

LITERATURE CITED

- Adam, A. 1991. Response of penaeid shrimp to exposure to *Vibrio* species. **Fish. Shellfish. Immunol.** 1: 59-70.
- Alpuche-Osorno, J., A. Pereyra, , C. Agundis, , C. Rosas, C. Pascual, , M-C. Slomianny, L. Vazquez and E. Zenteno. 2005. Purification and characterization of a lectin from the white shrimp *Litopenaeus setiferus* (*Crustacea decapoda*) hemolymph. **Biochim. Biophys. Acta** 1724: 86-93.
- Aebersold, R. and M. Mann. 2003. Mass spectrometry-based proteomic. **Nature.** 422: 198-207.
- Amersham Pharmacia Biotech AB 18-1022-29. 1999. **Affinity chromatography: Principles and methods.** Uppsala, Sweden.
- Arason, G. J. 1996. Lectins as defence molecules in vertebrates and invertebrates. **Fish. Shellfish. Immunol.** 6: 277-289.
- Armstrong, P. B., R. Melchior and J. P. Quigley. 1996. Humoral immunity in long-lived arthropods. **J. Insect Physiol.** 42: 53-64.
- Azumi, K. and H. Yokosawa. 1996. Humoral factors and cellular reactions in the biological defense of the ascidian, pp. 43-53. *In* K. Söderhäll (ed.). **New Directions in Invertebrate Immunology**, SOS Publications, USA.
- Bachère, E., E. Mialhe, D. Noel, V. Boulo, A. Morvan, and J. Rodriguez. 1995. Knowledge and research prospects in marine mollusc and crustacean immunology. **Aquaculture.** 132: 17-32.

- Beck, G. and G. S. Habicht. 1996. Immunity and the invertebrates. **Scientific American**. November. 60-66.
- Beisel, H-G., S. Kawabata, S. Iwagana, R. Huber and W. Bode. 1999. Tachylectin-2: crystal structure of a specific GlcNAc/GalNAc-binding lectin involved in the innate immunity host defense of the Japanese horseshoe crab *Tachypleus tridentatus*. **The EMBO Journal** 18: 2313-2322.
- Boman, H. G. 1991. Antibacterial peptides: key components needed in immunity. **Cell** 65: 205-207.
- Bradford, M. 1976. A rapid and sensitive method for the quantitation of protein utilizing the principles of protein dye binding. **Anal. Biochem.** 72: 248-254.
- Briggs, M., S. Funge-Smith, R. P. Subasinghe and M. Phillips. 2005. **Introduction and movement of two penaeid shrimp species in Asia and the Pacific**. FAO Fisheries Technical Paper. No. 476. FAO, Rome.
- Bulgakov, A.A., K.-I Park, K.-S. Choi, H.-K. Lim and M. Cho. 2004. Purification and characterisation of a lectin isolated from the Manila clam *Ruditapes philippinarum* in Korea. **Fish. Shellfish. Immunol.** 16: 487-499.
- Cardenas, W., J. A. Jenkins and J. R. Dankert. 2000. A flow cytometric approach to the study of crustacean cellular immunity. **J. Invert. Pathol.** 76: 112-119.
- Cerenius, L. and K. Söderhäll. 2004. The prophenoloxidase-activating system in invertebrates. **Immunol. Rev.** 198: 116-126.
- Chaitiamvong, S. and M. Supongpan. 1992. **A Guide to Penaeoid Shrimps Found in Thai Waters**. Australian Institute of Marine Science.

