The Society of Environmental Toxicology and Chemistry (SETAC) is hosting the 26th European annual meeting this week and has asked experts from across academia, government and industry to answer questions on an array of environmental issues. We will have experts across a range of environmental science topics, including neonicotinoids (pesticides) and bees (pollinators), risk assessment, microplastics, nanotechnology, personal care products and pharmaceuticals (in the environment), endocrine disruptors, metals in the environment, environmental disasters (such as oil spills), and many more. If you have questions about chemicals or toxicants in the environment – we’ll try to get you the best possible answers according to the latest science. Please do note that we are asking members of the society who represent researchers from a variety of disciplines and sectors; the answers are not official SETAC positions. We encourage discussion and debate! Just please keep it professional.

For more information on SETAC see [http://www.setac.org](http://www.setac.org)

Post your question and the organizers of the conference will find someone to answer it as soon as possible.

EDIT: We're here answering your questions!

Answers to questions will begin at 8AM EST (6 PM UTC, 10 AM PST) and continue throughout the morning until 12 PM EST, with a few breaks.

One of the issues I see with reports on toxin exposure in the environment is that we often don't foresee what's coming or how it will impact us. I imagine people are aware of this and are trying to predict what may affect us down the road.

What do you think the next big chemical scare is going to be? What are we not prepared for or underestimating?

Izawwlgood

It's always difficult to predict what the next big issue will be in toxicology, and issues like microplastics (en.wikipedia.org/wiki/Microplastics) have showed us that pollutants can impact us in more than one way. In environmental toxicology and chemistry we work to identify potential risks based on properties such as volume of usage, the chances for chemicals building up in the environment or entering into tissues, or connections between impacts on organisms in the environment to events such as spills or historical contaminations. This is how toxicologists came to study nanomaterials, endocrine disrupting chemicals, and now new trends like microplastics. While we can't predict everything that happens, we work to keep an eye on the horizon by paying attention to data, trends, and major toxicological events and seeing how things connect together.

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What's coming or how it will impact us. I imagine people are aware of this and are trying to predict what may affect us down the road.

What do you think the next big chemical scare is going to be? What are we not prepared for or underestimating?

Izawwlgood

At my opinion, the next "big chemical scare" is going to be what we will be able to assess in the future. I don't refer to any kind of chemicals but much more to the advances in research and risk assessment methodologies that would allow us to better understand what are the risks related to chemicals. There is a lot of effort made a the moment to understand what are the risk of mixtures, endocrine disruptors and nano-materials in order to be able to appropriately regulate them.

On the use of pesticides; What do you think effect of the trend towards "organic" produce is? Are the "natural" pesticides used any better for consumers or is it leading to heavier use and/or less regulated products?

ImNotJesus

Hi! Natural chemicals are not safer (or less toxic) than synthetic ones. (One of) the most toxic substances we know is botulinum toxin, a natural compound. Think also of cadmium, copper and uranium - all natural! Due to the fact that organic pesticides are less strictly regulated and tested, the chance we overlook side-effects is bigger for these than for synthetic pesticides.

On the use of pesticides; What do you think effect of the trend towards "organic" produce is? Are the "natural" pesticides used any better for consumers or is it leading to heavier use and/or less regulated products?

ImNotJesus

Very good question, ImNotJesus! Although not the absolute expert on this aspect, I would argue that depends somewhat on the definition of "organic" in the first place. I have learned some years ago that the use of copper as a fungicide in on country may be allowed under organic farming practices, while this may be forbidden in others. Hence, there is no simple answer. Moreover, just blindly using "natural pesticides" in quantities far above naturally background levels, would certainly be problematic. I would thus assume that the environmental safety of these types of natural pesticides will be tested before authorisation. Nonetheless and just as for any new substance or technologies, there might be a risk for unexpected effects.

Could you discuss your career progression a bit? How did you end up in this position?

Was it something you originally set out to do? If a college student was interested in similar things, what would you suggest they do?

nate

How any of us (and there are several experts answering for SETAC today) ended up in this position is unusual and difficult to use as an example for you. For everyone it is different but there are some basic pathways. You will need a qualification in an environmental science first. Then most of us have gone on to postgraduate studies in a speciality that interests them. Then the membership of SETAC is tripartite. Some of us are working in research institutions or academia, some in government and some...
in industry. That diversity of approaches is needed in environmental science. So find your own path.

