^8 CFU mL⁻¹, which algicidal activity was greater than 50% significantly different from 10^5 – 10^6 CFU mL⁻¹ ($P < 0.05$). In addition, when strain BP5 was inoculated with other algae (*Chaetoceros* sp., *Skeletonema* sp., *Chlorella* sp., *Scenedesmus* sp. and *Spirulina* sp.). It was found the most specific effect significantly on LmTK01. Moreover, Algicidal modes of the bacterial culture and cell-free filtrate showed that algal cells were clearly destroyed and algicidal modes of strain BP5 were higher than control and bacteria cell groups. The results indicated that the algicidal bacteria strain BP5 specifically and effectively controlled the cyanobacteria strain LmTK01 bloom.

Keywords: Algicidal bacteria, bacteria cell, bacterial culture, blue-green algae, cell-free filtrate, cyanobacteria strain LmTK01