- Chattopadhyay, T., A. K. Guha and B. P. Chatterjee. 1996. Novel antimicrobial activity of scyllin, a haemolymph lectin of the edible crab *Scylla serrata*. **Biomed. Lett.** 53: 29-40.
- Chiou, T-T., J-L Wu, T. T. Chen and J-K Lu. 2005. Molecular cloning and characterization of cDNA of Penaeidin-like antimicrobial peptide from tiger shrimp (*Penaeus monodon*). **Mar. Biotechnol.** Published online. Springer Science and Business Media.
- Chisholm, J. R. S. and V. J. Smith. 1992. Antibacterial activity in the hemocytes of the shore crab, *Carcinus maenas*. **J. Mar. Biol. Association of the United Kingdom** 72: 529-542.
- Chisholm, J. R. S. and V. J. Smith. 1995. Comparison of antibacterial activity in the hemocytes of different crustacean species. **Comp. Biochem. Physiol.** 110A: 39-45.
- Cominetti, M. R., M. Risoleta, F. Marques, D. M. Lorenzini, S. E. Löfgren, S. Daffre and M. A. Barracco. 2002. **Dev. Comp. Immunol.** 26: 715-721.
- Cooper, E. L. and C. A. E. Lemmi. 1981. Invertebrate humoral immunity. **Dev. Comp. Immunol.** 5: 3-21.
- Cuthbertson, B. J., E. E. Bullesbach, J. Fievet, E. Bachère and P. S. Gross. 2004. A New class (penaeidin class 4) of antimicrobial peptides from the Atlantic white shrimp (*Litopenaeus setiferus*) exhibits target specificity and an independent praline-rich-domain function. **Biochem. J.** 381: 79-86.
- Delahunty, C. and J. R. Yates III. 2005. Protein identification using 2D-LC-MS/MS. **Methods.** 35: 248-255.

- Destoumieux, D., P. Bulet, D. Loew, A. V. Dorsselaer, J. Rodriguez and E. Bachère. 1997. Penaeidins, a new family of antimicrobial peptides isolated from the shrimp *Penaeus vannamei* (Decapoda). **J. Biol. Chem.** 272:28398-28406.
- Dodd, R. B. and K. Drickamer. 2001. Lectin-like proteins in model organisms: implications for evolution of carbohydrate-binding activity. **Glycobiology** 11: 71R-79R.
- Drickamer, K. 1997. Making a fitting choice: common aspects of sugar-binding sites in plant and animal lectins. **Structure** 5: 465-468.
- Evans, E.E., J.E. Cushing, S. Sawyer, P.F. Weinheimer, R.T. Action and J.L. McNeely. 1969. Induced bactericidal response in the California spiny lobster, *Panulirus interruptus*. **Proc. Soc. Exp. Biol. Med.** 132: 111-114.
- Fragkiadakis, G. and E.K. Stratakis. 1995. Characterization of hemolymph lectins in the prawn *Parapenaeus longirostris*. **J. Invert. Pathol.** 65: 111-117.
- Franc, N. C. and K. White. 2000. Innate recognition systems in insect immunity and development: new approaches in *Drosophila*. **Microbes Infect.** 2: 243-250.
- Fujita, Teizo. 2002. Evolution of the lectin-complement pathway and its role in innate immunity. **Immunol.** 2: 346-353.
- Ganz, T. 2003. The role of antimicrobial peptides in innate immunity. **Integr. Comp. Biol.** 43: 300-304.
- Giga, Y., A. Ikai and K. Takahashi. 1987. The complete amino acid sequence of echinodin, a lectin from coelomic fluid of the sea urchin *Anthocardaris crassispina* homologues with mammalian and insect lectin. **J. Biol. Chem.** 262: 6197-6203.

Gillespie, J. P., M. R. Kanost and T. Trenczek. 1997. Biological mediators of insect immunity. **Ann. Rev. Entamol.** 42: 611-43.

Giulianini, P. G., M. Bierti, S. Lorenzon, S. Battistella and A. Ferrero. 2007.
Ultrastructural and functional characterization of circulating hemocytes from the fresh water crayfish *Astacus leptodactylus*: cell types and their role after in vivo artificial non-self challenge. **Micron.** 38: 49-57.

Goldstein, I.J. 1980. What should be called a lectin? **Nature** 285: 66.