Could you discuss your career progression a bit? How did you end up in this position?

Was it something you originally set out to do? If a college student was interested in similar things, what would you suggest they do?

nate

I don't know much background here, but regional chapter or branches of SETAC (or other scientific societies) are wonderful (and inexpensive) ways to learn about research in the field, meet established scientists, and explore career opportunities. If it does turn out that you wanted to pursue this career path, SETAC provides mentorships, travel grants, student awards, and many more supports for early environmental scientists. We also have a terrific student group and I'm sure they would be happy to talk to you if you had more explicit questions about their experiences. You can email setac@setac.org.

Which common household items can be the most toxic/damaging to the environment?

Ppppdddd

If you're interested in 'greening' up your household cleaning products, the US Environmental Protection Agency (US EPA) has come up with some great materials about what greener household products (www.epa.gov/saferchoice).

What's the latest research on water fluoridation? Is it dated or still backed by modern science?

smithy006

There have been continuous reviews of the fluoridation literature and epidemiological data, but there is no demonstrated connection between fluoride levels in water and cancer or bone-related impacts. Here is one review done by the UK in 2005 (www.sciencedirect.com/science/article/pii/S0022113905002599).

What are we going to do when hundreds of years from now all of the nasty poisonous and caustic things we have thrown away into landfills turns into a toxic avenger and whoops all of humanity? Kidding, but will our misuse of landfills and dumps lead to a disaster in the future and how would we fight something like this chemically to be eco friendly?

ChilieMacPalmer

Obviously risk associated with landfills vary with the level of engineering controls of environmental risks. SETAC is a global society and we work with a very wide range of landfill types in many countries. Some are well engineered in stable geology with predictable levels of environmental risk. Others have little design, few controls and substantial environmental impacts that will continue to develop for many decades. So, it is a complex problem with no general answer I'm afraid. It will differ for each landfill. But environmental risk management is something that SETAC tries to promote.

Why does it appear to be extremely difficult to replicate how the environment would detox itself and then speed up that process?
Hi, bageera566! Unfortunately there's not an easy way for an environmental detox (not even an environmental AA), because the processes that happen as part of general environmental health are different than what happens when you get sick or maybe have a bit too much to drink. The environment is very complex and there is no easy way for the environment to get rid of chemical contaminants, especially for chemicals that don't break down easily. This is why toxicologists do research to prevent unnecessary chemicals and waste from getting into the environment in the first place and to develop ways to remediate chemicals from the environment when need be.

What is the extent of power Corporations have over regulations and general safety guidelines of a product as opposed to "real" scientists... who decides what? and what makes it that it takes an average of 14 years for a toxic chemical to be removed from anything including food sources. again [who] decides what?

Gallionella

Chemical regulations and general safety guidelines are aimed primarily at the safe use of chemicals, both when it comes to human health and the environment. While industry lobbies may have some influence in certain countries, in most of the developed world these regulations are being drafted by experts in close consultation with the public. The long period of removing some toxic chemicals from the market depends on several factors. For example, if a certain industrial chemical is proven to be toxic, it usually needs to undergo a restriction process. Before the chemical is completely banned from the market, the use of the chemical has to be examined in detail - if no substitute for the chemical currently exists, the transition period may be approved. During this period the chemical may be used under the restrictive regime. However, in any case no risk for human health or the environment would be allowed. In the European Union, EU institutions are making decisions: European Chemicals Agency for industrial chemicals, and the European Commission for food-related chemicals (advised by the European Food Safety Authority). In the United States, the EPA is responsible for industrial chemicals and pesticides.

As someone who knows close to nothing about toxicology and environmental hazards or how they're affecting our environment, what is an issue that you wished everyone was aware of or information that everybody should know?

yellinkobe

It's important to understand the difference between hazards and risks. Sometimes people assume all hazards are a risk, which isn't always the case. If you think about a tiger in a cage. The tiger is a hazard, but because it's in a cage, it's not a risk.

People often overestimate the risk of particular environmental hazards. As environmental toxicologists, we're more concerned with managing risks (so, what's actually happening).

In short, managing the risks of environmental contamination are more important than anything else.

