

Title Shelf-life of chilled fresh Mediterranean swordfish (*Xiphias gladius*) stored under various packaging conditions: Microbiological, biochemical and sensory attributes

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Abstract

The present work evaluated the effect of air, vacuum and modified atmosphere packaging (MAP) on the shelf-life of chilled Mediterranean swordfish (*Xiphias gladius*). Fresh swordfish slices were stored in air, under vacuum and MAP (40%/30%/30%, CO₂/N₂/O₂) under refrigeration (4 °C) for a period of 16 days. Of the three treatments used (vacuum, MAP and air), both MAP and vacuum packaging (VP) were the most effective for inhibiting growth of aerobic microflora in swordfish samples until days 9–10 of refrigerated storage. Of the microbial species determined, both *Pseudomonas* spp. and H₂S-producing bacteria (including *Shewanella putrefaciens*) were dominant in swordfish samples stored in air, whereas growth of these species was partly inhibited under VP and MAP conditions. Lactic acid bacteria (LAB) and *Enterobacteriaceae* were also found to be members of the final swordfish microbial flora, irrespective of packaging conditions throughout the entire storage period. Of the chemical freshness indices determined, thiobarbituric acid (TBA) values were variable in swordfish samples, indicative of no specific oxidative rancidity trend. Trimethylamine nitrogen (TMA-N) values of swordfish samples stored in air, under VP and MAP exceeded the limit value of 5 mg N/100 g fish muscle after days 7, 8–9 and 11 days of storage, respectively. In a similar trend, total volatile basic nitrogen (TVB-N) for swordfish samples stored in air, under VP and MAP exceeded the limit value of 25 mg N/100 g fish muscle after 7–8, 10 and 12 days of storage, respectively. Sensory analyses (odor and taste attributes) indicated a shelf-life of ca. 7 days for air, 9 days for VP and 11–12 days for the MA-packaged swordfish samples.