PubMed Results

Items 1 - 7 of 7 (Display the 7 citations in PubMed)

1. Chemosphere. 2016 Aug;156:37-44. doi: 10.1016/j.chemosphere.2016.04.083. Epub 2016 May 6.

Effects of glyphosate and the glyphosate based herbicides Roundup Original(®) and Roundup Transorb(®) on respiratory morphophysiology of bullfrog tadpoles.

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Abstract

Glyphosate-based herbicides are widely used in agriculture and are commonly found in water bodies. Roundup Original(®) (RO) contains an isopropylamine glyphosate (GLY) salt containing the surfactant POEA, while Roundup Transorb R(®) (RTR) contains a potassium salt of GLY with unknown surfactants. Both contain different compositions of so-called

"inert" ingredients, more toxic than glyphosate. Amphibian tadpoles often experience variations in O2 availability in their aquatic habitats; an ability to tolerate hypoxia can condition their survival and fitness. We evaluated the impacts of sublethal concentrations of GLY (1 mg L(-1)), RO (1 mg L(-1) GLY a.e) and RTR (1 mg L(-1) GLY a.e) on metabolic rate (V·O2 - mLO2 Kg1 h(-1)) of bullfrog tadpoles during normoxia and graded hypoxia, and related this to morphology of their skin, their major site of gas exchange. In control (CT) V·O2 remained unaltered from normoxia until 40 mmHg, indicating a critical O2 tension between 40 and 20 mmHg. GLY significantly reduced V·O2, possibly due to epidermal hypertrophy, which increased O2 diffusion distance to O2 uptake. In contrast, RTR increased V·O2 during hypoxia, indicating an influence of "inert" compounds and surfactants. V·O2 of RO did not differ from CT, suggesting that any increase in V·O2 caused by exposure was antagonized by epidermal hypertrophy. Indeed, all herbicides caused marked alterations in skin morphology, with cell and epithelium wall presenting hyperplasia or hypertrophy and chromatid rupture. In summary, GLY, RO and RTR exert different effects in bullfrog tadpoles, in particular the surfactants and inert compounds appear to influence oxygen uptake.

PMID: 27160633 [PubMed - in process]
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2. Acta Histochem. 2016 Jun 7. pii: S0065-1281(16)30099-X. doi: 10.1016/j.acthis.2016.05.009. [Epub ahead of print]

Effect of glyphosate on reproductive organs in male rat.

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Abstract

Glyphosate as an active ingredient of Roundup® which is thought to be one of the most popular herbicide was used worldwide. Many studies have focused on reproductive toxicity on glyphosate-based herbicide, but few evidence exists to imply the male reproductive toxicity of glyphosate alone in vivo. In this study SD rats were Lavaged with glyphosate at doses of 5, 50, 500mg/kg to detect the toxicity of glyphosate on rat testis. Glyphosate significantly decreased the average daily feed intake at dose of 50mg/kg, and the weight of seminal vesicle gland, coagulating gland as well as the total sperm count at dose of 500mg/kg. Immunohistochemistry of androgen receptor (AR) has no difference among all groups. As to testosterone, estradiol, progesterone and oxidative stress parameters, the level of them has no differences amidst all doses. Taken together, we conclude that glyphosate alone has low toxicity on male rats reproductive system.

PMID: 27286640 [PubMed - as supplied by publisher]
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3. Environ Toxicol Pharmacol. 2016 Mar;42:45-54. doi: 10.1016/j.etap.2016.01.003. Epub 2016 Jan 4.

Glyphosate induces neurotoxicity in zebrafish.

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Abstract

Glyphosate based herbicides (GBH) like Roundup(®) are used extensively

in agriculture as well as in urban and rural settings as a broad spectrum herbicide. Its mechanism of action was thought to be specific only to plants and thus considered safe and non-toxic. However, mounting evidence suggests that GBHs may not be as safe as once thought as initial studies in frogs suggest that GBHs may be teratogenic. Here we utilize the zebrafish vertebrate model system to study early effects of glyphosate exposure using technical grade glyphosate and the Roundup(®) Classic formulation. We find morphological abnormalities including cephalic and eye reductions and a loss of delineated brain ventricles. Concomitant with structural changes in the developing brain, using in situ hybridization analysis, we detect decreases in genes expressed in the eye, fore and midbrain regions of the brain including pax2, pax6, otx2 and ephA4. However, we do not detect changes in hindbrain expression domains of ephA4 nor exclusive hindbrain markers krox-20 and hoxb1a. Additionally, using a Retinoic Acid (RA) mediated reporter transgenic, we detect no alterations in the RA expression domains in the hindbrain and spinal cord, but do detect a loss of expression in the retina. We conclude that glyphosate and the Roundup(®) formulation is developmentally toxic to the forebrain and midbrain but does not affect the hindbrain after 24 h exposure.

PMID: 26773362 [PubMed - in process]
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4. Neurotoxicology. 2016 Jan;52:150-61. doi: 10.1016/j.neuro.2015.12.004. Epub 2015 Dec 10.

Neuronal development and axon growth are altered by glyphosate through a WNT non-canonical signaling pathway.