Gollas-Galván, T., J. Hernandez-Lopez and F. Vargas-Albores. 1999.
Prophenoloxidase from brawn shrimp (*Penaeus californiensis*) hemocytes.
Comp. Biochem. Physiol. 122B: 77-82.

Goto, R., K. Muramoto, M. Yamazaki and H. Kamiya. 1992. Purification and characterization of an agglutination of the soft coral *Sinularia* species.
Dev. Comp. Immunol. 16: 9-17.

Goto-Nance, R., K. Muramoto, Y. Zenpo and H. Kamiya. 1996. Purification and characterization of the lectins of the soft coral *Lobophytum variatum*.
Fish. Sci. 62: 297-301.

Haug, T., A. K. Kjuul, K. Stensvag, E. Sandsdalen and O. Styrvold. 2002.
Antibacterial activity in four marine crustacean decapods. **Fish. Shellfish. Immonol.** 12: 371-385.

Hisbi, D., J. Vandenberghe, R. Robles and L. Verdonck. 2000. Characterisation of *Vibrio* and related bacteria associated with shrimp *Penaeus monodon* larvae in Indonesia. **Asian Fish. Sci.** 13: 57-64.

- Holt, J. G., N. R. Krieg, P. H. A. Sneath, J. T. Staley and S. T. Williams. 1994. **Bergey's Manual of Determinative Bacteriology**, 9th ed, The Williams & Wilkins Co, Baltimore.
- Hose, J. H., G. G. Martin and A. S. Gerard. 1990. A Decapod hemocyte classification scheme integrating morphology, cytochemistry, and function. **Biol. Bull.** 178: 33-45.
- Inamori, K., T. Saito, D. Iwaki, T. Nagira, S. Iwagana, F. Arisaka and S. Kawabata. 1999. A newly identified horseshoe crab lectin with specificity for blood group A antigen recognizes specific O-antigens of bacterial lipopolysaccharides. **J. Biol. Chem.** 274: 3272-3278.
- Iwanaga, S. 2002. The molecular basis of innate immunity in the horseshoe crab. **Curr. Opin. in Immunol.** 14: 87-95.
- Jayasree, S. 2001. Biological properties of natural agglutinin in the hemolymph of Indian white prawn, *Penaeus indicus* H. Milne Edwards. **Aquaculture**. 194:245-252.
- Jayasree, S., G.S. Selvam and S. Thomas. 2000. Development of an enzyme-linked immunosorbent assay (ELISA) for agglutinin-An antibacterial protein of shrimp, *Fenneropenaeus indicus*. **J. Crust. Biol.** 20: 621-627.
- Johansson, M. W., P. Keyser, K. Sritunyalucksana, and K. Söderhäll. 2000. Crustacean haemocytes and haematopoiesis. **Aquaculture**. 191: 45-52.
- Johansson, M. W. and K. Söderhäll. 1989. A cell adhesion factor from crayfish hemocytes has degranulating activity towards crayfish granular cells. **Insect Biochem.** 19: 183-190.

- Kawabata, S. and S. Iwanaga. 1999. Role of lectins in the innate immunity of horseshoe crab. **Dev. Comp. Immunol.** 23: 391-400.
- Kocorek, J. and V. Hořejši. 1981. Defining a lectin. **Nature** 290: 188.
- Kondo, M. H., H. Matsuyama and T. Yano. 1992. The opsonic effect of lectin on the phagocytosis by hemocytes of kuruma prawn, *Penaeus japonicus*. **Fish Pathol.** 27: 217-222.
- Kopáček, P., L. Grubhoffer and K. Söderhäll. 1993. Isolation and characterization of a hemagglutinin with affinity for lipopolysaccharide from plasma of the crayfish *Pacifastacus leniusculus*. **Dev. Comp. Immunol.** 17: 407-418.
- Laemmli, U.K. 1970. Cleavage of structural proteins during the assembly of the head of bacteriophage T4. **Nature** 227: 680-685.
- Lee, S. Y., B. L. Lee and K. Söderhäll. 2004. Processing of crayfish hemocyanin subunits into phenoloxidase. **Biochem. Biophys. Res. Com.** 322: 490-496.
- Lee, S. Y. and K. Söderhäll. 2002. Early events in crustacean innate immunity. **Fish. Shellfish. Immunol.** 12: 421-437.
- Lightner, D. V. and R. M. Redman. 1998. Shrimp diseases and current diagnostic methods. **Aquaculture** 164: 201-220.
- Lis, H. and N. Sharon. 1986. Application of lectins, pp. 293-370. In I. E. Liener, N. Sharon and I. J. Goldstein (eds.). **The Lectins : Properties, Functions, and Applications in Biology and Medicine**, Academic Press. New York.