As someone who knows close to nothing about toxicology and environmental hazards or how they're affecting our environment, what is an issue that you wished everyone was aware of or information that everybody should know?

yellinkobe
I think it is important for people to consider that even everyday actions like driving and consumerism contribute pollutants to the planet. So as populations grow it is important that we all have more of a conservation ethic... everyone can help reduce pollution; you do not have to be a scientist, you just have to care. Thanks for your great question!

In your opinion what's the biggest toxic disaster going on today that the general public won't recognize for another 10-20 years?

recipverseclusion

It's difficult to predict what's going to happen in the future, and many of the emerging fields in toxicology (nanomaterials, endocrine disruptors, microplastics) came about from a smaller number of key studies. In toxicology we focus on existing data, trends, and big events in environmental science in order to keep an eye on issues that might emerge in the future.

In your opinion what's the biggest toxic disaster going on today that the general public won't recognize for another 10-20 years?

recipverseclusion

Very difficult question and I am not sure whether this will properly answer the question. Nonetheless, I try adding a piece to this puzzle. An aspect that is likely recognised by the public but lacks a proper solution, seems to me how we are dealing with all the nuclear waste we are generating all over the planet. Another aspect we are now increasingly paying attention to is the occurrence and effects of microplastics in our ecosystems. But there are certainly other issues to name here and I bet colleagues will continue with this list.

What is the state of things for contaminants like nanoparticles? As I understand they don't just pose chemical hazards but also physical hazards at the microscopic level.

superhelical

Nanocontaminant work is still very much in progress. The behaviour of a nanoparticle in either the environment or in an organism is dependent upon many more things than the chemistry of the particle core, a partial list is below:

- Size (smaller particles can potentially penetrate cell membranes, blood-brain barrier etc) - Shape (long, thin particles have been shown to irritate lungs in the same way as asbestos does) - Surface coating (many particles are given surface coatings like citrate, polyethylene glycol, MUDA etc which stop then sticking together. These can determine how the particle may interact chemically, what surface charge they have etc) - Crystal structure. (or example, Titanium dioxide can form two crystal structures, anatase and rutile. One is reported to be quite toxic, and the other significantly less so)

There are two main problems stopping us from seeing the whole picture. Firstly, environmentally relevant concentrations of nanoparticles are very hard to measure - we can't just put them in an electron microscope and have a look - there just aren't enough particles in there! Several new techniques like single particle inductively coupled plasma mass spectrometry (spICP-MS) and nanoparticle tracking analysis (NTA) are slowly improving in this regard. Secondly, it is very difficult to use the conclusions from one study to determine what will happen in a different situation - there are few if any standard protocols for nanoparticle assessment. There is a current EU project called nanoreg which is addressing this problem.
What is the state of things for contaminants like nanoparticles? As I understand they don't just pose chemical hazards but also physical hazards at the microscopic level.

Superhelical

Nanoparticle toxicity is a widely researched topic. Obviously they may have physical effects but may also release chemicals if adsorbed to their surfaces. In my opinion and experience, dissolved chemicals are in most cases more toxic than particles.

I'm both troubled and also bummed out on a personal level by coral bleaching. What's the state of our understanding about this phenomenon?

I read a recent report suggesting that it might be attributable in significant part to avobenzone (sunscreen) or some similar personal care chemical. But other reports seem to suggest it may be due to rising ocean temperatures.

I have found myself rooting for e.g. avobenzone as a cause since it seems more concrete and easier to address than larger scale environmental trend might be... but is that true? Is any one cause (chemical vs temperature, etc.) easier than another to mitigate at this scale?

Finally, is there a reasonable chance that we might be able to turn this trend around before reefs worldwide are ruined?

Schmedlock

An excellent source of information on the key chemical risks for corals at least in the Great Barrier Reef is at http://www.reefplan.qld.gov.au. The Queensland Government has undertaken considerable research into the relative impacts of different substances on corals and links to other research. It is a good place to start to answer your question.

I'm curious to any updates on nanotech toxicology. How long do gold NPs sit in your body? Do they wreak havoc on the lungs? Once they pass through you, are they a threat to the environment? I'm also wondering about other non-heavy metal NPs in the body, if there have been any studies.

Thanks!

DopeManFunk

This is quite a complex question; I'll try and answer this in parts.

