CHEMWATCH

Bulletin Board

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*** While Chemwatch has taken all efforts to ensure the accuracy of information in this publication, it is not intended to be comprehensive or to render advice. Websites rendered are subject to change.**

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Agricultural chemical products and approved labels

2020-09-08

Pursuant to the Agricultural and Veterinary Chemicals Code scheduled to the Agricultural and Veterinary Chemicals Code Act 1994, the APVMA hereby gives notice that it has registered or varied the relevant particulars or conditions of the registration in respect of the following products and has approved the label or varied the relevant particulars or conditions of the approval in respect of the containers for the chemical product, with effect from the dates shown.

APVMA Gazette No. 18, 8 September 2020

https://apvma.gov.au/sites/default/files/gazette_08092020.pdf

Veterinary chemical products and approved labels

2020-09-08

Pursuant to the Agricultural and Veterinary Chemicals Code scheduled to the Agricultural and Veterinary Chemicals Code Act 1994, the APVMA hereby gives notice that it has registered or varied the relevant particulars or conditions of the registration in respect of the following products and has approved the label or varied the relevant particulars or conditions of the approval in respect of the containers for the chemical product, with effect from the dates shown.

APVMA Gazette No. 18, 8 September 2020

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Approved active constituents

2020-09-08

Pursuant to the Agricultural and Veterinary Chemicals Code scheduled to the Agricultural and Veterinary Chemicals Code Act 1994, the APVMA hereby gives notice that it has approved or varied the relevant particulars or conditions of the approval of the following active constituents, with effect from the dates shown.

APVMA Gazette No. 18, 8 September 2020

https://apvma.gov.au/sites/default/files/gazette_08092020.pdf

Pursuant to the Agricultural and Veterinary Chemicals Code scheduled to the Agricultural and Veterinary Chemicals Code Act 1994, the APVMA hereby gives notice that it has registered or varied the relevant particulars or conditions of the registration in respect of the following products and has approved the label or varied the relevant particulars or conditions of the approval in respect of the containers for the chemical product, with effect from the dates shown.

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Amendments to the APVMA MRL Standard

2020-09-08

The Australian Pesticides and Veterinary Medicines Authority (APVMA) approves maximum residue limits (MRLs) of agricultural and veterinary chemicals in agricultural produce, particularly produce entering the food chain.

The MRLs approved by the APVMA are associated with a regulatory decision to register a product, grant a permit approval, or as an outcome from a review decision and are set out in the Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019.

The MRL Standard lists MRLs of substances that may arise from the approved use of agricultural and veterinary chemical products containing those substances on commodities used for human consumption as well as livestock feeds. The MRL Standard also provides the relevant residue definitions to which these MRLs apply.

There may be situations where the residue definition for monitoring and enforcement is different to the definition used for dietary risk assessment purposes. MRLs are set at levels which are not likely to be exceeded if the agricultural or veterinary chemicals are used in accordance with approved label instructions. In considering MRLs and variation to MRLs, the APVMA takes into account studies on chemistry, metabolism, analytical methodology, residues, toxicology, good agricultural practice and dietary exposure. In approving MRLs, the APVMA is satisfied, from dietary exposure assessment, that the levels set are not an undue hazard to human health.

The APVMA has amended the MRL Standard and the changes will have affect the day after the instrument is registered. Details of the amendment can be found in the Agricultural and Veterinary Chemicals Code (MRL Standard) Amendment Instrument (No. 7) 2020. The amendments will be incorporated into the compilation of the Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019.

The MRL Standard is accessible via the Federal Register of Legislation website.

For further information please contact: MRL Contact Officer Australian Pesticides and Veterinary Medicines Authority

GPO Box 3262 Sydney NSW 2001

MRLs are set at levels which are not likely to be exceeded if the agricultural or veterinary chemicals are used in accordance with approved label instructions.

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Phone: +61 2 6770 2401

Email: enquiries@apvma.gov.au.

APVMA Gazette No. 18, 8 September 2020

https://apvma.gov.au/sites/default/files/gazette_08092020.pdf

AMERICA

Mexico to phase out use of herbicide glyphosate

2020-08-13

Mexico will gradually phase out use of the herbicide glyphosate by the time the current administration ends in late 2024, President Andres Manuel Lopez Obrador said on Wednesday, following a ministerial spat over the product.

Acknowledging differences between his agriculture and environment ministries over the herbicide, which is used in brands such as Roundup, Lopez Obrador said the government would immediately stop using glyphosate on its own projects.

The agriculture ministry said that private food producers will have until 2024 to phase out glyphosate, which has sparked safety concerns in a number of countries.

"We couldn't get rid of it in one fell swoop, it can't be done, it would hit food output," the president told reporters. "We would have to import, and also products and foods that are grown with these agrochemicals."

Full Article

Reuters, 13 August 2020

https://www.reuters.com/article/us-mexico-herbicide/mexico-to-phase-out-use-of-herbicide-glyphosate-idUSKCN25902N?utm_source=reddit.com

The agriculture ministry said that private food producers will have until 2024 to phase out glyphosate, which has sparked safety concerns in a number of countries.

U.S. EPA rolls back limits on waste water from coal plants

2020-08-31

WASHINGTON — The Environmental Protection Agency on Monday rolled back Obama administration rules limiting levels of toxic materials in waste

water released from coal plants, its latest effort to slash environmental regulations for the coal industry as the Trump administration's first term winds down.

The EPA finalized "effluent limitations" for two types of waste from coal plants, a savings of $140 million annually for industry.

"Newer, more affordable pollution control technologies and flexibility on the regulation's phase-in will reduce pollution and save jobs at the same time," agency administrator Andrew Wheeler said.

A senior EPA official said the final rule would reduce pollution by nearly a million pounds per year over the 2015 rule, though environmental groups said the rollback lets industry use cheaper, less effective treatment methods on polluted wastewater that puts waterways at risk. The changes apply to flue gas desulfurization (FGD) wastewater and bottom ash transport waste. The rollback eases requirements for how they are treated before being released, offers a "flexible, phase-in approach" for implementation and pushes back compliance dates.

Full Article

Financial Post, 31 August 2020

https://financialpost.com/pmn/business-pmn/u-s-epa-rolls-back-limits-on-waste-water-from-coal-plants/wcm/5806f193-12ff-4d18-88d1-8ab0a8fab7e8/

EPA announces approval of first-ever long-lasting antiviral product for use against COVID-19

2020-08-26

On August 24, 2020, the U.S. Environmental Protection Agency (EPA) **announced** the issuance of a Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 18 emergency exemption to the state of Texas permitting it to allow American Airlines and Total Orthopedics Sports & Spine to use a new product that is believed to inactivate coronaviruses like the SARS-CoV-2 virus on surfaces for up to seven days. EPA states that after carefully reviewing the available data and information, it "determined that the product helps to address the current national emergency." According to EPA, the product is "expected to provide longer-lasting protection in public spaces, increasing consumer confidence in resuming normal air travel and other activities."

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FIFRA Section 18 authorizes EPA to exempt federal or state agencies from any provision of FIFRA in the event that emergency conditions require such an exemption. EPA regulations (40 C.F.R. Part 166) specify when state or federal government agencies will be permitted to use unregistered pesticides in response to an emergency. EPA's regulations provide that an emergency exists when:

- There is an "urgent, non-routine" situation requiring the use of a pesticide to control a new pest not previously prevalent in the United States, to control significant risks to health, the environment, beneficial organisms, or endangered species, or to prevent specified types of economic loss; and
- There is no registered pesticide or economically or environmentally feasible alternate method of control available.

40 C.F.R. § 166.3.

The exemptions granted can be very specific and time-limited; EPA has developed a **database** so companies can search (by chemical, site, pest, applicant, or date range) to determine if an emergency exemption has been issued and its expiration date.

In this case, EPA approved the Section 18 emergency exemption request for SurfaceWise2 -- a product manufactured by Allied BioScience -- a surface coating that Allied BioScience states inactivates viruses and bacteria within two hours of application and continues to work against them for up to seven days, between regular cleanings. EPA's approval will allow Texas to permit American Airlines airport facilities and planes at specific locations and two Total Orthopedics Sports & Spine Clinics to use SurfaceWise2 under certain conditions. The approved Section 18 emergency requests are effective for one year. As new data emerge, EPA may alter the terms of the product's emergency uses.

Over the coming months, Allied BioScience will pursue a non-emergency approval under FIFRA Section 3 by submitting additional data to meet EPA's registration requirements as an antiviral and antibacterial surface coating. If the full registration process is completed, the product would become available for purchase by members of the public. SurfaceWise2 is not yet available to the general public because Allied Biosciences has not yet submitted the necessary data to qualify for registration under Section 3 of FIFRA.

Full Article

Pesticide Law and Policy Blog, 26 August 2020

http://pesticideblog.lawbc.com/entry/epa-announces-approval-of-first-ever-long-lasting-antiviral-product-for-use

PFAS ban included in California cosmetics bill

2020-09-09

On August 30, 2020, the California legislature passed Assembly Bill 2762, the Toxic-Free Cosmetics Act. The bill would ban 12 chemicals, including PFAS, mercury, and endocrine disruptors, from cosmetics and other personal care products made in or sold to the state of California. The bill was sent to Governor Gavin Newsom and he has until September 30, 2020 to either sign the bill into law or veto it. If passed into law, the ban on the chemicals in these products would take effect January 1, 2025. The bill does permit for "unavoidable trace amounts" of the various banned chemicals, recognizing that the end products may inevitably and inadvertently be contaminated with chemicals after the manufacturing process – for example, from leaching from product packaging.

The bill is a landmark bill for several reasons, first and foremost because it would be the first of its kind in California and the United States in banning such a broad array of chemicals from personal care products. Previous state-level legislation related to chemicals in personal care products have focused primarily on one or two chemicals per bill. The bill is also unique in that it received bipartisan support from legislators and resounding support from the Personal Care Products Council. On the surface, the support of this organization surprised many; however, the Personal Care Products Council issued a statement in which they indicated that they view their support for the bill as a way of bringing harmony to regulations that already exist. The European Union has for many years aggressively studied and regulated many of the chemicals subject to the California bill, and has already banned them in many products, including cosmetics and personal care products. The Council therefore saw supporting the California bill as a way to unify the regulations that exist, rather than attempting to come into compliance with a multitude of varying regulations.

If passed, the impact of the California regulations will also have national and global ripple effects. In the United States, California is often at the forefront of products and chemical regulation initiatives. States often model their own regulations off of California regulations. In addition,

Previous state-level legislation related to chemicals in personal care products have focused primarily on one or two chemicals per bill.

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California is the fifth largest economy in the world. Cosmetics and personal care products' manufacturers can now adjust product design, manufacturing, and distribution in a much more globally uniform manner, which will result in cost savings to manufacturers.

Full Article

The National Law Review, 9 September 2020

https://www.natlawreview.com/article/pfas-ban-included-california-cosmetics-bill

EUROPE

Water companies challenged to improve environmental performance

2020-09-08

Water company chiefs challenged on environmental performance, leakage and protecting supplies.

