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Biochemical blood parameters: are they effective biomarkers of monitoring fish condition?

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The use of biomarkers has become attractive and useful for monitoring environmental quality and health of fish inhabiting polluted ecosystems. Among them, plasmatic biochemical parameters could be a promissory indicator of fish health condition. The question that comes up is if plasmatic biochemical levels could be a tool in a long-term evaluation of the fish stress responses.

The habitat under research is Esmoriz-Paramos, a small polluted coastal lagoon (Northwest coast, Portugal), where mullets, *Liza saliens*, are exposed to heavy metals in water and sediments resulting in high accumulation of Cu and Zn in their tissues. The effect of metals chronic exposure in plasmatic parameters is scarcely studied and this study in a lagoon, where fish are exposed to metals for its life span, enabled a realistic long-term evaluation of the stress responses.

Plasmatic biochemical parameters of the lagoon mullets were compared with those of a control group, within the same size class. The results showed that the high glucose levels observed in lagoon mullets can be an indication of hyperglycemia induced by metals. The majority of lagoon mullets have sodium and chloride levels decreased, suggesting a sort of ionic homeostatic chronic disturbance. The high globulin and protein levels found could be the result of chronic inflammatory conditions, by both infectious and non-infectious causes. Albumin is also increased in lagoon mullets compared to controls, probably related to its function in blood pressure maintenance and/or its function as biomolecules transporter. The increased plasmatic AST activity in lagoon mullets, together with above results, suggests a change in protein metabolism, rather than a consequence of cell permeability and integrity alterations.

Caution must be taken since the establishment of accurate reference intervals requires a large size sample. Specially large size samples are needed if reference intervals are to be established based on age classes, gender or other criteria. This study shows that, the long-time of exposure of lagoon mullets to stress conditions, induced plasma biochemical changes that can be used as a tool to monitor fish condition.

Keywords: blood parameters, biomarkers, chronic toxicity.

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