How long do they remain in the body? This depends massively upon the coating, shape, and size of the NP. If you're interested, this study (Park, S., Woodhall, J., Ma, G., Veinot, J. G., & Boxall, A. B. (2014). Does particle size and surface functionality affect uptake and depuration of gold nanoparticles by aquatic invertebrates? Environmental Toxicology and Chemistry, 9999(9999), n/a–n/a. http://doi.org/10.1002/etc.2868) might interest you. It found that for a particular type of gammarus invertebrate, between 9% and 65% of gold NPs which had been taken up had been eliminated within 24 hours, depending upon the coating of the particle.

Do they wreak havoc with the lungs? This would depend on how they had arrived in the body. Mouse studies like this one (http://erj.ersjournals.com/content/37/2/299.short) suggest that inhaled gold NPs can be problematic for the lungs.
Are any passed NPs a threat to the environment? If you're worried about NPs in the environment, there are many very significant sources that completely eclipse the contribution that such NPs as a human may pass.

Other non-heavy-metal nanoparticles in the body? There have been many studies of other NPs. One of the most topical has been silver; silver NPs are used in many commercially available products, and there have been many studies looking at silver nanotoxicology. Other studies have looked at TiO2, SiO2, ZnO, carbon nanotubes etc. Most studies have found that feeding mice and rats large quantities of nanoparticles isn’t very good for them, but many of the studies are inconsistent with each other. This paper (Farrera, C., & Fadeel, B. (2015). It takes two to tango: Understanding the interactions between engineered nanomaterials and the immune system. European Journal of Pharmaceutics and Biopharmaceutics. http://doi.org/10.1016/j.ejpb.2015.03.007) contains a good review of some of the better research in the field.

TL;DR A while, possibly, not really, yes!

What do you consider to be the most reliable experimental data, to date, concerning the effects of hydraulic fracking??

AhemOrange

There is no general answer to your question unfortunately. Fracking is done differently depending on the nature of the geology that is being stimulated. How you would frack deep, hard shale is very different from how you would frack a shallow coal seam. The pressures used, the fluid compositions used and the method of managing the produced water will be very different in each region. It is important not to extrapolate environmental risks from one area to another. If there is an area of fracking that is of particular concern to you then you should approach the regulator for that region for the best insight, as a general rule.

What do you believe to be the long-term effects of fracking chemicals on the water supply? I've not yet seen definitive proof that links fracking to hazardous side-effects, but I wouldn't be surprised if that is the case. Would you be in favor of a complete ban on fracking?

twominits Turkish

SETAC recently held a focused topic meeting on the environmental quality applications of unconventional natural gas development. This specific question was identified as a strategic research need. Certainly, additional information is needed to support robust science-based environmental assessment and management decisions. SETAC is currently soliciting related articles for a special section of this flagship journal, Environmental Toxicology and Chemistry.

I'm currently working on a construction project that requires washing of fine and coarse aggregates to get the -#200 size material out for testing. Some of these aggregates are recycled concrete, so they contain Portland cement. How toxic can this small amount of cement be? We are using a sort of drainage system that runs onto the pavement and dries (no drain anywhere leading to treatment), but if this cement were to seep into the ground, how far could it go and what problems could it cause? Keep in mind I'm using a lot of water to wash this stuff so it sometimes makes a muck pit in the area I'm working. Thanks!

wigwam2323
It is a little hard to tell the specifics from your descriptions but basically it seems that the main potential environmental hazards from your processes would be fines and pH from the contained cement, which is quite alkaline. So, if the area it drains to never overflows to a drain or water course it is probably low risk. The contained fines will tend to limit penetration into the soil profile. You may generate a thin layer of alkaline soil that might need remediation at some time depending on the proportion of fines the cement is. If at times rainfall could wash the fines into a water course then you would need to assess the risk of impact of that. Measuring soil pH in the area where the fines are accumulating would give an indication of the potential for that to be an issue.

What is your view on the glyphosate problematic? Do you consider the problem is with the active substance itself or with the not so correct handling and application of the product, that is, if the handling is well done is the risk of the use of the glyphosate as an herbicide still too high?