The chief executives of fifteen water companies met today (8 September) with Environment Minister Rebecca Pow, who challenged them to do more to protect the environment and safeguard our water supplies.

Representatives from Ofwat, the Environment Agency, Natural England, Water UK, The Consumer Council for Water (CCWater) and the Drinking Water Inspectorate (DWI) were also present.

The meeting follows the joint letter sent to water companies in July, encouraging them to accelerate investment as part of the country's green economic recovery from coronavirus.

While water companies had coped well under increased pressure during lockdown, Minister Pow made clear that much stronger action was needed on environmental priorities, particularly in the following areas:

Storm overflows: The volumes of sewage discharged into rivers and other waterways in extreme weather must be reduced. A new Taskforce has been set up between Defra, the EA, Ofwat and Water UK which will meet regularly and set out clear proposals to reduce the frequency and volumes of these incidents. The Environment Bill will also allow government to set legally binding wastewater targets.

The Environment Bill will also allow government to set legally binding wastewater targets.

Chalk streams: Chalk streams – known for their clear waters and rich wildlife – continue to be at risk due to low flows, poor water quality and unsustainable abstraction by water companies. The Minister urged water companies to significantly raise their ambition to improve chalk stream catchments and asked them to join her at a Chalk Stream summit she will host on 16 October.

Water resources and leakage: While improvements on leakage rates have been made, the Minister reiterated the government's expectation for leakage rates to be halved by 2050. A new national framework was published in March 2020 by the Environment Agency setting out the scale of action needed to safeguard our water supplies for the future, requiring collective action from government, water companies, businesses and the general public.

Today's meeting comes ahead of the Environment Agency's annual report on water companies' environmental performance, which will be published later this month.

Environment Minister Rebecca Pow said:

"Water companies need to take their environmental obligations seriously and this impetus must come from the top.

"Despite investment from the industry, the damage inflicted on our environment – our rivers, lakes, streams and the wildlife that rely on them – is still far too great. Today we discussed a number of issues I feel strongly about, including storm overflows, and how we can work together to see much more ambitious improvements.

"This country's green recovery from coronavirus can only happen if water companies step up and play their part."

Harvey Bradshaw, Executive Director of Environment and Business at the Environment Agency, said:

"Our water environment is precious and under huge and increasing pressure from a growing population and the climate emergency.

"Our environmental targets are ambitious and we are challenging water companies to go faster and further on environment, leakage and protecting supplies. Water companies have a key role to safeguard our water environment and we will regulate them as a modern regulator should; rewarding excellence and sanctioning behaviour that harms

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the environment. In this way we will be working with them to drive up standards including through our new Taskforce on storm overflows.

"Everybody shares a crucial responsibility to protect the environment for future generations, and we will continue to work with all parties to deliver much-needed improvements.

John Russell, Senior Director, Strategy and Planning at Ofwat, said:

"We welcome the challenge to water companies set by Minister Pow and are committed to continuing to work with government and other independent regulators on the future direction for the water industry, particularly the focus on environmental priorities. These sector wide discussions are crucial for setting targets which can drive long term resilience and broader improvements to water customers, such as the progress water companies are reporting on leakage and the industry's pledge to achieve net zero by 2030."

The meeting also touched on changes to the £5 billion Water Industry National Environment Programme (WINEP) – investment by water companies in the environment – to make it more outcome-focused and increase the involvement and accountability of water companies.

Gov.uk, 8 September 2020

https://www.gov.uk/government/news/water-companies-challenged-to-improve-environmental-performance

INTERNATIONAL

Toxic pesticides and flame-retardants found in monkey, baboon, and chimpanzee poop

2020-09-09

"We think a lot about habitat disturbance, logging, and hunting as threats to these species, while pollution has been overlooked."

Baboons in the U.S., howler monkeys in Costa Rica, and baboons, chimpanzees, red-tailed monkeys, and red colobus in Uganda are all getting exposed to dangerous pesticides and flame-retardant chemicals, according to new research.

"We were surprised both at the number of chemicals measured in the feces and the levels of some of these chemicals in animals, especially those

The researchers also caution the findings are a warning sign that such pesticide and flame-retardant pollution is harming people as well.

that are wild," Marta Venier, an environmental chemist at Indiana University and senior author of the study, told EHN.

The study, published today in Environmental Science and Technology, is the first to examine these chemicals in both wild and captive primates, and suggests that, as humans increasingly encroach on their habitat, such species are at a high risk of chemical contamination.

The researchers also caution the findings are a warning sign that such pesticide and flame-retardant pollution is harming people as well.

"The presence of numerous anthropogenic chemicals in primates living in protected areas warrants an evaluation of the possible biological effects resulting from exposure," the authors wrote.

Researchers collected feces samples from captive baboons at a primate sanctuary in Indiana; wild howler monkeys at a research station in Costa Rica; and wild baboons, chimpanzees, red-tailed monkeys, and red colobus monkeys from a national park in Uganda.

The red colobus and chimpanzees in Uganda are both endangered populations, Michael Wasserman, a researcher and assistant professor of anthropology and human biology at Indiana University and co-author of the study, told EHN.

"We think a lot about habitat disturbance, logging, and hunting as threats to these species, while pollution has been overlooked," Wasserman said.

They tested the samples for a suite of contaminants—21 legacy pesticides, 29 pesticides currently in-use, 47 halogenated flame-retardants, and 19 organophosphate flame-retardants.

They found a suite of chemicals across the species.

Full Article

Environmental Health News, 9 September 2020

https://www.ehn.org/toxic-chemicals-in-monkey-poop-2647524070.html?rebelltitem=2#rebelltitem2

Consultations

2020-09-11

Applications for authorisation

Consultations: 11

- Start date: 12/08/2020
- Deadline: 07/10/2020

Identification of substances of very high concern

Substances: 2

- Start date: 01/09/2020
- Deadline: 16/10/2020

Restrictions

Restriction proposals: 1

- Start date: 25/03/2020
- Deadline: 25/09/2020

Testing proposals

Testing proposals: 6

- Start date: 24/08/2020
- Deadline: 08/10/2020

ECHA, 11 September 2020

https://echa.europa.eu/consultations/current

Janet's Corner

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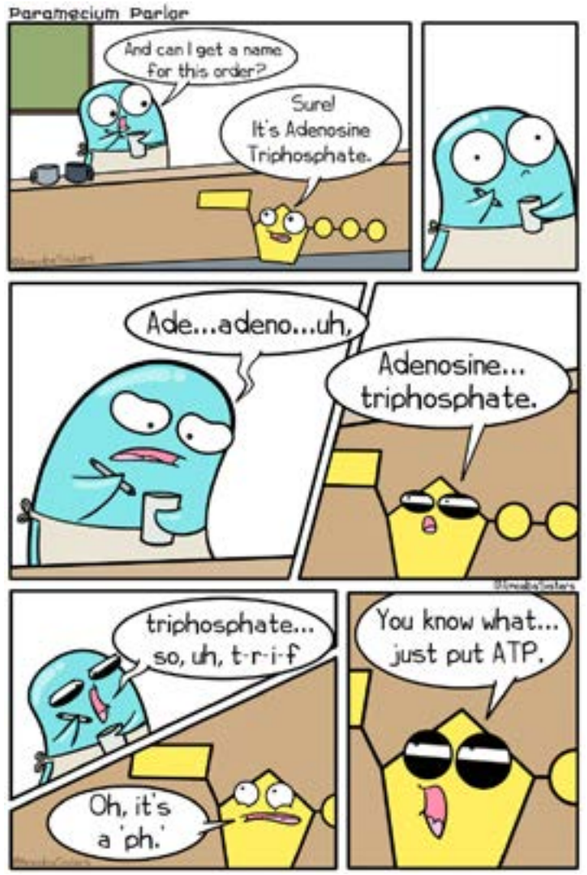
Complicated Names

2020-09-18



https://www.amoebasisters.com/parameciumparlorcomics

Hazard Alert

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Hydrochloric Acid

2020-09-18

Hydrochloric acid, aka HCl or hydrochloride, is a slightly yellow to colourless, corrosive acid with a strong odour. It is non-combustible and non-flammable, with a pH of <1. The acid belongs to a class of inorganic compounds known as halogen hydrides. [1,2,3]

USES [1,4]

Hydrochloric acid is used across a range of applications in various industries. It is commonly used in industrial processes, such as in the production of batteries and fireworks. It is also used to adjust pH levels in pools, and as a way to pickle steel, including rust and scale removal. Hydrochloric acid is used in the production of drinking water, other beverages, foods, and pharmaceuticals. It is also used in the tanning industry.

ROUTES OF EXPOSURE [5]

- The main route of exposure to hydrochloric acid are ingestion or skin or eye contact.

Hydrochloric acid, aka HCl or hydrochloride, is a slightly yellow to colourless, corrosive acid with a strong odour.

HEALTH EFFECTS

Hydrochloric acid poisoning affects a range of systems, including the integumentary and respiratory systems.

Acute Effects [2]

Severity of symptoms depend on the level and type of exposure.

Acute exposure from inhalation to the acid can result in hoarseness, coughing, chest pain, ulceration and inflammation of the respiratory tract and pulmonary oedema. These symptoms are exacerbated for people who suffer from asthma. Acute oral exposure can also cause nausea, vomiting, diarrhea, and corrosion of the mucous membranes, stomach and oesophagus. Dermal contact to hydrochloric acid can result in scarring, ulceration and severe burns.

Chronic Effects [1,5]

Chronic exposure to hydrochloric acid is toxic to multiple body systems. Long term exposure to the chemical compound can cause dermatitis, photosensitisation, chronic bronchitis and gastritis. Prolonged exposure

to low concentrations of the acid may result in dental erosion and discolouration.

SAFETY

First Aid Measures [4]

- Ingestion: If swallowed, contact a medical professional immediately. If medical attention is not available immediately, the patient is more than 15 minutes from the hospital, or unless instructed otherwise, induce vomiting ONLY IF THE PATIENT IS CONSCIOUS.
- Skin contact: Remove all contaminated clothing, footwear and accessories. Do not re-wear clothing until it has been thoroughly decontaminated. Immediately rinse affected areas with plenty of soap and water. If irritation persist, contact a doctor immediately.
- Eye contact: Flush eyes (including under the eyelids), with water for at least 15 minutes. Removal of contact lenses should only be done by skilled personnel. Contact a medical professional immediately.
- Inhalation: Take victim away from the contaminated area to the nearest fresh air source and monitor their breathing. Keep the victim warm. If the victim is not breathing, and you are qualified, you may perform CPR with a one-way valve or protective mask. Immediately contact a medical professional.
- General: Never administer anything by mouth to an unconscious, exposed person.

Exposure Controls/Personal Protection [4]

- Engineering controls: Emergency eyewash fountains and quick-drench areas should be accessible in the immediate area of the potential exposure. Ensure there is adequate ventilation. Use a local exhaust ventilation or process enclosure, to limit the amount of acid in the air.
- Personal protection: Safety glasses, protective and dustproof clothing, gloves, an apron and an appropriate mask or dusk respirator. Wear impervious shoes. Do not wear contact lenses. For specifications regarding other PPE, Follow the guidelines set in your jurisdiction.

