

# **Pyrogallol Pollution in Aquatic Ecosystems: Chemistry, Sources, and Impacts on Organismal Health**

Mohamed Hamed<sup>a\*</sup>, Jiezhong Mo<sup>b</sup>, Rashad E.M. Said<sup>a</sup>, Najat El-Kurdi<sup>c</sup>, Christopher J. Martyniuk<sup>d</sup>, Mohamed Abd El-Aal<sup>e</sup>, A K M Munzurul Hasan<sup>f</sup>, Elhagag A. Hassan<sup>g</sup>, Hamdy A. M. Soliman<sup>h</sup>, Alaa El-Din H. Sayed<sup>i\*</sup>, Ahmed Abdelmoneim<sup>j</sup>, Alaa G. M. Osman<sup>a</sup>

<sup>a</sup> Department of Zoology, Faculty of Science, Al-Azhar University (Assiut Branch), 71524 Assiut, Egypt.

<sup>b</sup> Department of Biology, College of Science, Shantou University, Shantou, 515063, China.

<sup>c</sup> Faculty of Bioscience Engineering, Ghent University, 9000 Ghent, Belgium.

<sup>d</sup> Centre for Environmental and Human Toxicology, Department of Physiological Sciences, College of Veterinary Medicine, University of Florida, Gainesville, FL 32611, USA.

<sup>e</sup> Chemistry Department, Faculty of Science, Assiut University, 71516 Assiut, Egypt

<sup>f</sup> Department of Biology, University of Saskatchewan, Saskatoon, SK S7N 5E2, Canada

<sup>g</sup> Department of Botany and Microbiology, Faculty of Science, Assiut University, Assiut, 71516, Egypt

<sup>h</sup> Department of Zoology, Faculty of Science, Sohag University, Sohag 8562, Egypt.

<sup>i</sup> Department of Zoology, Faculty of Science, Assiut University, Assiut 71516, Egypt.

<sup>j</sup> Department of Comparative Biomedical Sciences, School of Veterinary Medicine, Louisiana State University, Skip Bertman Drive, Baton Rouge, LA 70803, USA.

\*Corresponding author:

Mohamed Hamed ([mohamedhamedsayed239@gmail.com](mailto:mohamedhamedsayed239@gmail.com))

Alaa El-Din H. Sayed ([alaasayed@aun.edu.eg](mailto:alaasayed@aun.edu.eg))

Global Publication Trends on Pyrogallol Research by Study Type (2000–2025)

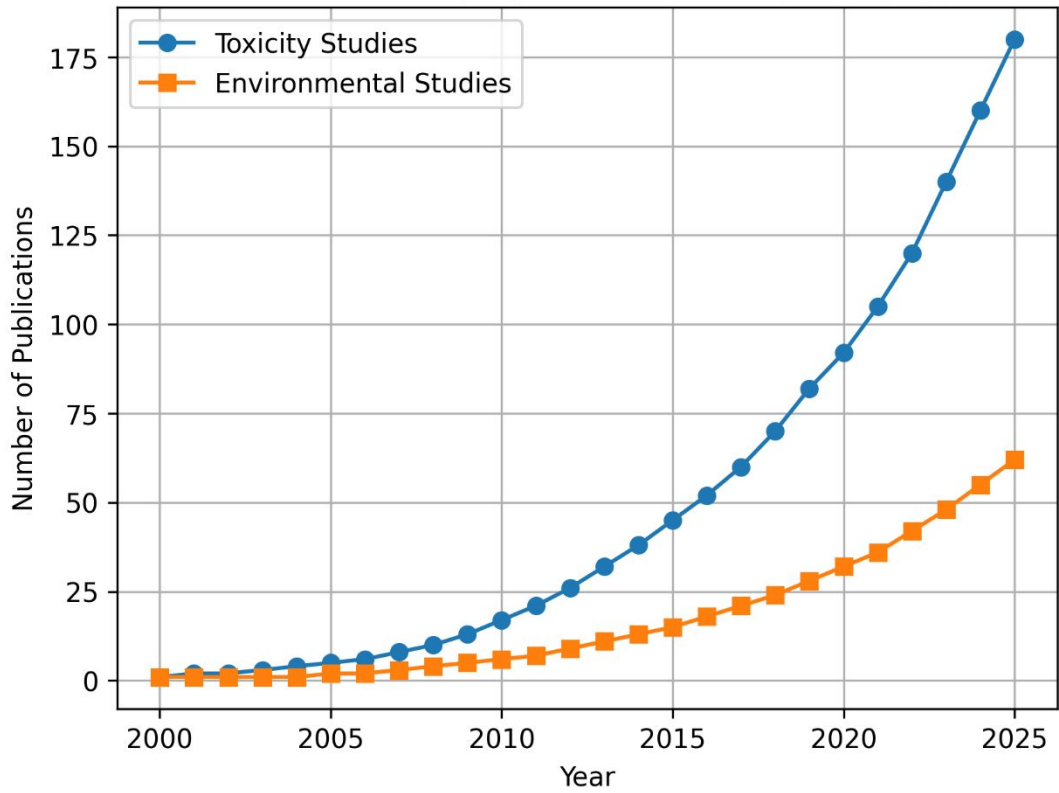


Fig. S1. Global Publication Trends on Pyrogallol Research: Toxicity vs Environmental Studies (2000–2025)

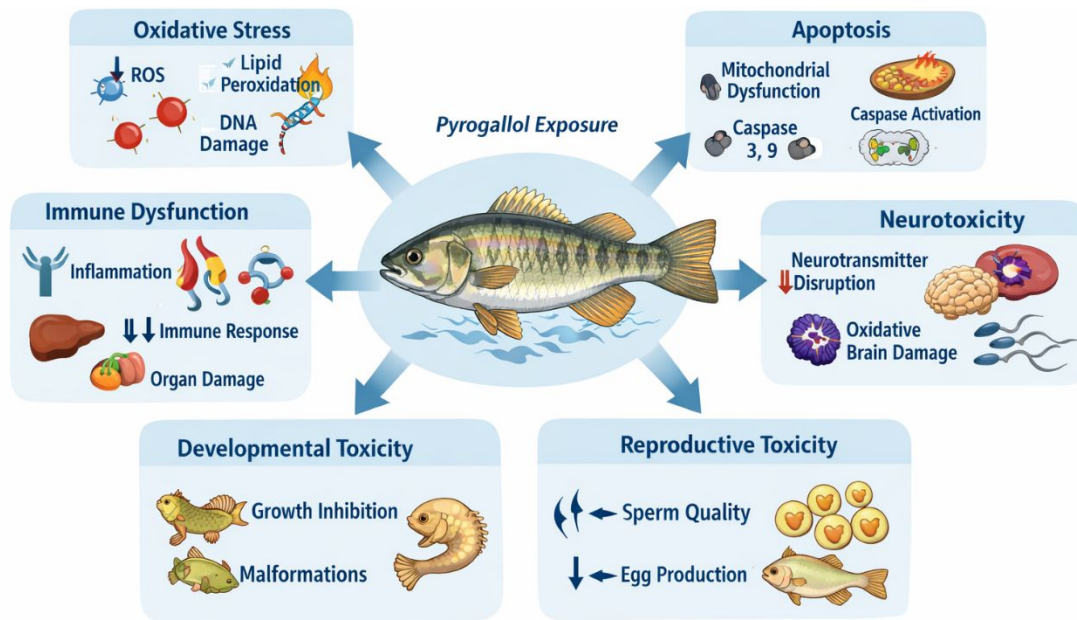


Fig. S2. Mechanistic Pathways of Pyrogallol-Induced Toxicity in Fish