Jhscrym

Both the active ingredient glyphosate and its products are subject to extensive testing and so if handled and used as directed (which is important!), I do not consider it to be too high a risk to operators, consumers or the environment. A conclusion reached by the many regulators which have reviewed it properly. Indeed you could consider that compared to some other herbicides it presents a lower risk, although as all authorised herbicides have been determined to have acceptable risk, it is debatable whether this is relevant.

What is your opinion on “cleaning up” naturally occurring “pollution”, such as arsenic and other heavy metals in peaty ground or eutrophication in surface water in fall? Is it something we should endeavour to clean up and make into a healthier area for humans, or leave it as-is?

Tar_alcaran

interesting question Tar. In the Netherlands there’s an area with a high natural zinc concentration in soil. This actually caused changes in local populations showing adaptation. Due to such selection pressures new species may even arise! Imagining cleaning up the sulphur emitting black smokers on the sea bottom ... No, there is definitively a good reason not to touch some of these areas.

What is your opinion on “cleaning up” naturally occurring “pollution”, such as arsenic and other heavy metals in peaty ground or eutrophication in surface water in fall? Is it something we should endeavour to clean up and make into a healthier area for humans, or leave it as-is?

Tar_alcaran

I don’t believe that we should clean-up naturally occurring pollution like heavy metals for example. There are some sites that contains naturally substances that can affect humans and I guess those sites should be avoided by the humans meaning that no construction should be built on these sites. Saying that eutrophication is another problem because it mainly came from the release of nutrients from human activities. In this case, the solution is to reduce the release of nutrients to restore the good functioning of the ecosystem.

Is living in a concrete building a health hazard?

420 points
Can you precise your question please? Do you worry about exposure to contaminants in your house?

[deleted]

[deleted]

This is outside of our area of expertise. The Society of Toxicology would be a better place for this kind of inquiry. [www.toxicology.org](http://www.toxicology.org)

Is the solution to pollution, truly dilution?

Hazi-Tazi

Eventually you run out of dilution! There is also the boomerang paradigm: "What you throw away can come back and hurt you."

Is the solution to pollution, truly dilution?

Hazi-Tazi

Depends. For pollution in the Yangtze river, especially in the vicinity of the Three Gorges Dam, the results we got from one study at least suggest that dilution helps to mitigate current pollution. But pollution continuously increases, so eventually this is only a temporary relief, not a real solution.

What does the latest research tell us about the effects of graphene and carbon nanotubes on humans and the environment?

Is it perfectly safe? Do we need more research? Or have there been adverse side effects?

zaihein


What are the most significant challenges in getting local and national regulatory agencies to respond to developing environmental issues in real time?

dark_magnetar

characterizing environmental problems requires standardized methods to assure comparability of results. Developing these methods takes a lot of time (5-10 y). Sometimes it is not clear what the cause is for a problem and this should be identified first before you can tackle a problem properly. Emergency situations e.g. chemical accidents, should be attended to immediately.

What are the most significant challenges in getting local and national regulatory agencies to respond to developing environmental issues in real time?
Worldwide, there are several environmental monitoring programs that respond to developing environmental issues. The challenges faced by these authorities vary significantly by region, and also by regulatory statutes.

What are the most significant challenges in getting local and national regulatory agencies to respond to developing environmental issues in real time?

dark_magnetar

The most significant challenge in responding to developing issues is that they are not incorporated into the existing regulation. Regulatory processes take time, and it is difficult to react in real time.

What are the most significant challenges in getting local and national regulatory agencies to respond to developing environmental issues in real time?

dark_magnetar

Knowledge availability is probably the most significant challenge. Research takes time and risk assessment is a balance between risk and benefit, so taking early action without solid knowledge could undermine the regulatory intentions.

No question, just please keep trying to educate regulators. Every time I get a new project manager on my projects I have to re-educate them about how fate and transport works, as well as how risk-based corrective action works.

Mightbehittingonyou

SETAC is a tri-partite society, where representatives of academia, industry, and regulatory agencies exchange information and ideas on the study, analysis and solution of environmental problems, the management and regulation of natural resources, research and development, and environmental education. It would be unfair to assume regulatory scientists less qualified to tackle environmental issues.

How often do you get calls for SEATAC airport?

DruidOfFail

Luckily, our SETAC World headquarters are in Pensacola, FL. So, unless you're really lost...