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REGULATION [6]

United States:

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) concentration limit for hydrochloric acid of 5ppm.

Australia [7]

An 8-hour time-weighted average (TWA) for hydrochloric acid of 5ppm has been set.

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5. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/337689/hpa_hydrogen_chloride_toxicological_overview_v1.pdf
6. https://www.cdc.gov/niosh/npg/npgd0332.html
7. https://www.chemsupply.com.au/documents/HL0201CH34.pdf

A grim reality of reopening: More mold

2020-09-01

LAST MONTH, I took a road trip to North Carolina. The area had just experienced an extremely wet and rainy spring, and the Airbnb I was staying in had been unoccupied since Covid-19 halted almost all travel in March. When I unlocked the door, a putrid smell hit my nose immediately, like a wet beach towel left too long in a hot car. I was now sharing my rental house with some sort of mold.

The pandemic has forced all sorts of buildings to sit empty for long periods of time. As people venture back into their homes, schools, and offices again, they may also find an unwelcome surprise inside. The Centers for Disease Control and Prevention warns people who are reopening buildings to watch out for potential hazards like mold and *Legionella pneumophila*, the bacterium that causes Legionnaires' disease. Greg Bukowski, CEO of the mold inspection and removal firm Moldman USA, says he's seen an uptick in customers in the Chicago and St. Louis areas where his company is based. "Homes that have been unoccupied for months have a high likelihood of having water-intrusion issues and subsequent mold issues," he says. Water intrusion can come from something like a roof or plumbing leak or high humidity as a result of leaving the air conditioning off.

This is not a new phenomenon, of course. Vacation homes and foreclosed properties often harbor mold. New construction techniques may be somewhat to blame: Because homes are now tightly sealed for energy conservation, they may be poorly ventilated and susceptible to issues like mold. Every year, some unlucky school districts return in August or September to find classrooms full of the stuff, says Jason Earle, the founder and CEO of 1-800-GOT-MOLD?, a mold inspection and removal firm based in the New York City area. Oftentimes, he says, maintenance staff shampoo the carpets at the end of the school year and then turn air conditioning units off to save on utility costs, inadvertently creating a perfect environment for mold to thrive.

Fungi need moisture and food to grow. They will eat almost any organic substance, from cardboard and wood to ceiling tiles and upholstery. What I inhaled were the airborne byproducts of its metabolic processes, or what the US Environmental Protection Agency says are "microbial volatile organic compounds." I personally prefer to call them fungi farts.

Aside from producing a nasty smell, exposure to mold can also cause unpleasant side effects for people who are sensitive to it, like stuffy nose,

"Homes that have been unoccupied for months have a high likelihood of having water-intrusion issues and subsequent mold issues," he says.

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coughing, and sore throat. If you're immunocompromised, you may be more vulnerable to these and other symptoms, says Naresh Magan, a professor of applied mycology at Cranfield University in England. For parents, the most serious issue to be concerned about is childhood asthma: A number of studies have found a link between mold exposure and the condition.

That doesn't mean all mold is scary or harmful. Humans are constantly breathing in a plethora of different fungi and other microbes; usually they just don't realize it. "There are thousands of mold spores in the air," says Magan. If you wash a piece of fruit, for example, and then put the runoff water into a petri dish, "you will find loads of bacteria, yeasts, and filamentous molds," he says. The world is really just a gigantic terrarium full of microscopic creatures ready to be inhaled. But if the concentration of mold spores in the air becomes too high, like inside a mold-contaminated building, it can cause an adverse health reaction.

If you return from quarantining at a loved one's place to find that mold has turned your home into *its* home, it should be removed. While some companies will sell you testing kits to identify the exact species, the process is not necessary, according to the CDC. "The health effects of mold can be different for different people, so you cannot rely on sampling and culturing to know if you or a member of your family might become sick," the agency's website advises.

If the mold covers an area less than 10 square feet, you may be able to take care of it on your own. On hard surfaces, the CDC recommends using household cleaners or bleach and water to remove the mold, as a property manager at my Airbnb did. Soft items, like rugs, need to be thrown out. If the problem is larger, the CDC refers people to the EPA's mold remediation guide designed for professionals.

If you're thinking about hiring one, Bukowski says a lot depends on your comfort level doing a somewhat dirty job. "Safety should be the top priority. For example, a 4-square-foot problem in the attic should be handled by a pro, because attics are usually difficult, unsafe areas to work in," he says. Professionals also come equipped with proper protective equipment you might not have on hand.

If you smell that signature musty scent but don't know where the mold is hiding, Earle says a regular flashlight can be your best friend. Check typically empty areas, like attics, crawl spaces, and basements. Even if the mold itself is not visible, you may see signs of its presence, like blistering paint, loose wall trim, staining, or discoloration around windows. It's also

a good idea to look out for any leaks or puddles of standing water—mold loves wetness.

To prevent the fungi from taking root in the first place, Earle says you should keep your home heated or cooled to temperatures comfortable for humans, even if you don't plan to be there. "This is something we warn people about all the time: Buildings need to be lived in or maintained as such," he says. But the most important thing is to control the level of moisture. The CDC recommends keeping humidity levels as low as possible, ideally below 50 percent. If you're planning an extended absence, you can invest in a smart thermostat capable of delivering moisture readings, or simply have a friend or family member drop by once in a while to check on things.

Cleaning up mold is just one of many challenges communities are facing as they begin reopening offices and schools in the middle of a pandemic. More than half of US public schools are in need of repairs, according to a Government Accountability Office report released in June. The most commonly needed fixes are to heating, ventilation, and air conditioning systems—the very infrastructure necessary for stopping mold.

wired.com, 1 September 2020

https://www.wired.com

Steroids reduce deaths of critically ill COVID-19 patients, WHO confirms

2020-09-02

In June, a large study in the United Kingdom suggested that the steroid dexamethasone could help reduce the risk of death for critically ill COVID-19 patients. Now, more evidence suggests that steroids are an effective weapon against the coronavirus.

Researchers from the World Health Organization combined data from seven randomized clinical trials for severely or critically ill COVID-19 patients treated with steroids versus standard care or a placebo up to June 9. The trials used the steroids hydrocortisone, dexamethasone or methylprednisolone.

People who were on ventilators when their clinical trial started had a 30 percent chance of dying from the virus if given steroids compared with a 38 percent chance on standard care or a placebo, researchers report September 2 in *JAMA*. Results were even more promising for critically

The trials used the steroids hydrocortisone, dexamethasone or methylprednisolone.

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ill people who were not on ventilators: Those taking steroids had a 23 percent chance of death compared with a 42 percent for people taking a placebo or getting standard care.

Results of three of the studies included in the combined analysis — one from France testing hydrocortisone, a trial of dexamethasone in Brazil and an international study of hydrocortisone — were published at the same time in *JAMA*. Those and other trials in the WHO analysis were stopped early because it wouldn't have been ethical to continue and deny some sick patients steroids once the U.K. study found them effective.

Based on the results of the combined analysis, the WHO recommended on September 2 that doctors give dexamethasone or hydrocortisone to severely and critically ill COVID-19 patients, but not to people with milder illness. Giving steroids to people with moderate or mild cases might dampen the immune system too much, allowing the virus to do more damage. The U.S. National Institutes of Health have also recommended use of steroids for hospitalized people who need extra oxygen or are on ventilators.

sciencenews.org, 2 September 2020

https://www.sciencenews.org

Hot roads and roofs send harmful pollution into the air

2020-09-03

We all know cars and trucks spew pollution into the air—but it turns out what's underneath their tires do as well.

Asphalt—a petroleum product used on roads and roofs—is a significant source of harmful chemicals that end up contributing to ozone and particulate matter pollution, according to a study published today in *Science Advances*.

The researchers found the emissions from asphalt are highest on hot, sunny days. While producing asphalt is a known source of pollutants such particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, and volatile organic compounds, the asphalt industry has said pollution from applied asphalt is negligible.

The findings are important as most states and cities have tackled combustion sources of air pollution—such as cars and power plants—but have neglected to take asphalt emissions into account.

The researchers found the emissions from asphalt are highest on hot, sunny days.

"Asphalt at typical application and in-use temperatures emits a complex mixture of organic compounds that span a wide volatility range," the authors wrote.

The researchers took samples of fresh asphalt and heated them to different temperatures (from 104 degrees Fahrenheit to 392 degrees Fahrenheit), finding that, as the asphalt heated up, emissions rose. Emissions doubled when temperatures increased from 104 F to 140 F.

From 140 F to 284 F, emissions increased about 70 percent for every 20-degree jump.

In addition, when road asphalt was exposed to solar radiation, which mimics sunlight, emissions increased 300 percent. "That's important from the perspective of air quality, especially in hot, sunny summertime conditions," said Peeyush Khare, a researcher and graduate student at Yale University and lead author of the study, in a statement.

Asphalt releases organic compounds that are precursors to secondary organic aerosols, which contribute to particulate matter pollution (PM2.5). PM2.5 consists of toxic airborne particles much tinier than the width of a human hair, and is linked to a variety of health impacts including respiratory and heart problems, birth impacts and altered brain development for children.

Such emissions are important because asphalt is so widespread—cities' total surface areas are, on average, 45 percent paved. The U.S. alone uses about 27 million metric tons of liquid asphalt each year, according to a recent report.

Khare and colleagues estimated in Los Angeles, for example, asphalt's potential to emit secondary organic aerosols is comparable to vehicles.

Drew Gentner, as associate professor of chemical and environmental engineering at Yale University, said that asphalt is just one source of secondary aerosols in cities, as personal care and cleaning products are other common sources.

Asphalt is "another important non-combustion source of emissions that contributes to secondary organic aerosols production, among a class of sources that scientists in the field are actively working to constrain better," Gentner said in a statement.

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See the full study here.

ehn.org, 3 September 2020

https://www.ehn.org

Blue jeans linked to water pollution from Great Lakes to Arctic, study suggests

2020-09-02

They may hug you in all the right places, but your favourite pair of jeans could be contributing to the pollution of Canada's waters, a new study suggests.

Researchers at the University of Toronto published a paper on Wednesday revealing that they've detected microfibres from blue jeans in aquatic environments ranging from the shallow suburban lakes near Toronto, across the Great Lakes and all the way up to the Arctic Archipelago.

Co-author Sam Athey said previous studies have shown that plastic microfibres from synthetic clothing are polluting oceans and rivers.

But Athey said the team's findings indicate that so-called "natural" fabrics may represent a new frontier of the microfibre pollution problem.

She said further investigation is needed to understand the impacts of human-processed cotton microfibres on marine wildlife.

But earth sciences professor Miriam Diamond said there may not be time to let the scientific process unfold, because the presence of these particles in waters so far away from most of the jeans-wearing population should be cause for global concern.

"Frankly, we can't keep waiting to figure out what the impacts are," Diamond said. "What we do know is that we shouldn't be polluting the Arctic like this."