- Liu, C-H., S-T. Yeh, S-Y. Cheng, and J-C. Chen. 2004. The immune response of the white shrimp *Litopenaeus vannamei* and its susceptibility to *Vibrio* infection in relation with the molt cycle. **Fish. Shellfish. Immunol.** 16: 151-161.
- Liu, P-C., K-K. Lee, K-C. Yui, G-H. Kou and S-N. Chen. 1996. Isolation of *Vibrio harveyi* from diseased kuruma prawns *Penaeus japonicus*. **Curr. Microb.** 33: 129-132.
- Maheswari, R., P. Mullainadhan and M. Arumugam. 1997. Characterisation of a natural haemagglutinin with affinity for acetylated aminosugars in the serum of the marine prawn, *Penaeus indicus* (H. Milne Edwards). **Fish. Shellfish. Immunol.** 7: 17-28.
- Maheswari, R., P. Mullainadhan and M. Arumugam. 2002. Isolation and characterization of an acetyl group-recognizing agglutinin from the serum of the Indian white shrimp *Fenneropenaeus indicus*. **Arc. Biochem. Biophys.** 402: 65-76.
- Marques, M. R. F. and M. A. Barracco. 2000. Lectins, as non-self-recognition factors, in crustaceans. **Aquaculture.** 191: 23-44.
- Martin, G. G. and B. L. Graves. 1985. Fine structure and classification of shrimp hemocytes. **J. Morphol.** 185: 339-348.
- Martin, G. G., C. Castro, N. Moy and N. Rubin. 2003. N-acetyl-D-glucosamine in crustacean hemocytes; possible functions and usefulness in hemocyte classification. **Invert. Biol.** 122: 265-270.
- Matsui, T., M. Ozeki, M. Suzuki, A. Hino and K. Titani. 1994. Purification and characterization of two Ca^{2+} -dependent lectins from coelomic plasma of sea cucumber, *Stichopus japonicus*. **J. Biochem.** 116: 1127-1133.

- Middleton, D., D. M. Holdich and N. A. Ratcliffe. 1996. Haemagglutinins in six species of freshwater crayfish. **Comp. Biochem. Physiol.** 114A: 143-152.
- Montano-Perez, K., G. Yepiz-Plascencia, I. Higuera-Ciapara, and F. Vargas-Albores. 1999. Purification and characterization of the clotting protein from the white shrimp *Penaeus vannamei* **Comp. Biochem. Physiol.** 122B: 381-387.
- Moriarty, D. J. W. 1999. Disease control in shrimp aquaculture with probiotic bacteria. **In the Proceeding of the 8th International Symposium on Microbial Ecology**. Bell C.R., M. Brylinsky and P. Johnson-Green (eds), Atlantic Canada Society for Microbial Ecology, Halifax, Canada.
- Nagai, T., T. Osaki and S. I. Kawabata. 2001. Functional Conversion of Hemocyanin to Phenoloxidase by horseshoe crab antimicrobial peptides. **J. Biolo. Chem.** 276: 27166-27170.
- Nair, S.V., S. Pearce, P. L. Green, D. Mahajan, R. A. Newton and D. A. Raftos. 2000. A collectin-like protein from tunicates. **Comp. Biochem. Physiol.: Biochem. Mol. Biol.** 125B: 279-289.
- Nakayama, T., E. Ito. N. Nomura, N. Nomura and M. Matsumura. 2006. Comparison of *Vibrio harveyi* strains isolated from shrimp farms and from culture collection in terms of toxicity and antibiotic resistance. **FEMS Microbiol. Lett.** 258: 194-199.
- Noga, E. J., T.A. Arroll and Z. Fan. 1996. Specificity and some physicochemical characteristics of the antibacterial activity from blue crab *Callinectes sapidus*. **Fish. Shellfish. Immunol.** 6: 403-412.

