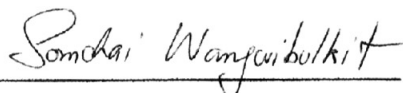


Somchai Wangwibulkit 2008: Factors Affecting the Growth of Blue-Green Algae, *Oscillatoria* sp. and *Microcystis* sp., and the Relationship of Their Abundance to Off-Flavor in Pond-Cultured Pacific White Shrimp (*Litopenaeus vannamei*). Doctor of Philosophy (Fisheries Science), Major Field: Fisheries Science, Department of Fishery Biology. Thesis Advisor: Associate Professor Chalor Limsuwan, Ph.D. 110 pages.

Experiments were carried out to determine the effects of salinity, pH and total suspended solids (TSS) on the growth of blue-green algae, *Oscillatoria* sp. and *Microcystis* sp., and the relationship of their abundance to off-flavor in pond-cultured Pacific white shrimp (*Litopenaeus vannamei*). *Oscillatoria* sp. and *Microcystis* sp. were isolated from Pacific white shrimp low-salinity culture ponds and cultured for mono-algae. Each species was kept in 250-ml BG-11 media in the laboratory. For *Oscillatoria* sp. salinities of 0,5,10,15,20,25 and 30 ppt were maintained throughout the experimental period, while for *Microcystis* sp. salinities of 0,3,6,9,12,15 and 18 ppt were used. The water pH was maintained at 3.0,4.5,6.0,7.5,9.0,10.5 and 12 for both species for 10 days. TSS of 0,5,10,15,20 and 25 g/l were maintained throughout the 28-day experimental period. The algal growth was measured by the determination of chlorophyll-a every 2 days.

Results showed that the optimal salinity levels for growth were 0-10 ppt for *Oscillatoria* sp., and 0-6 ppt for *Microcystis* sp. An increase in the salinity decreased the growth of both species. Water pH levels of 7.5 to 9.5 were suitable for the growth of both species, while a pH below or above this range caused a decrease in the growth of both species. TSS of more than 5.45 ± 0.24 g/l significantly decreased the growth of *Oscillatoria* sp., while TSS greater than 4.95 ± 0.36 g/l significantly decreased the growth of *Microcystis* sp. ($P < 0.05$). High concentration of ammonia and phosphorus increased the growth of both *Oscillatoria* and *Microcystis* spp. in the growout ponds. Total nitrogen and ammonia were related to the abundance of both genera in growout ponds to a greater extent than sediment and soil textures. *Oscillatoria* and *Microcystis* spp. produced geosmin which was analyzed by GC/MS with SPME fiber. The results showed that geosmin was related to chlorophyll-a (x) of *Oscillatoria* as $y = 0.0009x - 0.0048$ ($R^2 = 0.9986$) and *Microcystis* as $y = 0.0009x - 0.0048$ ($R^2 = 0.9986$). Geosmin concentration in shrimp muscle was related to the density of *Oscillatoria* and *Microcystis* spp. An estimate of the sensory threshold of geosmin concentration in shrimp muscle lower than 2.5 µg/kg gave the same results as a sensory evaluation of less than 1 which meant that there was no contamination. This study clearly indicated that in order to prevent off-flavor in shrimp from both *Oscillatoria* and *Microcystis* spp. TSS must be maintained at a suitable level during the culture period.



Student's signature



Thesis Advisor's signature

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