Athey said the investigation started when she and her fellow doctoral students realized that indigo-dyed cotton fibres kept coming up in samples across their respective areas of environmental research.

Diamond suspected that the source may be a worldwide wardrobe staple: blue jeans.

The researchers set out to study the distribution of denim and other human-processed cotton microfibres across Canada's water systems.

"What we do know is that we shouldn't be polluting the Arctic like this."

Denim microfibres were found at depths greater than 1,500 metres, indicating that the particles may be able to travel long distances and accumulate in remote regions, according to the study.

Athey said denim microfibres were also detected in effluent from wastewater treatment plants that discharge into Lake Ontario, suggesting their route may be traced back to the washing machine.

Researchers conducted a series of tests that found that a pair of used jeans can shed roughly 56,000 microfibres per wash.

Athey said some studies suggest that washing machine filters can help trap microfibres and prevent them from entering aquatic environments.

Diamond said denim lovers can reduce their fashion footprint — and preserve their pants — by following clothing manufacturers' recommendations to try to get as much wear out of their jeans as possible before washing.

theglobeandmail.com, 2 September 2020

https://www.theglobeandmail.com

Amazon tragedy repeats itself as Brazil rainforest goes up in smoke

2020-09-03

Jair Bolsonaro smiles down from a propaganda billboard at the entrance to this scruffy Amazon outpost, welcoming travelers to his "route to development".

But 20 months into Bolsonaro's presidency – and a year after a devastating outbreak of Amazon fires caused global outrage – the fires are back, and many fear Brazil's leader is instead steering his country towards environmental ruin.

During a two-hour monitoring flight through the skies around Novo Progresso the Guardian saw giant columns of white and grey smoke rising from supposedly protected forests below.

Elsewhere, illegal goldmines could be seen within the Baú indigenous territory – a chaotic tapestry of muddy pools and makeshift encampments where pristine forest once stood. Newly deforested areas of fallen and charred trees were visible within the Iriri forest reserve.

"Under this government there will be no combating [of rainforest destruction]," the ex-official said. "The future looks dark."

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"The Amazon is condemned to destruction," despaired one former top official at Brazil's enfeebled environmental agency, Ibama, accusing the far-right populist of overseeing a wholesale "demolition" of protection efforts.

"Under this government there will be no combating [of rainforest destruction]," the ex-official said. "The future looks dark."

Under pressure from foreign investors, governments and Brazilian business leaders to avoid a repeat of last year's scandal – when celebrities and world leaders such as Leonardo DiCaprio and Emmanuel Macron condemned Bolsonaro's treatment of the Amazon – Brazil's government has gone on the offensive.

"This story that the Amazon is going up in flames is a lie," Bolsonaro insisted earlier this month, despite growing evidence to the contrary.

In May thousands of troops were deployed to the Amazon as part of a military mission supposedly designed to cut environmental crime – but which some claim is making things worse.

In July, as pressure from international investors intensified, Brazil announced a four-month ban on burning designed to reassure the world something was being done.

But satellite imagery being gathered by Brazil's own space agency, Inpe, suggests those efforts are falling short. In August it detected more than 7,600 fires in Amazonas – one of nine states making up the Brazilian Amazon – the highest number since 1998 and nearly 1,000 more than last year. On Tuesday Inpe announced that across the entire Amazon region it had detected more than 29,307 fires in August – the second highest number in a decade and only slightly less than last year's figure of 30,900.

Greenpeace calculated that despite the military mobilization and burning ban there had been only an 8% reduction in fires between mid-July and mid-August compared with last year.

"We are watching last year's tragedy repeat itself," said Rômulo Batista, a Greenpeace campaigner in Manaus, the capital of Amazonas.

During a recent surveillance flight over four Amazon states – Amazonas, Mato Grosso, Rondônia and Pará – Batista also witnessed shocking scenes of devastation.

"We saw tracts of pasture that were burning, deforested areas that were burning, areas of forest that were burning. And it was obvious that down there in the forest below us nobody was staying at home [because of coronavirus]," he said.

"Everyone – illegal loggers, land grabbers, illegal miners – they're all up and running, and even more so than usual, safe in the knowledge that government inspections have been scaled back because of the pandemic."

A monitoring official from the indigenous NGO Instituto Kabu, which organized the Guardian's single-engine flight over Pará state, said: "There has been a flagrant increase in illegal mining and logging activities in the last two years. The lack of inspection operations by Ibama and the federal police in this region has ended up encouraging environmental crimes in indigenous territories."

Bep Protti Mekrãgnoti Re, a chieftain for the indigenous Kayapó people, said its communities were paying a heavy price for the government's anti-environmental stance.

"What Bolsonaro's development means is destruction within our reserve," said Bep Protti who recently led a week-long blockade of the Amazon highway cutting through Novo Progresso to demand protection.

He called for urgent action to monitor and protect the region's forests and the wildlife within: "It's with the forest and the rivers that I feed myself."

The chieftain said two models of development were currently facing off in the Amazon: "the development of destruction" and the sustainable "development of construction and knowledge".

Environmentalists are clear which model Bolsonaro – who took office in January 2019 vowing to open the Amazon and its indigenous reserves to development – is pursuing.

"This is without doubt the worst moment in more than 30 years that we are facing in Brazil. And unfortunately it was entirely expected because the president was elected thanks to his anti-environment rhetoric – and now he is making good on those promises," said Carlos Rittl, a Brazilian environmentalist who works at Germany's Institute for Advanced Sustainability Studies.

"The feeling is one of desolation," Rittl said, adding: "2020 is going to be a terrible year."

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Batista compared Bolsonaro's approach to the forest fires to his denialist handling of coronavirus, which has now killed more than 120,000 Brazilians. The far-right populist hoped to deny satellite images and science and project "an air of normality" to the world "just as he did with Covid-19". "Unfortunately, this simply isn't true."

The former Ibama official was similarly pessimistic, claiming its operations were "completely paralyzed" and Brazil's environmental policies in tatters. The organization, reeling from years of cuts, had only six helicopters to police the Amazon's 2.1m square miles, with plans to take two more of those out of service. "If you ask me, to fight deforestation we would need at least 12."

Last week Brazil's environment minister announced that all anti-deforestation operations were to be halted, although that was reversed after an outcry.

Rittl called the latest fires – which are likely to continue until October – "a tragedy foretold" and the consequence of "a government with absolutely no commitment to the environment".

"Under Bolsonaro, Brazil is becoming perhaps the greatest global enemy of the environment. It is so sad to see," he said. "A tiny number of people grow very rich with this – and all of us lose."

theguardian.com, 3 September 2020

https://www.theguardian.com

California's toxic-free cosmetics act moves forward for governor's approval

2020-09-02

The California legislature passes the **Toxic-Free Cosmetics Act, A.B. 2762** and now the bill is passed to Gov. Gavin Newsom. The landmark legislation bans 12 toxic ingredients which are already prohibited from cosmetics and other personal care products sold in the European Union and other countries.
Bill to Ban Toxic Fluorinated Chemicals

The list of banned chemicals includes the toxic fluorinated chemicals known as PFAS, mercury, formaldehyde, as well as endocrine-disrupting phthalates and long-chain parabens, preservatives used in skincare products.

The landmark legislation bans 12 toxic ingredients which are already prohibited from cosmetics and other personal care products sold in the European Union and other countries.

The U.S. has done little to protect consumers from unsafe ingredients in personal care products. For more than 80 years, Congress has neglected to increase the scope of the FDA's authority on cosmetics, limiting the agency's ability to ensure the safety of cosmetic products.
Creating Global Standard for Cosmetic Safety

By contrast, the EU has performed rigorous research to identify the chemicals that are not safe for use in cosmetics and other personal care products. By following their science on chemical bans, Californians will be safer, while also creating a more global standard for cosmetic safety.

"*California is the first state to ban ingredients from personal care products. And for the first time, groups like EWG and the industry's trade association, the Personal Care Products Council, support legislation to modernize the rules governing these everyday products. We urge Gov. Newsom to sign this absolutely necessary legislation into law*," said Ken Cook, president of EWG.

cosmetics.specialchem.com, 2 September 2020

https://www.cosmetics.specialchem.com

Google's quantum computer achieves chemistry milestone

2020-09-04

When researchers at Google announced last fall that they had achieved "quantum superiority"—a point at which a quantum computer can perform a task beyond the reach of regular computers—some people wondered what the big deal was. The program, which checked the output of a random number generator, was of limited practical value and did not prove that the company's machine could do anything useful, critics said.

Now, however, Google's quantum computer has achieved something that could have real-world applications: successfully simulating a simple chemical reaction. The feat points the way toward quantum chemistry, which could expand scientists' understanding of molecular reactions and lead to useful discoveries, such as better batteries, new ways to make fertilizer and improved methods of removing carbon dioxide from the air.

Last year's quantum superiority experiment was run on a chip dubbed Sycamore, which contained 53 superconducting quantum bits, or qubits. Chilled to near absolute zero, the qubits take on quantum-mechanical

Now, however, Google's quantum computer has achieved something that could have real-world applications: successfully simulating a simple chemical reaction.

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properties, allowing scientists to manipulate them in more complicated and useful ways than the simple "on/off" flows of current that make up the bits of classical computers. The hope is that one day, quantum computers will become powerful enough to quickly perform calculations that would take the lifetime of the universe for a classical computer to complete.

This quantum-chemistry experiment, which was described in the August 28 issue of the journal *Science*, relied on the same basic Sycamore design, though it only used 12 qubits. But it demonstrates the system's versatility, says Ryan Babbush, the researcher in charge of developing algorithms for the Google project. "It shows that, in fact, this device is a completely programmable digital quantum computer that can be used for really any task you might attempt," he says.

The team first simulated a simplified version of the energy state of a molecule consisting of 12 hydrogen atoms, with each of the 12 qubits representing one atom's single electron. They then modeled a chemical reaction in a molecule containing hydrogen and nitrogen atoms, including how that molecule's electronic structure would change when its hydrogen atoms shifted from one side to the other. Because the energy of electrons dictates how fast a reaction occurs at a given temperature or concentration of different molecules, such simulations could help chemists understand exactly how that reaction works—and how it would change if they altered the temperature or the chemical cocktail.

The simulation the researchers ran, known as the Hartree-Fock procedure, can also be performed on a classical computer, so it did not, by itself, demonstrate the superiority of a quantum computer. And it was run with help from a classical computer, which used machine learning to evaluate each calculation and then refine new rounds of quantum simulation. But the feat validates the project's underlying methods, which will be integral to future quantum-chemistry simulations, says Nicholas Rubin, a research scientist on the Google quantum team. And it was twice as large as the previous record-holding chemistry calculation made on a quantum computer.

In 2017 IBM performed a quantum-chemistry simulation using six qubits. Rubin says that result described a molecular system with a level of complexity that scientists in the 1920s could calculate by hand. In doubling that figure to 12 qubits, Google's project tackled a system that could be calculated with a 1940s-era computer. "If we double it again, we'll probably go to something like 1980," Babbush adds. "And if we double it again, then we'll probably be beyond what you could do classically today."

