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# Oxidative Stress Markers in Parasitized and Non-Parasitized *Amietophrynus regularis* (Reuss, 1833) Exposed to Multi-Stress Conditions in Lagos Metropolis, Nigeria

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## Abstract

Background: Amphibians are subjected to a variety of natural and artificial stresses that can compromise physiological balance. This study explored the variations in oxidative stress markers in *Cosmocercan* parasitized and non-parasitized *Amietophrynus regularis* in diverse conditions. The toad specimens were collected from natural habitats and dumpsites of three (3) major areas of Lagos. 15 g wet weight of the liver, intestine, and parasites were separately prepared and analyzed for oxidative stress parameters including; SOD, CAT, GSH, and MDA activities according to well-established protocols. Result: Based on stations, there were significant differences in the SOD levels in the liver and intestine of infected and uninfected toads obtained at the dumpsite and the natural habitat at  $p < 0.001$ . Also, the concentration of SOD in the parasites ( $238.86 \pm 7.72$  min/mg prot.) recovered from the toads at the dumpsite was very much significantly higher than the concentration in those recovered from the toads in the natural habitat ( $p < 0.001$ ). The study has shown that the level of SOD

released by the antioxidant defense system in response to the oxidative stress in the organism makes it a reliable tool for ecotoxicological assessment. All the oxidative stress markers except for MDA showed significant differences at  $p < 0.05$  between the host tissues and the parasites irrespective of sampling locations indicating both organisms were stressed either due to the host-parasite relationship or from other environmental contaminants. Conclusions: The toad's antioxidant defense system was typically sensitive and adaptable to environmental conditions, suggesting that it could be used in future research on effective ecotoxicological evaluation tools.

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A.B and O.M.O conceived and designed the experiments. O.M.O performed the experiments on the toads. O.M.O and I.P.O analyzed and interpreted the data. O.B.A and A.K contributed reagents, materials, analysis tools, and ideas. O.M.O wrote the Manuscript. All authors read and approved the final manuscripts.

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## Ethics declarations

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### COMPLIANCE WITH ETHICAL STANDARDS

*Conflict of interest.* The authors declare that they have no conflicts of interest. *Statement on the welfare of animals.* Ethical approval for this research was given by the Health Research Ethics committee of the College of Medicine of the University of Lagos. CMULHREC no. CMUL/ACUREC/03/20/729.

### ADDITIONAL INFORMATION

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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