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Changes in postmortem quality and shelf life determination of frigate mackerel (*Auxis thazard*) and ray (*Dasyatis margarita*) during ice storage

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Postmortem changes of two commercially important marine fish species, Frigate mackerel (*Auxis thazard*) and Ray (*Dasyatis margarita*) were evaluated during 21 days of storage at 0 °C (ice) by monitoring changes in physical, biochemical, sensory and microbiological parameters. The protein content of Frigate mackerel and Ray was 18.8% and 19.0% (% dry weight), respectively and the crude fat content was high ($P < 0.05$) for Frigate mackerel (6%) but low for Ray (1%). The moisture content was higher in Ray (78 %) than in Frigate mackerel (77.7%). The bacteriological counts, total volatile basic nitrogen (TVB-N), pH, Water holding capacity (WHC), trimethylamine (TMA) and thiobarbituric acid reaction substances (TBARS) values increased ($P < 0.05$) while sensory results decreased ($P < 0.05$) with the days of storage in ice.

Physical quality parameters such as pH and the WHC changed ($P < 0.05$) in two fish species during ice storage. pH fluctuated from 6.27 ± 0.04 to 6.24 ± 0.02 and 6.8 ± 0.02 to 6.83 ± 0.03 in Frigate mackerel and Ray, respectively. In Frigate mackerel TVB-N value was less than the critical limits with initial value of 9.47 mg TVB-N/100 g muscle and 28.37 mg TVB-N/100 g muscle, at the time of rejection at day 12. The TVB-N (45 mg/100g) and TMA-N (3 mg/100g) level exceeded the rejection level on day 16. When spoilage starts, TBARS value in ray was 3.64 malonaldehyde /100g at day 16 whereas it was 4.78 mg malonaldehyde/100g at day 12 which is close to rejection limit of 5 mg malonaldehyde/100g.

According to the sensory data, overall acceptability of raw and cooked fish samples were acceptable for 12 days for Frigate mackerel and for 16 days for Ray samples. The results of bacteriological counts within the reported acceptable limits of 10^9 log CFU/g until day 11 in Frigate mackerel whereas until day 16 in ray. The overall results of this study indicated that the edible quality of Frigate mackerel and ray could be maintained for 12 days and 16 days, respectively on ice storage.