Drinking energy drinks on a regular basis, are there any concerns or likely expected issues?

What are the top 2 greatest threats that humanity will have to deal with in the next 50 years?

My father has been in toxicology and chemistry for 40 years, met a lot of your people in the field. Very cool stuff.

UtahUser01
Climate change and overpopulation!

Can you you tell us what the current situation is with regard to identifying the chemicals that can cause respiratory illness such as irritant-induced asthma, reactive airways dysfunction syndrome (RADS) and similar injuries?

It would appear that there was some work done many years ago, but are you aware of any recent research?

Thanks very much for this AMA!

forgotmypwd_again

Ground based ozone, ozone that is in the breathable air and not up in the stratosphere, and particulate matter (small particles) have been the focus of recent research and regulation efforts to reduce irritant-induced asthma attacks and death. If you have additional questions, you can look to the EPA or WHO websites that track this information (http://www.who.int/mediacentre/factsheets/fs313/en/)

Is there data supporting the claim that EPA is harmful to the endocrine system?

mrfreshmint

EPA is trying to help the endocrine system!

https://www.epa.gov/endocrine-disruption

Is there data supporting the claim that EPA is harmful to the endocrine system?

mrfreshmint

Do you mean BPA?

Is there data supporting the claim that EPA is harmful to the endocrine system?

mrfreshmint

EPA is the acronym used by many countries for ‘Environmental Protection Agency’. These generally are regulatory guys ensuring environmental and human protection. The regulation of specific endocrine disrupting properties is currently being implemented into regulations worldwide.

It’s no secret that OSHA is critically underfunded in the United States at both the federal and state levels. Workplaces can expect a federal OSHA visit once every 137 years and a state visit once every 63 years. Even if numerous transgressions are identified, companies are typically only given small fines that are frequently reduced with legal action. What does SETAC do to help encourage workplace safety? Do you believe corporations can truly keep their workers safe without the threat of realistic regulatory penalties?

shiruken

SETAC does not have a position on this issue.
Is mercury becoming more of a problem? As someone with autoimmune disease trying to figure out some root causes, I've come across mercury many times. But it is very difficult to test and detect. Curious if there is any evidence outside the autoimmune healing industry that correlates with this?

Gmibr

Hi, Gmibr! Currently the largest risk from mercury comes from eating certain types of fish, generally large, top-level predators. If you have concerns about mercury you can read more on the US Geological Survey (https://www2.usgs.gov/themes/factsheet/146-00/) or the US Environmental Protection Agency (https://www.epa.gov/mercury/health-effects-exposures-mercury).

Mercury is not necessarily getting worse, but it is getting a lot more attention. We are a member of the UNEP Mercury Partnership and working towards science-based management solutions for reducing the impacts and risks associated with mercury exposure.

Tributyltin (TBT) has been quoted as being the most toxic chemical ever to be deliberately introduced to nature. The use of TBT as an anti-fouling agent has been banned for most seafaring nation by the 'International Convention on the Control of Harmful Anti-fouling Systems on Ships'. However has production of this chemical been stopped on an international level, or is it still condoned by nations that qualify as 'flags of convenience'? Furthermore, is there any data available on the global production of harmful chemicals?

Whitevendetta

Hello, I'm not sure if your first statement is correct, but as far as I know there is a global ban on TBT use. Obviously some ship hulls may still contain TBT in old paint and slowly release it into the waters they're in contact with. Also, sediments may still contain TBT as it has quite a long halflife. Further, there are other uses for TBT than antifouling for shiphulls. Wikipedia provides a good summary of the issue: https://en.wikipedia.org/wiki/Tributyltin

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Whitevendetta

I just did a search and sadly TBT paint still seems to be on sale: http://www.seahawkpaints.com/product/islands-44-plus/
Hi Jack, this is non-scientific advice: listen to your wife and use the words as directed by her ;-) 

Toxicants are substances released into the environment by human activities, while toxins are produced from living organisms. Your wife sounds like a keeper!

What kind of plans are there if any to help prevent or mitigate against cyanide leaching from mining endeavours and gold refining?  
Also how do you conduct these assessments in rough terrains and areas where you might not be able to reach all the potential contact points?

Brokenquill

What country is still using cyanide leaching?