So far, no quantum computer has achieved what a classical computer could not, says Xiao Yuan, a postdoctoral research fellow at Stanford University's Institute for Theoretical Physics, who wrote a commentary accompanying Google's paper in *Science*. Even the company's achievement of quantum superiority in 2019 was called into question by IBM researchers, who showed a way to achieve the same results on a supercomputer in two and a half days, although Google's version took just more than three minutes. But, Yuan says, the quantum-chemistry experiment is an important step toward a major goal. "If we can use a quantum computer to solve a classically hard and meaningful question, that would be really the most exciting news," he adds.

There is no theoretical reason scientists could not achieve that goal, Yuan says, but the technical challenge of moving from a few qubits to several hundred—and eventually many more—will require a lot of complicated engineering. A general-purpose quantum computer with millions of qubits will require the development of error-correction protocols, a particularly arduous problem that may take a decade or more to solve. But so-called noisy intermediate-scale quantum computers, which do not have full error correction, might still prove useful in the meantime.

Chemistry is well matched with quantum computing, because a chemical reaction is inherently quantum, says Alán Aspuru-Guzik, a pioneer of quantum chemistry at the University of Toronto. To fully model such a reaction, one must know the quantum states of all the electrons involved. And what better way is there to model a quantum system than to use another quantum system? Long before engineers develop a generally programmable quantum computer, devices with a handful of qubits should be able to outperform classical computers on a subset of interesting problems in chemistry, Aspuru-Guzik says. "So this is a big deal, but it's not the end of the story," he adds.

For instance, Aspuru-Guzik is seeking better battery materials to store energy produced by wind turbines and solar cells. Such materials have properties that can be in conflict: they need to be reactive enough to charge and discharge quickly but still stable enough to avoid exploding or catching fire. Computer models of the reactions could help identify ideal materials for that tricky task. Such models could also be important in developing new drugs.

Even so, quantum computers may not be the only revolutionary new way to model chemical reactions, Aspuru-Guzik says. It is possible that

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artificial intelligence could develop algorithms efficient enough to run usable simulations on classical computers. To hedge its bets, his lab works on both possibilities: it is developing new algorithms to run on midrange quantum computers and creating AI-driven robots to discover new types of materials.

But Google's work makes Aspuru-Guzik optimistic that quantum computing can solve interesting problems in the not too distant future. "This is the best that a quantum computer can do today," he says. "But there is a lot of work, both in the hardware and the software, to get there."

scientificamerican.com, 4 September 2020

https://www.scientificamerican.com

Mercury from gold mining contaminates Amazon communities' staple fish

2020-09-03

For the communities of the Amazon, a land defined by its rivers, fish has always been an important part of the diet. In the northern reaches of the Amazon, the top four species are *tucunaré*, *pirapucu*, *trairão* and *mandubé*.

The result: detectable levels of mercury were found in all samples. In 28.7% of them, the amount exceeded the WHO limit.

But small-scale gold mining has turned these fish into an often deadly health hazard. According to a study published in July in the *International Journal of Environmental Research and Public Health*, mercury levels found in pirapucu (*Boulengerella cuvieri*) were four times higher than the safe limit established by the World Health Organization (WHO).

The researchers analyzed 428 samples of fish caught between 2017 and 2018 in five rivers in the Brazilian state of Amapá. The collection points were close to potential mining areas, where mercury is often used to separate gold from ore. The result: detectable levels of mercury were found in all samples. In 28.7% of them, the amount exceeded the WHO limit.

The study — a joint effort by the Oswaldo Cruz Foundation (Fiocruz), WWF Brazil, the Amapá Institute for Scientific and Technological Research (IEPA) and the Institute for Indigenous Research and Training (Iepé) — reveals the risks to which the state's Indigenous and riverine populations are exposed, especially children.

Study co-author Paulo Basta, a medical doctor and researcher at Fiocruz, a scientific institution in Rio de Janeiro, says the impacts of mercury exposure on unborn children are already well-documented. These children

"may face intelligence quotient impairments that will last throughout their lives," he says. "They will have learning difficulties and fewer chances of getting good jobs and income. The result is a permanent cycle of inequality and poverty." In the most severe cases, the child may be born with deformities.

In adults, mercury contamination may lead to coordination problems such as difficulty walking and hand tremors, hearing and vision impairment, and even dementia, Basta says.

Iepé assistant executive director Décio Yokota, another co-author of the study, says fish from the area studied is consumed by people from at least four Indigenous territories: Wajãpi, Uaçá, Juminã and Galibi. For these populations, fish is the main source of protein and also the main vector of mercury contamination as a result of bioaccumulation. "Small fish eat the algae, then a bigger fish eats the small fish and is eaten by other, even bigger, fish," he says. "That's why the most contaminated fish are usually at the top of food chains. They accumulate a very large amount of mercury in the process."

This explains why carnivorous fish had the highest levels of contamination in the study: 77.6% of them had mercury above the WHO limit. "If you eat these contaminated fish every day, you increase your level of contamination each time you eat them," Basta says.

The proportion contaminated with unsafe levels of mercury was 20% among omnivorous fish, which feed on both fish and plants, and 2.4% among herbivorous fish. The study authors recommend eating a maximum of 200 grams (7 ounces) of carnivorous fish a week. In the case of *mandubé* (*Ageneiosus inermis*), *pirapucu*, *tucunaré* (*Cichla monoculus*) and *trairão* (*Hoplias aimara*), consumption should be restricted to once a month.

Yokota acknowledges that it isn't easy for people who rarely have other sources of protein to follow the recommendation. "Ideally, mining should be eliminated. If that's not possible, we need to think about changing our diet. But we cannot tell people who have no other source of protein not to eat fish. That's why we suggest that they try to eat more herbivorous fish, whose levels of contamination are much lower."

A 2014 report shows mining is the main cause of deforestation in the Guiana Shield, a 2.5-million-square-kilometer (965,300-square-mile) area that straddles part of northern Brazil, French Guiana, Suriname, Guyana and part of Venezuela. It's a long-standing problem that has gotten worse in recent years, according to Marcelo Oliveira-da-Costa, a WWF Brazil conservation expert and co-author of the new study. "Managers of Amapá's conservation units say law enforcement has not been effective, and the political signals sent by the federal government are terrible," he says. "If you look at the Amazon as a whole, [mining] is only increasing."

Oliveira says there's an urgent need for studies on the impact of mercury contamination on the Amazon's Indigenous peoples. "We know that people are contaminated in several areas, such as the Yanomami, the Munduruku … but what are the effects? There is no investment to study the effects of contamination on those populations," he says.

To fill in this information gap, the same research institutions plan to carry out studies later this year to assess the impact of mercury on the health of Amapá's riverine families and the Munduruku people in Pará state.

news.mongabay.com, 3 September 2020

https://www.news.mongabay.com

Large study finds link between hair dye and a certain type of breast cancer

2020-09-05

A new large population study looks to clarify the theorised connection between hair dye and cancer. The study found no link between ever using hair dye and an increased risk of most types of cancer in women. However, it did find a possible relationship between hair dye and certain forms of breast cancer, ovarian cancer, and the most common kind of skin cancer — links that "warrant further investigation."

The study, published in the BMJ this week, looked at data from another research project, called the Nurses' Health Study. That study has kept track of volunteers' health and lifestyle habits since 1976, with questionnaires sent out and returned every two or four years. More than 120,000 women between the ages of 30 to 55 were initially enrolled.

The researchers of this study looked at 117,200 women who detailed whether or not they had ever used permanent hair dye and were reported free of cancer at the start of the project. On average, the women were followed for 36 years, and a third reported hair dye use at some point in their lives. During that time, there were more than 47,000 self-reported cases of cancer among the women, along with over 4,800 deaths.

During that time, there were more than 47,000 self-reported cases of cancer among the women, along with over 4,800 deaths.

The study found no significant association between a greater chance of most cancers and hair dye use, regardless of how long or often the women used hair dye. It also found no link between a greater risk of dying from cancer and hair dye use.

Compared to women with no hair dye use, however, women who had ever used hair dye did seem to have a higher risk of developing hormone receptor-negative breast cancer, a form of breast cancer that tends to grow faster, affects younger women, and doesn't respond to treatments that block or lower the hormone estrogen and progesterone. They also had a higher associated risk of ovarian cancer and basal cell carcinoma, the most common but very treatable form of skin cancer.

The results of this new study agree with other research showing no link between hair dye and many types of cancer, including a 1994 study using the same group of women that ruled out a hair dye link to leukemia and related blood cancers. But it also lines up with recent research tying breast cancer, specifically, to hair dye use. That includes a government-led study last December that found such a link, which was even greater for Black women in particular.

"This prospective cohort study among mostly white U.S. women offers some reassurance against concerns that personal use of permanent hair dyes might be associated with increased cancer risk or mortality," the authors wrote. "However, we did find a positive association for risk of some cancers."

Cancer risk often is a very hard thing to study and nail down. There are around 5,000 chemicals that are found in hair dye products and some are known to be carcinogenic on their own. But the risk of any one thing causing cancer can be affected by a lot of factors, including a person's genetics, environment and the strength of exposure to it. Another unanswered question is how much added risk hair dye might come with, assuming it does exist.

The World Health Organisation has found that the occupational exposure of hair dye faced by people working all day in salons and similar places, for instance, is a probable human carcinogen. The personal use of hair dye, however, is currently considered what the WHO calls a "group 3 agent," meaning there's not enough evidence to classify its cancer risk either way right now.

These sorts of studies alone can't directly prove or disprove a causative link to cancer. But they do give scientists a clearer direction to focus on, such as

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the cancers that may have been associated with hair dye use in the study. Importantly, the authors note, future studies should look at more diverse groups of women and look outside of the U.S. as well as take into account the type of colour dye they were using, something that wasn't possible in this study. Darker hair dyes are especially of concern to study, the authors noted, since they tend to contain more chemicals than lighter ones.

The American Cancer Society, discussing the research on hair dye and cancer so far, summarises things well:

"It's not clear how much personal hair dye use might raise cancer risk, if at all. Most studies done so far have not found a strong link, but more studies are needed to help clarify this issue."

gizmodo.com.au, 5 September 2020

https://www.gizmodo.com.au

Uber pledges all-electric fleet by 2040

2020-09-08

Uber has said that all taxis available through its app will be electric by 2040 - and by 2030 in US, Canadian and European cities.

Users will also be able to request an electric or hybrid vehicle.

The ride-hailing firm said the move was part of its "responsibility" to tackle the challenge of climate change.

The company said that it would spend $800m (£614m) to help drivers switch to electric cars, creating partnerships with manufacturers to ensure discounts.

Users will also be able to request an electric or hybrid vehicle.

That option is available in 15 US and Canadian cities for an extra $1, Uber said. It said it would launch in more than 65 cities globally by the end of the year.

"It's our responsibility as the largest mobility platform in the world to more aggressively tackle the challenge of climate change," chief executive Dara Khosrowshahi said in a blog post on Tuesday.

