

Tippaporn Lorsingcum 2011: Evaluation of Isoeugenol as an Anesthetic for Pacific White Shrimp (*Litopenaeus vannamei*). Master of Science (Fisheries Science), Major Field: Fisheries Science, Department of Fishery Biology. Thesis Advisor: Associate Professor Chalor Limsuwan, Ph.D. 105 pages.

The efficacy of isoeugenol as an anesthetic for Pacific white shrimp (*Litopenaeus vannamei*) was investigated. Acute toxicity test of isoeugenol in postlarval stage *L. vannamei* (48-hr LC₅₀) was tested in various salinity concentration (5, 15, 25 psu). The result indicated that the 48-hr LC₅₀ value was 19.93 ± 2.40 ppm and the toxicity was lower at the salinity 15 and 25 psu which was 20.58 ± 1.83 and 22.53 ± 1.65 ppm, respectively. Optimum concentration of isoeugenol for use as an anesthetic for juvenile *L. vannamei* (15-20 g) for 2 minutes was 95 ppm while the concentration was 70 ppm for 10 minutes. Recovery time of the concentration of 95 ppm and 70 ppm were 7.81 ± 3.09 minutes and 11.98 ± 5.28 minutes respectively. Degradation rate of isoeugenol (95 ppm) at room temperature (28 ± 1 °C) within 0, 3, 6, 12, 24 and 48 hours were 2.00 ± 0.00, 4.41 ± 1.52, 5.87 ± 1.76, 7.58 ± 2.84, 8.09 ± 3.07 and 11.14 ± 4.84 minutes respectively and degradation rate of isoeugenol at 23-25°C within 0, 3, 6, 12, 24 and 48 hours were 2.00 ± 0.00, 4.42 ± 1.55, 5.56 ± 1.99, 7.09 ± 2.58, 8.19 ± 2.63 and 9.35 ± 3.26 minutes respectively significantly different ($P < 0.05$) at both the temperature that is at 28 ± 1 °C and 23-25°C the degradation rate of isoeugenol achieved at 0 hours is significantly different from the degradation rate at 3, 6, 12, 24 and 48 hours. Moreover, isoeugenol gave the best effective result at the first time. For the next time, more time for anesthetic needed because the concentration of isoeugenol in the water decreases. *L. vannamei* exposed to isoeugenol at 95 ppm which cause anesthesia to stage 3 within 2 minutes in fiberglass tanks before being transferred into glass aquaria for recovery and immune parameters (total haemocyte count, percentage phagocytosis, phenoloxidase activating system, bactericidal activity, superoxide dismutase) was analysed at 0, 6, 12, 24 and 48 hrs. The results showed that shrimp exposed to isoeugenol were not significantly ($P > 0.05$) different from pre-stressed shrimp before transportation but significantly different ($P < 0.05$) from shrimp, that were transported without being exposed to isoeugenol. However, shrimp that exposed to isoeugenol showed all the immune parameters not significantly different ($P > 0.05$) from shrimp which were not exposed to isoeugenol at 6, 12, 24 and 48 hrs after transportation. The results indicated that isoeugenol could be used as an anesthetic for handling and short transportation purpose for *L. vannamei*.

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