auratus except one positive control ($T0^+$) where healthy goldfish was maintained. Five treatment groups *viz.,* T1, T2, T3, T4 and T5 treated with 1, 3, 5, 7 and 9 mg L^{-1} piperine solution through bath, respectively and negative control ($T0^-$) with only 2% DMSO. *In vivo* antiparasitic efficacy of piperine was estimated after 3 days of consecutive bath treatment. A complete elimination of *Argulus* was observed in groups that were treated with 7 and 9 mg L^{-1} piperine. After 7 days of post-treatment, the blood and serum from each group was evaluated for haematological and serum biochemical parameters. A significant ($p<0.05$) elevated total leucocyte count (TLC), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), glucose, total protein (TP), serum glutamate oxaloacetate transaminase (SGOT) and serum glutamate pyruvate transaminase (SGPT) in *Argulus* infested *C. auratus* was found when compared to healthy fish. The results reveal *Argulus* infestation have a noticeable impact on haematological and serum biochemical parameters. The significant ($p<0.05$) reduction in haematological and serum biochemical parameters were recorded in all the treatment groups in comparison with negative control group. The T4 and T5 groups showed significantly ($p<0.05$) high superoxide dismutase (SOD), catalase, total erythrocyte count (TEC) and haemoglobin (Hb). However, higher blood glucose and lactate dehydrogenase (LDH) levels in 9 mg L^{-1} piperine treated group revealed that higher concentration of piperine have prominent effects on tissues metabolism and physiology of the host. In conclusion 7 mg.L^{-1} piperine solution through bath treatment can be used to control *Argulus* spp.

AH PO 15

Studies on haemolytic response of crustacean haemolymph against pathogenic bacteria on blood agar

B.H. HARIPRIYA, N. RANJIT KUMAR, S. EZHIL NILAVAN, V.N. SREEJITH, K. AHAMED BASHA, M.M. PRASAD*

[1]ICAR-Central Institute of Fisheries Technology, Kochi, Kerala, India; **prasadmm@hotmail.com*

Nonspecific immune responses play very important role in crustacean immune system defending from external pathogens. Haemocytes particularly involve in vital physiological functions such as repair of wounds, transportation of food materials, coagulation of haemolymph, phagocytosis, nodule formation, encapsulation of bacteria and activation of prophenol oxidase system. It is essential to determine the role of haemocytes when pathogenic bacteria get encountered to an animal. Haemolysis of blood cells can serve as an evidence for the better understanding of crustacean immune responses. In this study, haemolymph collected aseptically form *Litopenaeus vannamei* and *Scylla serrata* was used for preparing blood agar plates to study haemolytic activity against aquatic and human pathogens. Haemolymph (5%) was supplemented to the basal medium for preparing blood agar plates with the addition of rose bengal dye (0.06%). The following type cultures are used for the study viz., *Edwardsiella tarda* (ATCC 15947), *Aeromonas hydrophila* (ATCC 35654), *Enterobacter cloacae* (ATCC 13047), *Pseudomonas aeruginosa* (ATCC 10145), *Escherichia coli* (ATCC 35218), *Staphylococcus aureus* (ATCC 43300), *Vibrio cholerae* (MTCC 3906) and *Salmonella paratyphii* (ATCC 15305). The overnight grown cultures was harvested, the optical density (600 nm) adjusted to 0.5

(corresponds to 10^6 cfu mL^{-1}) and was added to the freshly prepared plates in duplicate. The plates were incubated at 28^0C for 48 h, Results obtained from haemolytic activity of crustacean haemolyph were compared with healthy human blood. A clear zone of haemolysis was observed for all the aquatic bacterial pathogens on both shrimp and crab blood agar plates, where no hemolysis was observed for human pathogens. In case of human blood agar, all the isolates produced clear zone of haemolysis. This result shows that specificity of host-pathogen relation towards the crustacean haemocytes and is most accurate method of haemolysis determination. In conclusion, haemolytic assay employing crustacean haemolymph can be used to evaluate the mechanism of host specificity for invasion by the aquatic pathogens.

AH PO 16

Studies on *Photobacterium damselae* subsp. *damselae* infecting marine finfish

S. EZHIL NILAVAN[1], G. ROSELIND[2], M.M. PRASAD[1]*

[1]ICAR-Central Institute of Fisheries Technology, Kochi, Kerala, India; [2]Fisheries College and Research Institute, Thoothukudi, India; **prasadmm@hotmail.com*

Marine fish farming is a very important activity of Indian aquaculture industry. The main marine fish species intensively cultured are cobia (*Rachycentron canadum*), asian seabass (*Lates calcarifer*) and pompano (*Trachinotus auratus*) and several new marine fish species are being evaluated as potential candidates for aquaculture production. The intensive culture of these new fish species has favoured the appearance of several outbreaks with varied mortality rates. In recent years, *Photobacterium damselae* subsp. *damselae* has been repeatedly isolated from epizootic outbreaks affecting several cultured fish species in different geographical regions. In addition, this bacterial pathogen has been reported to cause diseases in humans, and for this reason, it may be considered as an agent of zoonoses. The present study was aimed to characterize and identify *Photobacterium damselae* subsp. *damselae* present in diseased cobia collected from Gulf of Mannar region of India. *Photobacterium damselae* subsp. *damselae* was isolated from gills, kidney, liver and spleen by using the thiosulfate citrate bile salts sucrose agar supplemented with 1.5% NaCl medium. A total of 11 *Photobacterium damselae* subsp. *damselae* isolates were studied together with one reference strain. The biotyping and multiplex PCR analysis of ure C and 16S rRNA, 16S rDNA, Damselysin (dly) genes confirmed the phenotypic characterization of the isolates as *Photobacterium damselae* subsp. *damselae*. Experimental infection studies revealed *Photobacterium damselae* subsp. *damselae* was found in the internal organs of cobia and it showed pathogenicity to fish. The study reports the first time isolation of this bacterium from cultured cobia in Gulf of Mannar region, which warns us to pay more attention to fishery in this geographical area.

AH PO 17

Characterization of *Vibrio mimicus* isolated from fish and aquatic environment

S. EZHIL NILAVAN, M.M. PRASAD*, V. MURUGADAS, N. RANJIT KUMAR, S.S. GREESHMA, ABHAY KUMAR

[1]ICAR-Central Institute of Fisheries Technology, Kochi, India; **prasadmm@hotmail.com*

Vibrio mimicus, a species closely related to *Vibrio cholerae*, is a type of