

Watchariya Purivirojkul 2006: Immunoenhancement of Black Tiger Shrimp
Penaeus monodon Fabricius. Doctor of Philosophy (Zoology), Major Field: Zoology,
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Immunoenhancement of black tiger shrimp, *Penaeus monodon* Fabricius by immuno-stimulant namely β -glucan, peptidoglycan and *Bacillus* spp. were studied. It was found that the optimum concentration that could enhance the immunity of this shrimp including phenoloxidase, superoxide anion, bactericidal activity and clearance ability were 3 gm β -glucan/kg feed, 0.18 gm peptidoglycan/kg feed, and 5 gm *Bacillus subtilis* /kg at total concentration of 10^{10} - 10^{11} CFU/gm. However, *Bacillus pumilus*, *Bacillus sphaericus*, *Bacillus subtilis*, the mixture of *B. pumilus* + *B. sphaericus*, a mixture of *B. pumilus* + *B. subtilis*, a mixture of *B. sphaericus* + *B. subtilis* and a mixture of *B. pumilus* + *B. sphaericus* + *B. subtilis* could enhance the immunity in 3 parameters including phenoloxidase, bactericidal activity and clearance ability. The duration of application of β -glucan and peptidoglycan were also studied. Similar results revealed that the application of 3 gm/kg feed of β -glucan and 0.18 gm/kg feed of peptidoglycan for 5 days per week and continue feeding for one month could enhance the immunity for about 6-7 weeks. The mixture of *Bacillus* spp. were recommended to be used daily throughout the entire crop because not only to enhance the immunity but also to reduce *Vibrio* spp. in shrimp intestine in the range of 20.97-32.45%. Although all *Bacillus* species did not show inhibition effect against *Vibrio harveyi* but Scanning Electron Microscope showed that the size of *V. harveyi* cell at the cross streak section area was smaller when compare with its normal cell. The competition on using nutrient for growth between *Bacillus* species and *V. harveyi* were studied *in vitro* by broth co culture assay. An initial concentration of 10^3 CFU/ml was used in monoculture and co-culture of *Bacillus* spp. and *V. harveyi*. Total *Bacillus* and *Vibrio* count were conducted after 0, 24, 48, 72, 96 and 120 hours. *B. pumilus*, *B. sphaericus* and *B. subtilis* could decrease *V. harveyi* by 47.90, 48.41 and 46.47%, respectively. This result supported that these *Bacillus* spp. can be applied as effective probiotic in *P. monodon* culture.

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Thesis Advisor's signature

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