- Oliver, L. M. and W.S. Fisher. 1995. Comparative from function of oyster *Crassostrea virginica* hemocyte from Chesapeake Bay (Virginia) and Apalachicola Bay (Florida). **Dis. Aquat. Org.** 22: 217-225.
- Pajic, I., Z. Kljajic, N. Dogovic, D. Sladic, Z. Juranic and M. J. Gasic. 2002. A novel lectin from the sponge *Haliclona cratera*: isolation, characterization and biological activity. **Comp. Biochem. Physiol. : Toxicology & Pharmacology**. 132C: 213-221.
- Paterson, W. D. and J. E. Stewart. 1974. In vitro phagocytosis by hemocytes of the American lobster (*Homarus americanus*). **Journal Fisheries Research Board of Canada**. 31: 1051-1056.
- Pérez Farfante, I. P. and B. Kensley. 1997. **Penaeoid and Sergestoid Shrimps and Prawns of the World**. National Museum of Natural History Smithsonian Institution Washington D. C., USA. 233p.
- Persson, M., L. Cerenius, and K. Söderhäll. 1987. The influence of haemocyte number on the resistance of the freshwater crayfish, *Pacifastacus leniusculus* Dana, to the parasitic fungus, *Aphanomyces astaci*. **J. Fish Dis.** 10: 471-477.
- Ratanapo, S. and M. Chulavatnatol. 1990. Monodin, A new sialic acid-specific lectin from black tiger prawn (*Penaeus monodon*). **Comp. Biochem. Physiol.** 97B:515-520.
- Ratanapo, S. and M. Chulavatnatol. 1992. Monodin- induced agglutination of *Vibrio vulnificus*, A major infective bacterium in black tiger prawn (*Penaeus monodon*). **Comp. Biochem. Physiol.** 102B: 855-859.
- Ravindranath, M. H., H.H. Higa, E.L. Cooper and J.C. Paulson. 1985. Purification and characterization of an O-acetylsialic acid-specific lectin from a marine crab *Cancer antennarius*. **J. Biolo. Chem.** 260: 8850-8856.

- Ruangpan, L. and T. Kitao. 1991. *Vibrio* bacteria isolated from black tiger shrimp, *Penaeus monodon* fabricius. **J. Fish Dis.** 14: 383-388.
- Saito, T., M. Hatada, S. Iwanaga and S. Kawabata. 1997. A newly identified horseshoe crab lectin with binding specificity to O-antigen of bacterial lipopolysaccharides. **J. Biol. Chem.** 272: 30703-30708.
- Saito, T., S. Kawabata, M. Hirata and S. Iwanaga. 1995. A novel type of limulus lectin-L6. **J. Biol. Chem.** 270: 14493-14499.
- Saulnier, D., P. Haffner, C. Goarant, P. Levy and D. Ansquer. 2000. Experiment infection models for shrimp vibriosis studies: a review. **Aquaculture** 191: 133-144.
- Schnapp, D., G. D. Kemp and V. J. Smith. 1996. Purification and characterization of a proline-rich antibacterial peptide, with sequence similarity to bactenecin-7, from the haemocytes of the shoe crab, *Carcinus maenas*. **Eur. J. Biochem.** 240: 532-539.
- Schneider, P. M. 1985. Purification and properties of three lysozymes from hemolymph of the cricket, *Gryllus bimaculatus* (De Geer). **Insect Biochem.** 15: 463-470.
- Sequeira, T., M. Vilanova, A. Lobo-Da-Cunha, L. Baldaia and M. Arala-Chaves. 1995. Flow cytometric analysis of molt-related changes in hemocyte type in male and female *Penaeus japonicus*. **Biolo. Bull.** 189: 376-380.
- Shiomi, K., H. Yamanaka and T. Kikuchi. 1980. Biochemical properties of hemagglutinins in the Red Alga *Serraticardia maxima*. **Bulletin of the Japanese Society of Scientific Fisheries.** 46: 1369-1373.