Given the competing problems of lead piping (from tap water) and plastic leaching (from bottled water), where should I get my water?

aethaulia

not from lead piping. Rather from bottles; glass or plastic. Bottles are often reused and require cleaning - this can be another source of low chemical residues, but I would not worry too much about it. More important is to have clean water at your disposal.

Thank you guys for this AMA. I work in the electrical distribution industry and one of our concerns currently is the use of PCBs in transformer oil. It is my understanding that PCBs are most toxic when burned, and under that right (or wrong!) conditions, pcb laden oil (greater than 50ppm) can burn in our workplace. Sometimes these transformers will burn inside rooms called vaults, that offer very little airflow. Part of my job is the enter these rooms to restore power, following the ignition of PCBs. What is the proper PPE required for such entry? Is there a specification of mask or suit that would be applicable? Thank you so much for your time.

SaeLow

I don't know where do you live but in many countries, the protection of the workers is well define and your employer should inform you, provide you and oblige you to wear the adequate protection that has been identified to ensure no risk to worker health. Don't you have any information on this issue from your employer?

Hello, I do storm water treatment professional lly.

I recently took a course in WA where the instructor told us that pollution in sea food is so high (due to
bioaccumulation) but we continue to allow consumption of fish like tuna even though we know about the consumption's negative health consequences. According to the course instructor, the reason seafood isn't regulated is because the recommended serving of a fish like tuna is 8 grams a month (less than one can). According to the instructor, more regulations will be coming down the pipe when the FDA actually takes an honest look at the concentration of pollutants in seafood and how much of it we actually consume.

Assuming this factoid is true, how do you see the field of toxicology affecting how we look at our diets in the future? Could predatory fishes with high bioaccumulation be removed from our diet? Will we start to take ocean pollution more seriously?

Thank you

KLR08Oakland

Only because there is a high bioaccumulation potential doesn't mean that the fish is actually loaded with toxicants and consumption is negative to your health. This depends on whether the fish got exposed. One would have to analyse it to find out. However, instrumental chemical analysis is expensive, and also you can especially find what you are looking for, so you should have an idea of the potential contamination. Tricky. There is ongoing research and action to implement effect-based tools in food security. These test systems report a biological effect, regardless of the substance that causes this. They are capable of investigating a large number of samples in parallel, they are reliable (especially when standardized), and they are comparably cost-effective. Also, some of them are much more sensitive than chemical analytical methods. Hence, such systems can be used on a regular basis for effect screening. In case of a detected effect the food samples could be chemically analysed, and the compounds to look for can be limited to those known to cause the specific effect. If we continue to implement those tools in food security, we could one day get to the situation that regulators would decide to take action against certain highly contaminated fish; which would also make the public more aware of ocean pollution. But this would require a comprehensive risk assessment. It is easy to tell that fish is contaminated, it is a complete different thing to make a science-based decision how to deal with the situation. But the latter is the way we should act.

I am doing a report on pharmaceuticals and personal care products in the water supply. I keep on seeing a lot of debate whether they are directly impacting human health (most of the articles that show no effect point out that total annual exposure is less than the normal dose for most of the compounds). I was wondering, what is your take on the matter? Are we seeing any human health effects that have been linked to PPCPs?

Caligrown710

The current evidence is based on dosage of such PPCPs indicates no risk. However, these assessments do not include additivity with similar MOAs nor what similar medicines we are currently using. The risk is mostly to wildlife which do not need such meds, for example blood pressure lowering or birth control.

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There is a potential of migration of substances to the body through wearing closing depending on its physico-chemical properties like lipophilicity. However, this doesn't mean that there is a risk which would depend on the quantity migrated, the hazard of the substance and the individual (e.g. adult, children...). For European fabrics, the absence of risk should be demonstrated through the REACH
Was a design ever finalized on the long-term containment of nuclear waste? The information I heard was that scientists were having trouble coming up with a containment center that wouldn't be mistaken for a tomb or place of valuable artifacts.

Coronis12

I believe that in the US, work has been halted on the Yucca mountain waste repository, though to the best of my knowledge no viable alternative has been proposed. Yucca had been many years in planning, and any viable alternative will realistically take a long time to come to fruition.

What options exist for real time monitoring of environmental pollutants? I imagine that currently samples have to be collected and then processed in the lab, are there any systems that are capable of doing analysis in the field?

