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Acute toxicity test of zinc chloride ($ZnCl_2$) in grey mullet (*Mugil cephalus*)

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The main aim of the present study was to examine the sensibility of marine fish *Mugil cephalus* to zinc chloride ($ZnCl_2$) in the toxicity test programs. All fishes were exposed to $ZnCl_2$ at various chosen concentrations 0.25, 1, 5, 10, 15, 20, 30 and 40 ppm (range finding test); then fish were exposed to 6 concentrations of $ZnCl_2$ (control, 16, 17, 18, 19 ppm). Number of mortality was registered after 24, 48, 72 and 96 h. LC_{50} values were determined with probite analysis. The 96 hour LC_{50} value of $ZnCl_2$ to the fish was found to be 17.21 ppm.

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Incertitude, causation and group judgment in science science-policy: Can toxicology benefit?

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Individual and group judgments about heterogeneous causal evidence are essential to modeling environmental health outcomes via causal models. In particular, scientific agreements about causation made on behalf of the public must meet legal challenges, be scientifically objective, and formal. This enhances their legitimacy when modeling is essential to obtaining predictions of disease burdens from environmental exposures. Because dose-response models link events that are time and site of action dependent (e.g., gene, protein, cell, organ) through known physical, chemical and biological mechanisms, but are also coupled with theoretical conjectures and weak causal associations, this evidence can generate alternative expert opinions. Although only one causal model is eventually used by a public agency to set environmental standards, its choice should normatively account for: 1) the uncertainty of its empirical evidence, 2) different representations of that uncertainty, 3) different cognitive and semantic understandings of cause and effect, and 4) competing causal theories, unless there is a non-conjectural, clear and convincing reason for rejecting one of them. Hence, public policy needs group agreement, possibly consensual, about conflicting scientific judgments unbiasedly to inform stakeholders' choices. Group decision-making may pick a winner or rank alternatives, but must also deal with paradoxes that arise when even a simple majority appears sufficient to justify its choice. These concerns result in three overlapping critical areas, which we unify through a three-pronged framework. The first prong regards the combination of heterogeneous numerical or other information through averages and Monte Carlo simulations (exemplified using inorganic arsenic exposure and certain cancers). We also discuss fuzzy integrals and Dempster-Shafer combination rules, which depends on alternative representations of uncertainty (fuzzy or possibilistic, rather than probabilistic) about the state of the information associated with risk factors. The second is the fusion of uncertain knowledge, exemplified through an example using of B[a]P, through probabilistic and fuzzy causal networks. The third is group decision-making–critical to public choices where consensus is the means to justify the choice of a causal model for regulatory law- as done by panels of learned societies or scientific advisory groups to national and international agencies. We discuss formal criteria and methods that result in agreements that demonstrably avoid paradoxical results: This makes group judgments rigorous and replicable.

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