"While we're not the first to set ambitious goals in transitioning to [electric vehicles], we intend to be the first to make it happen."

Climate change contributors

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Uber and smaller rival Lyft have faced ongoing criticism for their role contributing to traffic and air pollution, with research showing many of their rides replace less polluting alternatives, like walking, biking, or taking public transport.

Lyft in June pledged to have an all electric fleet by 2030, but it did not outline support for drivers. Many of them operate their own cars.

Uber on Tuesday said that battery electric vehicles accounted for roughly 0.15% of the miles logged on its platform in the US and Canada between 2017 and 2019. Including hybrids, the mileage logged in green vehicles is about five times the average in the United States.

In London, where it has clashed with regulators, Uber had already pledged that all the firm's rides would happen in electric cars by 2025.

On Tuesday, Uber said it was working with Renault and Nissan to expand that effort to other European cities, starting in France. In the US and Canada, it is working with General Motors.

Uber said drivers will earn more per ride if they are using electric or hybrid cars and it was also working to include more alternatives to cars in its app.

Climate change organisations, which have pressed the company to improve its environmental record, said they were pleased by Uber's announcement.

"Uber's commitment to rapidly electrify its fleet in major European cities is good news," said William Todts, executive director of the campaign group Transport & Environment.

"Now it's time for Europe's city mayors to show leadership. We need all big cities in Europe to introduce zero-emission zones, new pop-up bike lanes and cycle-only corridors, while also providing easy access to charging at home, at work and wherever people park."

bbc.com, 8 September 2020

https://www.bbc.com

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When fashion is fungal

2020-08-31

Fungus gets a bad rap. It renders our food inedible, our homes inhospitable and our toenails infectious. The word itself conjures up the notion of mold and decay — the slow ending of something alive.

But increasingly, scientists are using mycelium, the threadlike vegetative roots of fungus, to create everything from plastics to packaging materials to plant-based meats, even scaffolding to grow new organs.

And now, mycelium is starting to show up in closets as a nature-based material for clothes, shoes and bags slung over shoulders.

A new crop of manufacturers are harnessing mycelium to create leather-like materials without the cow. While their products are not yet on the mass market, they're demonstrating that durable clothing and accessories can be derived from fungi — which is neither plant nor animal — at a lower carbon cost than traditional animal hides or plastics.

The fashion industry is the world's second-most polluting business, behind oil, according to the United Nations. The industry consumes huge quantities of water and produces 10 percent of global carbon emissions — more than all international air travel and maritime shipping combined.

Not only does the production of textiles and leather pose environmental problems, so does their disposal. Fast fashion, inexpensive clothes frequently made from oil-based textiles that are designed to be worn briefly, has only compounded the problem. In 1960, Americans tossed 1,710 tons of textiles into landfills, according to the Environmental Protection Agency. By 2017, that amount ballooned to 11,150 tons.

Brands made from "biomaterials" are answering the call for greater sustainability, starting with how fabrics are made.

In 2007, when Sophia Wang became an assistant for Bay Area-based artist and sculptor Philip Ross, she had never considered fungi as a building material. But when she saw Ross's sculptures, she said, "I was just blown away."

Ross has been molding mycelium since the 1990s. He's grown tables and chairs, and, in 2009, he constructed a teahouse out of mycelial bricks that was exhibited at the Kunsthalle Düsseldorf, the contemporary art exhibition hall in Germany.

The fashion industry is the world's second-most polluting business, behind oil, according to the United Nations.

Wang and Ross founded MycoWorks in 2013, and today they are growing a biomaterials company out of mycelium inside a lab in Emeryville, Calif.

"The process for growing it is pretty similar to what you would find with agricultural processes used to cultivate mushrooms, or as an analog, to create fine wines or cheeses," Wang said.

MycoWorks feeds agricultural waste such as sawdust to ganoderma, a wood-eating fungus species, to coax it to grow mycelium cells in a dense, intertwined structure. Left alone, this mycelium would form mushrooms, but by controlling temperature, humidity and other environmental factors, the mycelium instead produces sheets of fibers. The resulting product, which they've branded Reishi, can then be treated and manufactured like leather.

"Reishi is not leather. Reishi is more than leather," said Matt Scullin, chief executive of MycoWorks. "We're sort of limited by the vernacular right now. It feels like leather, it looks like leather, so we talk about it as leather, but it's not leather."

Tests show that Reishi outperforms leather in strength and matches leather in durability and appearance, the company said. Beyond being a viable material for fashion, it might provide a better solution for the planet.

"The leather and plastic-leather industries comprise one percent of global carbon emissions," said Scullin. "I think the impact we can make with Reishi alone is actually quite significant."

Outside the lab, fungi's role in the carbon cycle might be more significant than previously understood. Studies show that when plants partner with certain types of fungi, they can store up to 70 percent more carbon in the soil, which contains more carbon than the atmosphere and vegetation combined.

"When the carbon is broken down from these plant materials, there's a large part of it that goes to making the fungus grow," said Jonathan Schilling, a scientist and professor of plant and microbial biology at the University of Minnesota. "There's a huge concentration of carbon that ends up resting in the soil, in this fungal biomass."

Once a mushroom garment has reached the end of its life, it might be returned to the fungi that created it, in a perfect circle of recycling. "Some of the fungi can eat themselves," said Schilling, who sits on the MycoWorks Scientific Advisory Board. "If you give them chunks of another individual fungus in their own species, they'll eat that material."

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But Stephen Sothmann, president of the Leather and Hide Council of America, said it's disingenuous for alternative leather brands to claim their products can save the lives of billions of animals or solve climate change. The U.S. leather industry maintains that it does not send a single animal to slaughter. Instead, it says, it exists primarily as a waste stream for skins and hides otherwise destined for landfills.

"The leather industry is a recycling industry," said Sothmann. "We're already taking a waste product and turning it into something sustainable and usable."

Still, the leather industry is facing significant head winds. The public is starting to equate cattle with climate, raising objections to the greenhouse gases, land and water use and soil degradation associated with beef production.

In the past few years, plant-based meat replacements such as Impossible Burger and Beyond Meat have flooded the market. And research firms estimate that vegan leather, often made with petroleum, will grow significantly by the end of this decade.

"Frankly, we're already in a nightmare scenario for the industry," said Sothmann. He estimates that 17 percent of hides went to landfill in 2019 alone — a sizable loss for the industry.

But the biomaterials industry is on the rise.

David Breslauer didn't set out to save the environment when he started Bolt Threads in 2009. But now he and his co-founders, Dan Widmaier and Ethan Mirsky, are working at the bleeding edge of material science, harvesting silk from sugars and "leather" from fungi.

"When I started looking into how spiders make silk," said Breslauer, "it turned out that they had this little microscale glandulature that secreted this protein that turned from a liquid into a fiber."

What started as three guys and an imitation spider gland is now a biomaterials company producing everything from "spider silk" to mushroom leather.

Bolt Threads takes organic material like corn sugar or sawdust and feeds it to yeast or fungus, which then convert it into materials used to make its Microsilk, which mimics the silk spun by spiders, and Mylo, which is Bolt's "leather" product, Breslauer said.

"Relative to a cow that takes years to grow, and then you slaughter it for its meat and skin, we grow Mylo in a couple of days," said Breslauer. "You can start really measuring how much better you are doing for the environment by finding an alternative."

Although humans have been cultivating animal skins for centuries, up until the 1800s, most hides were cured with excrement or dried in the sun. The Industrial Revolution ushered in new methods of chemically treating hides, introducing heavy metals and acids, like chromium salts and sulfuric acid, into the process.

Tanning, dying and treating skins can be chemically corrosive — harmful for the environment and human health. Beatrice Amblard, a master leatherworker of four decades, admits that "the tanning process is definitely not an ideal situation for the environment."

Investors have poured millions into bio-based textiles. Earlier this year, MycoWorks announced that it raised $17 million in Series A financing and is expanding into a third commercial plant adding the capacity to produce 80,000 square feet of material per year.

MycoWorks debuted sheets of Reishi at New York Fashion Week in February and said partnerships with fashion brands will be announced in coming months.

Bolt, which raised $213 million from investors including Formation 8 and Baillie Gifford, has tiptoed into the marketplace over the past few years, releasing limited-edition products like a Microsilk necktie priced at $314 and a blended Rambouillet wool and synthetic spider silk beanie priced at $198. It also partnered with Seattle-based Chester Wallace to release a driver bag in 2018, which debuted on Kickstarter at $400 and sold out in seven days, a spokesperson for Bolt said.

In 2019, Stella McCartney, a brand that eschews leather and fur and promotes the idea that fashion can be gentle on the environment, unveiled a tennis dress made from Bolt's Microsilk and a Falabella purse made from Mylo, although not for purchase. A drapey golden Microsilk dress was also shown at the Museum of Modern Art's "Is Fashion Modern?" exhibition in 2017. Bolt's materials are exclusively sold to Stella McCartney, but the company will be announcing other partnerships in the near future, a representative said.

Although it remains to be seen whether these products can safely biodegrade after manufacturing, Scullin says it's possible. "Under the right

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conditions, it will be biodegradable," said Scullin. But, he added, it will be up to brands that buy Reishi to be responsible stewards.

Despite its environmental downsides, leather remains popular. Last year, the United States exported over $1 billion of cattle hides, pig skins and semi-processed leather, and the global market for animal leather was estimated at $82 billion in 2016.

Although Sothmann said that the market has shrunk considerably since 2014, when this global data was compiled, he thinks leather, a natural material, is well-positioned for a future in which increasing emphasis is put on the circular economy, a system that eliminates waste through the continual use of resources.

For top fashion brands, leather still means luxury. Leather's durability, craftsmanship and buttery smooth feel are hard to compete against, but brands like Bolt and MycoWorks are betting their products can close that gap.

"I think we are going to grow the future," said Scullin. "We're not going to derive future materials from petroleum products, and we are not going to derive them from animal products."

Amblard is less convinced that mycelium will replace leather entirely, but she's excited to see new materials on the market. "We're going to get to a point where the look of mycelium will be very similar to leather, if not the same," she said. "I really think it's the way of the future."

washingtonpost.com, 31 August 2020

https://www.washingtonpost.com

In Europe, nine percent of bee and butterfly species are threatened, and about a third of their populations are declining.

The relative abundance of bumblebees in North America is estimated to have crashed by 97 percent

2020-09-05

Jack Bates' blueberries rely on "non-union" bees.

The Delta, British Columbia, farmer is not alone. Blueberries, raspberries, and tree fruits are some of BC's most important crops, worth about $370 million combined—and they all depend on bees, butterflies, moths, and other pollinators for a successful harvest.

"Pollination is always a struggle," said Bates, who owns a 90-acre blueberry farm.

That's no surprise. Pollinators are in rough shape in British Columbia and beyond.

The International Union for the Conservation of Nature says that 16.5 percent of vertebrate pollinators (e.g. birds) are threatened with global extinction.

In Europe, nine percent of bee and butterfly species are threatened, and about a third of their populations are declining.