- Smith, V. J. and Söderhäll, K. 1991. A comparison of phenoloxidase activity in the blood of marine invertebrates. **Dev. Comp. Immunol.** 15: 251-261.
- Söderhäll, K. and L. Cerenius. 1992. Crustacean immunity. **Annu. Rev. Fish Dis.** 1992: 3-23.
- Söderhäll, K. and V. J. Smith. 1983. Separation of hemocyte populations of *Carcinus maenas* and other marine decapods, and prophenoloxidase distribution. **Dev. Comp. Immunol.** 7: 229-239.
- Sotelo-Mundo, R. R., M. A. Islas-Osuna, E. de-la-Re-Vega, J. Hernández-López, F. Vargas-Albores and G. Yepiz-Plascencia. 2003. cDNA cloning of the lysozyme of the white shrimp *Penaeus vannamei*. **Fish. Shellfish. Immunol.** 15: 325-331.
- Sritunyalucksana, K., P. Sithisarn, B. Withayachumnarnkul and T. W. Flegel. 1999. Activation of prophenoloxidase, agglutinin and antibacterial activity in haemolymph of the black tiger prawn, *Penaeus monodon*, by immunostimulants. **Fish. Shellfish. Immunol.** 9: 21-30.
- Tunkijjanukij, S. and J.A. Olafsen. 1998. Sialic acid-binding lectin with antibacterial activity from horse mussel: further characterization and immunolocalization. **Dev. Comp. Immunol.** 22(2): 139-150.
- Vandenbergh, J., L. Verdonck, R. Robles-Arozarena, G. Rivera, A. Bolland, M. Balladares, B. Gomez-Gil, J. Calderon, P. Sorgeloos and J. Swings. 1999. Vibrios associated with *Litopenaeus vannamei* larvae, postlarvae, Broodstock, and hatchery probionts. **Appl. Environ. Microbiol.** 65: 2592-2597.
- van de Braak, C. B. T. 2002. **Haemocytic defence in black tiger shrimp (*Penaeus monodon*)**. Ph.D. thesis. Wageningen University. The Netherlands.

- Vargas-Albores, F., Gollas-Galvan, T. and Hernandez-Lopez, J. 2005. Functional characterization of *Farfantepenaeus californiensis*, *Litopenaeus vannamei* and *L. stylirostris* haemocyte separated using density gradient centrifugation. **Aquacult. Res.** 36: 352-360.
- Vargas-Albores, F. 1995. The defense system of brown shrimp (*Penaeus californiensis*): humoral recognition and cellular responses. **J. Mar. Biotechnol.** 3: 153-156.
- Vargas-Albores, F., A. Guzmán and J-L. Ochoa. 1992. Size-dependent haemagglutinating activity in the haemolymph from sub-adult blue shrimp (*Penaeus stylirostris* Stimpson). **Comp. Biochem. Physiol.** 103A: 487-491.
- Vargas-Albores, F., A. Guzman and J-L. Ochoa. 1993. A lipopolysaccharide-binding agglutinin isolated from brown shrimp (*Penaeus californiensis* Holmes) haemolymph. **Comp. Biochem. Physiol.** 104A: 407-413.
- Vasta, G. R. and H. Ahmed. 1995. Lectins from aquatic invertebrates: Strategies and methods for their detection, isolation and biochemical characterization. pp. 241-258. In Stolen, J. S., T. C. Fletcher, S. A. Smith, J. T. Zelikoff, S. L. Kaattari, R. S. Anderson, K. Söderhäll and B. A. Weeks-Perkins (eds.). **Techniques in Fish Immunology: Fish Immunology Technical Communications 4**. SOS Publications. USA.
- Vasta, G. R., H. Ahmed and M. S. Quesenberry. 1996. Invertebrate C-type lectins and pentraxins as non-self recognition molecules. pp. 189-227. In Söderhäll, K., S. Iwanaga and G. R. Vasta (eds.) **New Directions in Invertebrate Immunology**. SOS Publications. USA.
- Vasta, G. R. and E. Cohen. 1984. Carbohydrate specificities of *Birgus latro* (coconut crab) serum lectins. **Dev. Comp. Immunol.** 8: 197-202.

