

selected and the commercially important fish samples were collected for heavy metal content analysis. Two fish species from each category viz. pelagic (*Sardinella longiceps* and *Selaroides leptolepis*), demersal (*Epinephelus quoyanus* and *Lethrinus lentjen*) and bottom (*Penaeus semisulcatus* and *Portunus sanguinolentus*) were used for the present study. Among three landing centres, the highest mercury level (0.44 ppm) was reported in *Portunus sanguinolentus* followed by *Epinephelus quoyanus* (0.25 ppm), *Penaeus semisulcatus* (0.22 ppm) and *Lethrinus lentjen* (0.21 ppm). In pelagic type of fishes, mercury content was absent in all the three landing centres. The cadmium and lead contents were also analysed using Atomic Absorption Spectrometer and the cadmium content was found in all the varieties of fishes. The maximum value of cadmium (0.15 ppm) was estimated in *Portunus sanguinolentus* followed by *Penaeus semisulcatus* and *Lethrinus lentjen* (0.14 ppm), *Epinephelus quoyanus* (0.13 ppm), *Sardinella longiceps* (0.12 ppm) and *Selaroides leptolepis* (0.11 ppm). According to present findings, lead was completely absent in all the varieties of fishes from three landing centers.

SF PO 11

Characterization of *Vibrio parahaemolyticus* strains isolated from marine fish and shell fish

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A total of forty two samples comprising of marine fish (n=21) and shellfish samples comprising of farmed *Litopenaeus vannamei* (n=8), farmed *Litopenaeus vannamei*-cooked (n=7), farmed *Penaeus monodon* (n=2), and marine shrimp (*Metapenaeus* sp. (n=4)] procured from Visakhapatnam, Andhra Pradesh were analysed for the presence of *V. parahaemolyticus*. Nine samples of marine fish (*Rastrelliger kanagurta*, *Sardinella* sp., *Pampus argenteus*, *Parastromateus niger*, *Upeneus* sp., *Leiognathus* sp. *Scomberomorus guttatus*, *Mugil cephalus*, *Euthynnus affinis*) and one sample of marine shrimp (*Metapenaeus* sp.) were positive for the presence of *V. parahaemolyticus* but all the farmed shrimp samples were negative. The *V. parahaemolyticus* isolates were confirmed using *V. parahaemolyticus* specific PCR targeting *tl* and *flaE* genes. All the *V. parahaemolyticus* isolates were negative for thermostable direct haemolysin (*tsh*) gene and none of them belonged to the highly virulent O3:K6 serogroup. The genetic heterogeneity of *V. parahaemolyticus* (n=8) isolates from marine fish was tested by employing ERIC- PCR. *V. parahaemolyticus* isolates were clustered in to four distinct groups at 55% similarity level. Group one comprised of the MTCC and ATCC type cultures and a field isolate (VP5) of *V. parahaemolyticus*. However, majority of the *V. parahaemolyticus* isolates (VP1, VP2, VP3, VP6 & VP7) from marine fish were clustered in Group 2 at 80% similarity level. The *V. parahaemolyticus* isolates VP4 and VP8 showed lesser similarity of 68% and 55% respectively and were delineated separately. Thyme oil at 0.25% completely inhibited caseinase activity of *V. parahaemolyticus* whereas gelatinase activity was inhibited at 0.5% level. Amylase and DNase activities of the *V. parahaemolyticus* isolates decreased with increasing

concentration of thyme oil but enzymatic activity was still observed at 1% thyme oil level.

SF PO 12

Changes in the physical appearance of farmed *Litopenaeus vannamei* during iced storage: Correlation with biochemical and microbiological parameters

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Litopenaeus vannamei is the most widely farmed shrimp species in India that is processed for export. Post harvest, *L. vannamei* shrimp are transported from shrimp farms to processing plants in iced condition; both intrastate and interstate. Judging the quality based on visual inspection offers a simple solution for quality assessment. Farmed *L. vannamei* shrimp were harvested live, immediately iced and stored under iced condition. The physical appearance (gills, hepatopancreas), microbiological (APC, H₂S producing bacteria, pseudomonas count) and biochemical (TVBN, TMA, TBARS) changes during iced storage were observed for 20 days. Fresh shrimp had translucent white gills, light orange coloured hepatopancreas, APC of 55,400 cfu/g and TVBN of 16.8mg%. The first noticeable change during iced storage was in the appearance of hepatopancreas of the shrimp; which changed to bright orange colour by the end of 2nd day of iced storage but the microbiological (APC 1,27,000 cfu/g) and

biochemical parameters (TVBN 26.6mg%) were acceptable. However, by the end of 6 days of iced storage the gills of the shrimp started blackening at the posterior end and the hepatopancreas turned to dark orange colour with black margins with relatively higher APC (7,40,000 cfu/g) and TVBN (36.6 mg%) values. The appearance of shrimp further deteriorated during iced storage and by the end of 19th day, the gills turned completely black, hepatopancreas appeared dark brown. The results indicate that *L. vannamei* shrimp with dark orange hepatopancreas with black margins and blackening at the posterior end of the gills is the limit of freshness and hence unacceptable for processing.

SF PO 13

Commercial essential oils as antimicrobial agents against histamine forming bacteria isolated from *Thunnus albacores*

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Isolation and identification of the histamine decarboxylating bacteria was done by using Modified Niven's Media. Histamine decarboxylating bacteria isolated from the gut region was in the range of $73 \pm 8.17 \times 10^6$ cfu. Gill ($47 \pm 13.4 \times 10^6$ cfu) and dorsal tissue had a significantly lower amount of histamine formers ($17 \pm 7.98 \times 10^6$ cfu). The critical biochemical characteristics of the isolated bacterial strains were studied and identified to be *Lactobacillus*, *Bacillus*, *Micrococcus* and *Klebsiella*. Antimicrobial susceptibility test of the isolated histamine forming bacteria against clove and cardamom essential oils were done using agar well diffusion method. The test indicated greater