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Abstract

The growth and morphological differentiation of neurons are critical events in the establishment of proper neuronal connectivity and functioning. The developing nervous system is highly susceptible to damage caused by exposure to environmental contaminants. Glyphosate-containing herbicides are the most used agrochemicals in the world, particularly on genetically modified plants. Previous studies have demonstrated that glyphosate induces neurotoxicity in mammals. Therefore, its action mechanism on the nervous system needs to be determined. In this study, we report about impaired neuronal development caused by glyphosate exposure. Particularly, we observed that the initial axonal differentiation and growth of cultured neurons is affected by glyphosate since most treated cells remained undifferentiated after 1 day in culture. Although they polarized at 2 days in vitro, they elicited shorter and unbranched axons and they also developed less complex dendritic arbors compared to controls. To go further, we attempted to identify the cellular mechanism by which glyphosate affected neuronal morphology. Biochemical approaches revealed that glyphosate led to a decrease in Wnt5a level, a key factor for the initial neurite development and maturation, as well as inducing a down-regulation of CaMKII activity. This data suggests that the morphological defects would likely be a consequence of the decrease in both Wnt5a expression and CaMKII activity induced by glyphosate. Additionally, these changes might be reflected in a subsequent neuronal dysfunction. Therefore, our findings highlight the importance of establishing rigorous control on the use of glyphosate-based herbicides in order to protect mammals' health.

PMID: 26688330 [PubMed - in process]
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5 PLoS One. 2016 Mar 17;11(3):e0151633. doi:
. 10.1371/journal.pone.0151633. eCollection 2016.

Differential Growth Responses of Marine Phytoplankton to Herbicide Glyphosate.

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Abstract

Glyphosate is a globally popular herbicide to kill weeds and its wide applications may lead to accumulation in coastal oceans as a source of phosphorus (P) nutrient or growth inhibitor of phytoplankton. We studied the physiological effects of glyphosate on fourteen species representing five major coastal phytoplankton phyla (haptophyta, bacillariophyta, dinoflagellata, raphidophyta, and chlorophyta). Based on growth responses to different concentrations of glyphosate under contrasting dissolved inorganic phosphorus (DIP) conditions, we found that phytoplankton species could be classified into five groups. Group I (Emiliania huxleyi, Skeletonema costatum, Phaeodactylum tricornutum) could utilize glyphosate as sole P-source to support growth in axenic culture, but in the presence of DIP, they were inhibited by both 36-μM and 360-μM glyphosate. Group II (Karenia mikimotoi, Prorocentrum minimum, Dunaliella tertiolecta, Symbiodinium sp., Heterosigma akashiwo and Alexandrium catenella) could not utilize glyphosate as sole P-source to support growth, and in the presence of DIP growth was not affected by 36-μM but inhibited by 360-μM glyphosate. Glyphosate consistently enhanced growth of Group III (Isochrysis galbana) and inhibited Group IV (Thalassiosira weissflogii, Thalassiosira pseudonana and Chattonella marina) regardless of DIP condition. Group V (Amphidinium carterae) exhibited no measurable response to glyphosate regardless of DIP

condition. This grouping is not congruent with the phylogenetic relationships of the phytoplankton species suggesting functional differentiation driven by environmental pressure. We conclude that glyphosate could be used as P-source by some species while is toxic to some other species and yet has no effects on others. The observed differential effects suggest that the continued use of glyphosate and increasing concentration of this herbicide in the coastal waters will likely exert significant impact on coastal marine phytoplankton community structure.

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6. Ecotoxicol Environ Saf. 2015 Dec;122:193-7. doi: 10.1016/j.ecoenv.2015.07.030. Epub 2015 Aug 3.

Uptake and toxicity of glyphosate in the lichen Xanthoria parietina (L.) Th. Fr.

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Abstract

This study investigated if treatment of the lichen Xanthoria parietina (L.) Th. Fr. with glyphosate caused uptake of this herbicide as well as physiological alterations. Samples were treated with Glifene SL®, a common commercial glyphosate-based herbicide, at the lowest recommended doses (3.6g/L) as well as with doses slightly higher than the highest suggested (36 g/L). The results clearly showed glyphosate uptake in X. parietina proportionally to

the dose provided. Adverse physiological effects were evident on the photosynthetic apparatus (photosynthetic efficiency, chlorophyll a content, chlorophyll degradation) as well as on the fungal respiration rates and cell membrane integrity (ergosterol content, dehydrogenase activity) already after 24h from treatment, also at the low application dose. It is concluded that lichens are suitable organisms for monitoring unwanted biological effects from the application of glyphosate-based herbicides, as well as for detecting the accumulation of this compound in the biota, thus screening for its environmental fate.

PMID: 26247898 [PubMed - indexed for MEDLINE]
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7. Environ Toxicol Chem. 2015 Dec;34(12):2791-5. doi: 10.1002/etc.3118. Epub 2015 Oct 29.

The toxicity of glyphosate alone and glyphosate-surfactant mixtures to western toad (Anaxyrus boreas) tadpoles.

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Abstract

Pesticide choice based on toxicity to nontarget wildlife is reliant on available toxicity data. Despite a number of recent studies examining the effects of glyphosate on amphibians, very few have aimed to understand the toxicological effects of glyphosate in combination with surfactants as it is commonly applied in the field. Land managers interested in making pesticide choices based on minimizing impacts to nontarget wildlife are

hindered by a lack of published toxicity data. Short-term acute toxicity trials were conducted for glyphosate in the form of isopropylamine salt (IPA) alone and mixed with 2 surfactants: Agri-dex and Competitor with western toad (Anaxyrus [Bufo] boreas) tadpoles. Glyphosate IPA mixed with Competitor was 6 times more toxic than glyphosate IPA mixed with Agri-dex, and both mixtures were more toxic than glyphosate IPA alone. The median lethal concentrations reported for 24-h and 48-h exposures were 8279 mg/L (24 h) and 6392 mg/L (48 h) for glyphosate IPA alone; 5092 mg/L (24 h) and 4254 mg/L (48 h) for glyphosate IPA mixed with Agri-dex; and 853 mg/L (24 h) and 711 mg/L (48 h) for glyphosate IPA mixed with Competitor. The present study indicates that the toxicity of a tank mix may be greatly increased by the addition of surfactants and may vary widely depending on the specific surfactant.

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