



Abstract

# Your Past Condemns You: Trace Elements of a Marine Catfish in Two Periods in an Altered Tropical Bay <sup>†</sup>

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**Abstract:** Changes in coastal environments are usually caused by anthropogenic activities such as habitat degradation and nonpoint source pollution. Such changes reduce the life quality of the living organisms in altered environments, decreasing biotic descriptors and jeopardizing biodiversity. The aim of this study was to compare eventual changes in minor and trace elements in otoliths of the catfish *Genidens genidens* in two periods (1980s and 2017–2018) in an altered tropical bay (Sepetiba Bay, RJ, Brazil). The concentrations of 34 elements were determined by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) in fish otoliths. Although some elements have shown higher concentrations in more contemporary periods (2017–2018) such as <sup>7</sup>Li, <sup>11</sup>Br, <sup>85</sup>Rb, and <sup>205</sup>Tl, and some did not differ between the two periods (<sup>208</sup>Pb, <sup>34</sup>S, <sup>44</sup>Ca, <sup>55</sup>Mn, <sup>82</sup>Se, and <sup>137</sup>Ba), but most of the examined elements (such as <sup>24</sup>Mg, <sup>59</sup>Co, <sup>60</sup>Ni, <sup>65</sup>Cu, <sup>105</sup>Pd, <sup>107</sup>Ag, <sup>66</sup>Zn, <sup>75</sup>As, <sup>69</sup>Ga, <sup>98</sup>Mo, <sup>53</sup>Cr, <sup>27</sup>Al, <sup>114</sup>Cd, and <sup>11</sup>B) had higher concentrations in the 1980s compared to 2017–2018 (test w,  $p < 0.05$ ). Although this result was the opposite of what was expected, this could be associated with the intensity of activities without any environmental control in the past and with the first dredging to deepen the access channel to the port created in 1982, allowing the operation of large ships, which promoted the resuspension of trace elements trapped in the sediment and the pollution carried into the bay. The stability of the incorporation of elements in otoliths, compared to other tissues, allows such records, which are consistent over time, to be used in order to better understand past and present variations in the quality of the environment. Such information can be useful in conservation programs as it provides a historical view of variations in the quality of the environment.

**Keywords:** otolith chemistry; coastal bay; pollution; environmental impact



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