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## **Multifactorial Screening Reveals New Insight into Early Cadmium Exposure and Garlic Interactions in *Dicentrarchus labrax***

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Environmental pollutants and especially metal trace elements remain an unmitigated threat to the overall life support system. Their chemical stability and accumulation pattern in the ecosystem make them a persistent hazard. This study aims to characterize the early cadmium (Cd) histological and hematological alterations and their corresponding plasma indicators in the Mediterranean Sea bass (*Dicentrarchus labrax*). We also assessed garlic potential to prevent cadmium toxicity. For this purpose, 200 fish of 55 g mean weight were separated into 3 cylindrical fiberglass tanks of 500-L capacity, each with a stocking density of 4 kg m<sup>-3</sup>. The fish were regularly hand-fed 0% (control group), 2%, and 6% garlic-supplemented diets to apparent satiation twice a day for 1 month. At the end of the experiment, we injected 22.2 mM cadmium (CdCl<sub>2</sub>) intraperitoneally to the experimental groups and a placebo solution (9% NaCl) to the control groups; liver, kidney, heart, and blood tissue alterations were monitored with a full screening of their plasmatic indicators, 24 h before and 48 h after Cd injection. Subsequently, whole blood count and blood smears were performed to follow up on Cd-induced vascular damages. Our data showed that Cd induced thrombotic thrombocytopenic purpura, leading to widespread bleeding and cellular alterations in the targeted tissues. These alterations were associated with an obvious normochromic normocytic anemia in favor of microangiopathic hemolytic anemia. Cd injection has also seriously inhibited the overall enzymatic activities triggering a metabolic shift. Although garlic supplementation had little effect on cadmium-induced alterations, it significantly reduced biomass dispersion. Our data is the first evidence of the cadmium versatile toxicity involving vascular alterations as a central and a leading cause of the overall parenchymal lesions. Cd toxicity was associated with a specific enzymatic signature, which must be considered during the interpretation.

### **Recent Publications**

1. Mosbah A, Dhaouadi R, Ben Abdeljelil N, Guerbej H, Banni B (2021) Multifactorial Screening Reveals New Insight into Early Cadmium Exposure and Garlic Interactions in *Dicentrarchus labrax*; ; Biological Trace Element Research
2. Mosbah A, Guerbej H, Boussetta H, Bouraoui Z , Banni M (2017). Protective Effects of Dietary Garlic Powder Against Cadmium-induced Toxicity in Sea Bass Liver: a Chemical, Biochemical, and Transcriptomic Approach; Biological Trace Element Research, September 2017
3. Mosbah A, Guerbej H, Boussetta H, Banni M (2017). Effects of dietary garlic against cadmium induced immunotoxicity in sea bass head, kidney and liver issues: A transcriptomic approach; J Environ Chim Toxicol Vol 1 September 2017

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