Transponder7500

Here is a link to a report on continuous water quality monitors; there are additional probes being developed for nutrients and certain algal toxins: http://pubs.usgs.gov/tm/2006/tm1D3/

What options exist for real time monitoring of environmental pollutants? I imagine that currently samples have to be collected and then processed in the lab, are there any systems that are capable of doing analysis in the field?

Transponder7500

At my knowledge there is no analysis in the field because the analysis of the contaminants requires fragile instrumentation and clean environment that can only be maintained in a laboratory. However, a good sampling design or passive samplers can be assumed to be representative of annual variations of contaminant concentrations.

What options exist for real time monitoring of environmental pollutants? I imagine that currently samples have to be collected and then processed in the lab, are there any systems that are capable of doing analysis in the field?

Transponder7500

There are air and water monitors that can capture real time quality measurements for a range of parameters (pH, temperature, conductivity, particulate matter, etc.), but for some substances of environmental concern, we don't have that capability yet.

What options exist for real time monitoring of environmental pollutants? I imagine that currently samples have to be collected and then processed in the lab, are there any systems that are capable of doing analysis in the field?

Transponder7500

This is a very broad question. In terms of monitoring water, there is very little if any realtime monitoring
and very few options. Similarly, monitoring of pollutants in animals, soils, and plants cannot really be carried out in real time.

Air monitoring is slightly more positive. In the EU, most larger towns and cities will have active monitoring stations which take realtime data on common urban atmospheric pollutants like nitrogen oxides and sulphur dioxide. Realtime UK data is accessible here: https://uk-air.defra.gov.uk/interactive-map

More complete air monitoring that includes hydrocarbons and noise pollution is more expensive in realtime, though there is a new device that has this capability; there are some test installations in various locations around the world, you can view the realtime data here: https://elm.perkinelmer.com/map/#/1169

In what way would I poisoned if a radioactive mosquito bit me?

thenordicbat

Are you asking for a friend, because we're pretty sure that was a spider, and he knows. Haha. All we can say, "dose makes the poison." To be more serious, we cannot answer human health questions, in general.

I'm an environmental science undergrad student, with my education aligned towards ecosystem services and ecotechnology. One thing I've come to realize when I talk with people with limited knowledge about environmental and climate science is that the general public can't differentiate between these two. To me, this becomes most obvious when discussion pesticides here in Europe. The typical question for this is if you should buy organic products from abroad or conventional products from home; which really is a question about greenhouse gases vs. pesticides.

First of all, do you think this is a valid analysis, or what's your take on the subject? And how do you think we, as the scientific community, best can bridge this gap in knowledge?

mehraaza

Well, I would say this is also a question how you define environmental science in the first place. This subject actually includes a lot more than just toxicants in the environment. Environmental physics, env. psychology, env. law... are all part of environmental science. And also, of course (at least from my point of view) climate science. What you should differentiate between is climate science and ecotoxicology (impact of toxic substances on ecosystems; in your case anthropogenic substances). So the answer is: to bridge knowledge gaps in the public we should first get our own knowledge clear. How should they understand if you are not consistent and confuse them?

Is it ok if you get ortho home defense on your hand, and accidentally eat finger food like chips without washing your hands?

RedRanger77

You should really read the label for directions about how to handle ingestion. Good luck.

What's up with early puberty and environmental hormones? As I understand it, average onset of puberty keeps happening earlier, and environmental triggers seem likely, but very hard to pin down. Is
there any work being done to understand or mitigate this?

**owlpellet**

Some SETAC members research endocrine disrupting chemical in the environment and how they interact inside aquatic life, but we do not focus on human health effects. This is an emerging and active research topic.

In your opinion, what can the average person do to help the environment?

**rczx**

The three R’s: Reduce, Reuse, Recycle!

In your opinion, what can the average person do to help the environment?

**rczx**

Reduce, reuse, recycle...and a keynote speaker at this meeting, Thomas Maes, included “refuse.” Change your purchasing behaviors and be thoughtful about your personal impact.

In your opinion, what can the average person do to help the environment?

**rczx**

Great advice so far. You can also make your home energy-efficient (or ask your landlord to help with that) to save energy.... will save on cost and is good for the environment. Thanks for asking and for caring!