And in North America, bumblebees—a vital native pollinator—are estimated to have seen their relative abundance crash by 97 percent, with the sharpest decline occurring in the past 30 years.

It's a shocking decline, one driven by widespread pesticide use and habitat loss—byproducts of industrial agriculture. That system dominates North America's fields and relies heavily on chemical fertilizer, pesticides, and monocrops.

"A number of features of current intensive agricultural practices threaten pollinators and pollination," notes a 2016 report by the FAO Intergovernmental Science-Policy platform on Biodiversity and Ecosystem Service.

That's not good news for bees—or farmers. About 85 percent of food grown globally depends on pollination, and in BC, bees and other pollinators contribute about $538 million ($410 million USD) to BC's agricultural industry.

Faced with declining bee populations, Bates and other farmers who rely on pollination have turned to semi-domesticated honeybees to pollinate their crops. They hire commercial beekeepers to truck several hundred hives of honeybees into their fields while the crops are flowering.

There are about 5,600 commercial beekeepers in Canada who operate roughly 480,000 colonies.

Once the field has been pollinated and the flowers turn to fruit, the beekeeper will pack up the hives, moving them to the next flowering crop, which is sometimes thousands of kilometers away.

It's not an ideal system.

"When you have these very large and very simplified farms, farmers become reliant on bringing out these honeybees," said Claire Kremen, a professor of conservation biology at the University of British Columbia

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who is leading a research project to increase pollinator habitat on farms in Delta, BC in collaboration with the Delta Farmland and Wildlife Trust.

The project aims to encourage farmers to plant some of their fields with pollinator-friendly flowers or to build hedgerows.

"It's like honeybees are a kind of input to the farming system that needs to be purchased or supplied, whereas formerly, (pollination) was there and available."

Beyond the cost of renting honeybees—Bates pays about $50,000 ($38,000 USD) each year for roughly 425 hives—Kremen pointed out that they aren't really up to the job.

Native bumblebees are better: They're happy flying through the fields when it's cold or rainy and have a trick to get pollen out of blueberries' deep bell-shaped flowers.

"The bumblebee will grab onto the flower with their legs and, literally, they vibrate with their wings and it shakes the flower. And it happens that they do it at just the right frequency that it makes the pollen come out."

But bumblebees, unlike their semi-domesticated cousins, don't live in hives that are trucked around the country.

They stay in one place, rarely straying more than 10 kilometers from their hive, and need food throughout the year—not only for the few weeks blueberries are flowering.

Keeping them fed year-round takes biodiverse habitats like hedgerows and hayfields, Kremen said.

Those habitats that don't come cheap in BC's Lower Mainland.

Farmland prices in Metro Vancouver range from $50,000 to $80,000 ($38,000 to $61,000 USD) per acre for parcels of more than 40 acres, according to a 2016 report by researchers at Kwantlen Polytechnic University.

"It's very challenging for growers here in Delta," said Drew Bondar, executive director of the Delta Farmland & Wildlife Trust, a farmland advocacy organization that's a partner in Kremer's research project.

"With land costs, (farmers) really need to farm most of their acres. Without actually knowing the economic benefits (of more pollinator habitat), it's hard to justify taking land out of production."

That's where Kremen's research, which is supported by a $161,050 ($123,000 USD) provincial-federal grant, comes in. The project aims to put a dollar value on native pollinators' contribution, helping farmers weigh the cost of investing in hedgerows and other pollinator-friendly habitats against bringing in honeybees and having more acreage under production.

There's already evidence from other places that increasing pollinator habitat might, in fact, be a boon to farmers.

"You could see increases in yields anywhere from $8,000 per hectare to $14,000 ($6,093 to $10,665 USD) per hectare," Bondar said, citing studies that have determined the costs of pollination deficits—crops lost to bad pollination.

There are other advantages. Pollinator habitats also support pest-eating insects, helping farmers reduce their pesticide use, and help support agricultural regions' overall biodiversity.

About a million species are currently threatened with extinction globally and are going extinct at a rate up to hundreds of times faster than the average established over the past 10 million years.

Increasing pollinator habitat alone won't reverse this trend.

Still, in 2019, the UN Intergovernmental Science-Policy Platform on Biodiversity emphasized the importance of "promoting good agricultural and agroecological practices … and more integrated landscape and watershed management."

Those include the kinds of management practices Kremen hopes her research project will help make more common.

For Bates, whose blueberry farm is home to some plots in the study, those benefits have already started to arrive—even without unionized bees.

"You go in the fields late at night, and you stand and watch and listen, and the bumblebees are still working."

That's a sign of happy pollinators.

motherjones.com, 5 September 2020

<a href=" https://www.motherjones.com/environment/2020/09/the-relative-abundance-of-bumblebees-in-north-america-is-estimated-to-have-crashed-by-97-percent/?ct=t(RSS_EMAIL_CAMPAIGN)

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">https://www.motherjones.com

New U.S. plastics pact aims to accelerate circularity in plastics value chain

2020-09-02

The U.S. Plastics Pact, a collaborative led by The Recycling Partnership and World Wildlife Fund (WWF), launched as part of the Ellen MacArthur Foundation's global Plastics Pact network. The U.S. Plastics Pact is an ambitious initiative to unify diverse public-private stakeholders across the plastics value chain to rethink the way we design, use, and reuse plastics, to create a path toward a **circular economy for plastic** in the United States.
Collaborative Action Towards Circular Economy

U.S. industry leaders recognize that significant, systemwide change is needed to realize a circular economy for plastic; individualized action isn't enough and thus, The U.S. Plastics Pact brings together companies, government entities, non-governmental organizations (NGOs), researchers, and other stakeholders in a pre-competitive platform for industry-led innovation. The U.S. Plastics Pact will drive collaborative action and deliver a significant system change toward a circular economy for plastic, enabling companies and governments in the U.S. to collectively meet impactful goals by 2025 that they could not otherwise meet on their own.

"*Together, through the U.S. Plastics Pact, we will ignite systems change to accelerate progress toward a circular economy*," says Sarah Dearman, VP of Circular Ventures for The Recycling Partnership. "*As the lead organization that engages the full supply chain to advance circularity in the U.S., it's a natural fit for The Recycling Partnership to further collaborative action with other industry leaders to create substantial, long-lasting change for the betterment of our planet. The results from the U.S. Plastics Pact's efforts to **advance packaging**, improve recycling, and reduce plastic waste will benefit the entire system and all materials.*"

Developing Scalable and Sustainable Solution

In line with the Ellen McArthur Foundation's vision of a circular economy for plastic, which unites more than 850+ organizations, underpinned by common definitions and concrete targets, the U.S. Plastics Pact brings

Together, through the U.S. Plastics Pact, we will ignite systems change to accelerate progress toward a circular economy," says Sarah Dear-man, VP of Circular Ventures for The Recycling Partnership.

together plastic packaging producers, brands, retailers, recyclers, waste management companies, policymakers, and other stakeholders to work collectively toward scalable solutions tailored to the unique needs and challenges within the U.S landscape, through vital knowledge sharing and coordinated action.

More than 60 Activators – including for-profit companies, government agencies, and NGOs – have joined the U.S. Plastics Pact, representing each part of the supply and plastics manufacturing chain. By joining the U.S. Plastics Pact, Activators agree to collectively deliver these four targets: Define a list of packaging to be designated as problematic or unnecessary by 2021 and take measures to eliminate them by 2025.

- By 2025, all plastic packaging is 100% **reusable, recyclable, or compostable**.
- By 2025, undertake ambitious actions to effectively recycle or compost 50% of plastic packaging.
- By 2025, the average recycled content or responsibly sourced bio-based content in plastic packaging will be 30%.

ReSource: Plastic Footprint Tracker

Results of measurable change in each of the target areas and transparent reporting are key outcomes of the U.S. Plastics Pact. Progress of the U.S. Pact will be tracked through WWF's ReSource: Plastic Footprint Tracker, which provides a standard methodology to track companies' plastic footprints and publicly report on their plastic waste commitments each year. The report will be made publicly available each year.

"Plastic pollution is a global crisis that needs local solutions, and the United States is one of biggest opportunities where regional interventions can result in transformative change around the world," said Erin Simon, Head, Plastic Waste and Business at World Wildlife Fund. *"To do this, WWF sees the U.S. Plastics Pact as the linchpin for uniting the critical stakeholders—industry leaders, waste management systems, and policymakers—under a common vision and action plan for meaningful, measurable impact."*

Achieving this vision will require new levels of innovation and collaboration from all Activators of the U.S. Plastics Pact and beyond. The U.S. Pact is launched as part of the Ellen MacArthur Foundation's Plastics Pact network, joining Plastics Pacts in Europe, Latin America and Africa

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as a globally-aligned response to plastic waste and pollution that brings together shared ambition, combined expertise, and collaboration to create regional and national solutions toward a circular economy in which plastic never becomes waste.

omexus.specialchem.com, 2 September 2020

https://www.omexus.specialchem.com

Covestro's CO_2-incorporated polyols aid in automotive foam production

2020-09-01

Covestro has opened up an area of application for the use of CO_2 in plastics production. Now foams for the automotive industry can also be produced partly using carbon dioxide instead of fossil raw materials such as crude oil. The innovative precursor cardyon® is used for this purpose. The Swiss company FoamPartner uses the technology to produce foams for various areas in the vehicle interior.

Carbon Dioxide as an Alternative Raw Material

"We are now taking another important step towards using carbon dioxide as an alternative raw material in the chemical industry on an even broader scale. In doing so, we are accelerating the transformation to a circular economy and supporting our positive momentum for growth in recent weeks," says Sucheta Govil, chief commercial officer (CCO) of Covestro.

Covestro has developed a novel technology with which up to 20 percent CO_2 can be incorporated into so-called polyols. These are key components for polyurethanes, a widely used and versatile type of plastic. In this way, fossil raw materials are replaced, making Covestro an important contribution to resource conservation. Since the carbon contained in CO_2 is recycled, the new process also supports the circular economy.

CO_2 polyols of the brand cardyon® are already being used in numerous other applications.

"*Novel materials like cardyon® are extremely important for the development and responsible production of sustainable foams. We are pleased to work with Covestro as one of the innovation leaders in the use of alternative raw materials*," adds Michael Riedel, CEO of FoamPartner.

Since the carbon contained in CO2 is recycled, the new process also supports the circular economy.

Sustainable Foams from FoamPartner

The sustainable foams that FoamPartner will market in the future as a new product series under the name OBoNature™ will be laminated with a textile in a next step and will thus be used in the interior of vehicles. They will be processed primarily in headliners, but also in door panels and armrests, as well as in car seat covers.

In addition to their resource-conserving production, the particularly low-emission foams are characterized by a longer service life and material resistance. Moreover, due to their optimized lamination behavior, they can be processed in reduced material thickness while at the same time enabling faster laminating processes. This saves both material and manufacturing costs.

