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Morphofunctional alterations induced by chlorpyrifos on the gills apparatus of Thalassomapavo

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Abstract

Coastal areas represent the most vulnerable marine environment due to human exploitation and the contamination caused by pollutants. Organophosphate pesticides (OPs) have gained popularity worldwide as a viable alternative to organochlorine pesticides, and currently represent almost 40% of the global market (Triassi et al. 2019). One of the most employed OPs is chlorpyrifos (CPF), a broad-spectrum insecticide commonly used for domestic and agricultural pests (Bellas and Gil 2020). Based on its chemical properties and its toxicity to non-target organisms, CPF is of great concern to aquatic ecosystems where its presence has been extensively documented (Bellas and Gil 2020; Zahran et al., 2018).

In the present study, we used as a model the ornate wrasse, *Thalassomapavo*, a widespread species in the Mediterranean Sea that inhabit coastal waters near rocks. We investigated the morphological, ultrastructural, and functional alterations induced on the gill apparatus after 48 and 96 hours of exposure to two relevant CPF concentrations (4 and 8 µg/L). The main histopathological changes observed were hypertrophy of secondary filaments, ballooning of lamellar apical tips, hypertrophy of chloride cells, epithelial and vascular degenerations. CPF also induced an increase in the expression of Na^+/K^+ -ATPase in all experimental groups.

Our study successfully demonstrates that the alterations induced by CPF on *T. Pavo* gills are dose and time-dependent and may adversely affect gas exchange and ionic balance. This is the first evidence of the effects exerted by CPF on *T. pavo* gills and highlights the harmful properties of this insecticide even at low concentrations.

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Biography:

Rachele Macirella has completed her PhD in Life Sciences in 2017 at the age of 29 from the University of Calabria and starts postdoctoral studies at the same University. She has published 9 papers in international peer review journals with impact factor.

Speaker Publication:

1. Exposure and post-exposure effects of chlorpyrifos on Carassius auratus gills: An ultrastructural and morphofunctional investigation

2. Lead toxicity in seawater teleosts: A morphofunctional and ultrastructural study on the gills of the Ornate wrasse (Thalassoma pavo L.)

3. Bergamot Polyphenols Boost Therapeutic Effects of the Diet on Non-Alcoholic Steatohepatitis (NASH) Induced by "Junk Food": Evidence for Anti-Inflammatory Activity

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