- Vázquez, L., L. Jaramillo, P. Rosas, R. Lascurain, E. L. Cooper and E. Zenteno. 1996. Bacterial agglutination by the sialic acid specific lectin from the freshwater prawn *Macrobrachium rosenbergii*. **Comp. Biochem. Physiol.** 113B: 355-359.
- Vázquez, L., P. Massó, P. Rosas, L.P. Montaña and E. Zenteno. 1993. Purification and characterization of a lectin from *Macrobrachium rosenbergii* (crustacea, decapoda) hemolymph. **Comp. Biochem. Physiol.** 105B: 617-623.
- Viboonkit, K. 2002. **Species Diversity of Penaeid Shrimps Genus *Penaeus* Found in Upper Gulf of Thailand.** M.S. thesis, Kasetsart University.
- Watanachote, J., Tunkijjanukij, S. and Dechsakulwatana, C. 2006. Biochemical properties of lectin from hemolymph of banana prawn (*Penaeus merguensis*). *In the Proceedings of 44th Kasetsart University Annual Conference. Subject: Fisheries.* January 30-February 2, 2006. Kasetsart University. Bangkok, Thailand. (in Thai) :125-134.
- Wilson, R., C. Chen and N. A. Ratcliffe. 1999. Innate immunity in insects: The role of multiple, endogenous serum lectins in the recognition of foreign invaders in the cockroach, *Blaberus discoidalis*. **J. Immunol.** 162: 1590-1596.
- Xue, Q-G., K. L. Schey, A. K. Volety, F-L. E. Chu and J. F. La Peyre. 2004. Purification and characterization of lysozyme from plasma of the eastern oyster (*Crassostrea virginica*). **Comp. Biochem. Physiol.** 139B: 11-25.
- Zaslloff, M. 2002. Antimicrobial peptides of multicellular organisms. **Nature.** 415: 389-395.

- Zenteno, R., L. Vazquez, C. Sierra, A. Pereyra, M. C. Slomianny, S. Bouquelet and E. Zenteno. 2000. Chemical characterization of the lectin from the freshwater prawn *Macrobrachium rosenbergii* (De Man) by MALDI-TOP. **Comp. Biochem. Physiol.** 127B: 243-250.
- Zhang, X., H. Canhua and Q. Qin. 2004. Antiviral properties of hemocyanin isolated from shrimp *Penaeus monodon*. **Antiviral Research**. 16: 93-99.
- FAO Fishery Statistic. FAO. 2006. **Fisheries department review of the state of world aquaculture: Fishery statistic**. Available Source: <http://www.fao.org/figis/servlet>, 2000-2007, August 30, 2007.
- Fisheries and Aquaculture Department. FAO. 2007. **Species fact sheet: A world overview of species of interest to fisheries, *Penaeus merguensis* SIDP**. Available Source: www.fao.org/fi/website/FIRetrieveAction.do?dom, August 30, 2007.
- Fisheries Statistics Division. National Center for Genetic Engineering and Biotechnology. 2007. **Thailand marine shrimp culture statistics**. Available Source: <http://www.biotec.or.th/shrinfo/Others>. August 30, 2007.