Strategic Orientation Ensures Profitable Growth

Technologies such as these make a significant contribution to the promotion of the circular economy, to which Covestro is fully geared. In addition to alternative raw materials such as CO_2, biomass and waste materials, the focus is on the development of innovative recycling technologies and the use of clean energy sources such as wind power in production.
polymer-additives.specialchem.com, 1 September

https://www.polymer-additives.specialchem.com

How chemicals like PFAS can increase your risk of severe COVID-19

2020-09-05

Nearly a year before the novel coronavirus emerged, Dr. Leonardo Trasande published "Sicker, Fatter, Poorer," a book about connections between environmental pollutants and many of the most common chronic illnesses. The book describes decades of scientific research showing how endocrine-disrupting chemicals, present in our daily lives and now found in nearly all people, interfere with natural hormones in our bodies. The title sums up the consequences: Chemicals in the environment are making people sicker, fatter and poorer.

The title sums up the consequences: Chemicals in the environment are making people sicker, fatter and poorer.

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As we learn more about the novel coronavirus and COVID-19, research is revealing ugly realities about social and environmental effects on health – including how the same chronic illnesses associated with exposure to endocrine-disrupting compounds also increase your risk of developing severe COVID-19.

In the U.S. and abroad, the chronic disease epidemic that was already underway at the start of 2020 meant the population entered into the coronavirus pandemic in a state of reduced health. Evidence is now emerging for the role that environmental quality plays in people›s susceptibility to COVID-19 and their risk of dying from it.

Why Endocrine Disruptors Are a Problem

Endocrine-disrupting compounds, or EDCs, are a broad group of chemicals that can interfere with natural hormones in people›s bodies in ways that harm human health. They include perfluoroalkyl and polyfluoroalkyl substances, better known as PFAS, flame retardants, plasticizers, pesticides, antimicrobial products and fragrances, among others.

These chemicals are pervasive in modern life. They are found in a wide range of consumer goods, food packaging, personal care products, cosmetics, industrial processes and agricultural settings. EDCs then make their way into our air, water, soil and food.

Research has shown that people who are exposed to EDCs are more likely than others to develop metabolic disorders, such as obesity, type 2 diabetes and high cholesterol, and they tend to have poorer cardiovascular health.

EDCs can also interfere with normal immune system function, which plays a critical role in fighting off infection. Poor immune function also contributes to pulmonary problems such as asthma and chronic obstructive pulmonary disease; autoimmune diseases like rheumatoid arthritis and Crohn's disease; and metabolic disorders. Many EDCs are also associated with different cancers.

EDCs Can Mimic Human Hormones

EDCs affect human health by mimicking our natural hormones.

Hormones are chemical signals that our cells use to communicate with one another. You might be familiar with reproductive hormones – testosterone and estrogen – which help distinguish male and female physiology and

reproduction. Yet, hormones are responsible for maintaining virtually all essential bodily functions, including metabolism and healthy blood pressure, blood sugar and inflammation.

The chemical shape or structure of EDCs resembles hormones in ways that cause the body to misinterpret an EDC for a natural signal from a hormone.

Because the human body is very sensitive to hormones, only small amounts of hormones are required to convey their intended signal. Therefore, very small exposures to EDCs can have dramatic, adverse affects on people's health.

Environmental Quality and COVID-19

Researchers are only just beginning to paint a picture about how environmental quality contributes to COVID-19 susceptibility, and there is much we still don't know. However, scientists suspect that EDCs can play a role based on clear scientific evidence that EDCs increase people›s risk of developing chronic diseases that put people at greater risk from COVID-19.

Public health organizations such as the U.S. Centers for Disease Control and Prevention and the World Heath Organization officially recognize underlying health conditions – including obesity, diabetes, hypertension, cardiovascular disease, immunosuppression, chronic respiratory disease and cancer – as risk factors for critical illness and mortality from COVID-19.

Scientific evidence shows that EDC exposure increases people's risk of developing all of these conditions. Scientists are thinking about these connections, and research efforts are underway to answer more questions about how EDCs may be influencing the pandemic.

Air Pollution and Other Environmental Risks

In addition to EDCs, other environmental conditions are also likely playing a role in the COVID-19 pandemic. For example, multiple studies have reported increased risk of COVID-19 illness and deaths. The findings are consistent with those reported in China following the SARS outbreak in 2002-2003.

Recent evidence also shows that COVID-19 infection can lead to lingering health conditions, including heart damage. Environmental conditions such as heat waves are particularly dangerous for individuals with heart disease or heart damage. In places like California that are currently experiencing wildfires and heat waves, we can clearly see how multiple environmental

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conditions can combine to further increase risk of deaths associated with COVID-19.

In the U.S., regulations such as the Clean Water Act and Clean Air Act have improved environmental quality and human health since the 1970s. However, the Trump administration has been trying to weaken them.

In the past three and a half years, about 35 environmental rules and regulations pertaining to air quality or toxic substances like EDCs were either rolled back or are in the process of being removed, despite unambiguous evidence showing how poor environmental quality harms human health. Allowing more pollution threatens to exacerbate the trend toward a sicker, fatter and poorer America at a time when people›s overall health is necessary for our collective resilience to COVID-19 and future global health challenges.

ecowatch.com, 5 September 2020

https://www.ecowatch.com

Can you catch COVID-19 from your neighbour's toilet?

2020-09-04

Coronaviruses wafting through a Chinese apartment building's plumbing may have infected some residents, according to a new study, raising fears of yet another way that COVID-19 could spread. The case echoes a 2003 outbreak of severe acute respiratory syndrome (SARS) that spread through the pipes of a Hong Kong apartment building—and some worry that transmission via toilets might have contributed to the COVID-19 outbreak that shut down New York City early in the pandemic.

The study adds to months of warnings that SARS-CoV-2, which causes COVID-19 and is thought to spread mainly through respiratory droplets and aerosols, could also infect via feces. "It's not something that people like to talk about," buildings expert Joseph Allen of the Harvard T.H. Chan School of Public Health **wrote in a *Washington Post* op-ed this week**.

Although fecal transmission of a pathogen is tricky to confirm—and proving that a virus spreads via building waste pipes is even more difficult—it is entirely possible, several researchers tell *Science*Insider. With their help, we try to answer some key questions about this unusual and still speculative risk.

Can people catch COVID-19 from poop?

A person could therefore be exposed to SARS-CoV-2 by breathing aerosolized fecal matter, or by ingesting the virus after touching a contaminated surface.

A number of studies have reported finding RNA from SARS-CoV-2 **in fecal samples from COVID-19 patients**. Some of those patients also had diarrhea, suggesting the virus had infected their intestinal tracts; the RNA could also come from swallowing saliva or respiratory tract fluids containing the virus. Such fecal samples inspired wastewater testing currently being used to watch for incipient COVID-19 outbreaks in cities around the world and at **some U.S. universities**.

Some studies have also found abundant coronavirus RNA in **hospital bathrooms**, and one modeling study suggested that flushing a toilet can **spew viral particles far above the seat**. A person could therefore be exposed to SARS-CoV-2 by breathing aerosolized fecal matter, or by ingesting the virus after touching a contaminated surface.

A key point often glossed over, scientists say, is the limited evidence that viral RNA in stool comes from live, infectious viruses—not just leftover material from "dead" or destroyed viruses. Only a few labs have reported culturing live virus from COVID-19 patient stool samples, which is challenging to do. One team has suggested that **intestinal fluid neutralizes the virus**. The U.S. Centers for Disease Control and Prevention says "it is unclear" whether virus in feces can cause COVID-19 and concludes the risk of spreading the virus this way is "low." To date, there are no documented cases clearly indicating infection via fecal matter.

But Allen and other researchers say the risk should not be ignored. Many animal coronaviruses can be spread through feces, "so it isn't a stretch to believe it might be possible with SARS-CoV-2," says epidemiologist Susan Amirian of Rice University.

But whether that risk is present in sewage is another question. By the time human waste reaches a typical sewer outfall or treatment plant, any potentially intact viruses are likely too diluted to be infectious, says environmental engineer Jordan Peccia of Yale University, who is testing wastewater for SARS-CoV-2 in Connecticut. To date, there is little to no evidence that COVID-19 spreads via sewage.

What about that 2003 SARS outbreak in Amoy Gardens?

Amoy Gardens, a Hong Kong housing complex with multiple apartment towers, saw 321 residents catch SARS in 2003; 42 of them died. Researchers traced the outbreak to **a single visitor with SARS who had severe diarrhea**. The bathrooms in the apartments had floor drains for cleaning, and when the U-shaped traps beneath these drains dried out, aerosolized SARS virus from the sick resident reached apartments through an air shaft.

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Typically, such wafting is blocked by water that has accumulated in the traps. Scientists suggested the wind even carried the aerosols to adjacent buildings.

How does Amoy Gardens compare with the new COVID-19 cases in the Chinese apartment building?

Just nine people got sick from SARS-CoV-2 in Guangzhou, where the apartment building was located, and none died. But there are similarities, says University of Hong Kong mechanical engineer Yuguo Li, who studied both cases. Li's group—along with teams from the Guangdong Provincial Center for Disease Control and Prevention and Guangzhou CDC—**describe their new findings** this week in the *Annals of Internal Medicine*. (China CDC mentioned the cases in less detail in a **paper published late last month**, as **first reported by Bloomberg**.)

Here's what is known about the COVID-19 episode: All five members of a family living in a 15th floor apartment tested positive for SARS-CoV-2 in late January, after most of them had visited Wuhan, where the pandemic started. A few days later, two middle-aged couples living on the 25th and 27th floors—part of a stack of vertically arranged apartments directly above the flat in question and all sharing the same waste pipes—became ill. They had not traveled or been in close contact with a sick person during China's lockdown.

Li's team compiled a range of evidence suggesting the two couples were exposed to fecal aerosols from their neighbors more than 10 floors below through their shared waste pipes. Camera footage from elevators indicated that the families did not cross paths. Among more than 200 air and surface samples collected in the high-rise in mid-February, the only ones testing positive for SARS-CoV-2 came from the 15th floor family's apartment and a vacant apartment's bathroom on the 16th floor directly above. Finally, a tracer gas that Li's team piped into the 15th floor apartment's drainpipe exited in the 25th and 27th floor apartment bathrooms.

The researchers could not verify that any of the three U-shaped traps in the apartments had dried out when the COVID-19 cases happened, however. The apartments had already been cleaned and the traps filled with water when they visited. Evidence for spread via plumbing remains "circumstantial," they write. Still, Li's team tells "a compelling story," Peccia says.

Li says he's aware of three similar cases of possible SARS-CoV-2 transmission via high-rise plumbing, two in Hong Kong and another in Guangdong province. He's investigating one of the Hong Kong cases, which involved five stacked apartments. "We really do not know" how many other cases there may be in China or elsewhere, he says.

Could COVID-19 have spread through plumbing in New York City high-rises?

That depends on many factors and may be impossible to prove, researchers say. A sick person would have had to produce lots of infectious virus, which would have had to reach others quickly and at a high dose, Peccia says. "A lot has to fall in line."

It would also depend on a building's plumbing system and how well it was maintained. In the United States plumbing systems generally "protect people," says Michael Gormley, a water sanitation expert at Heriot-Watt University in Edinburgh, who **wrote a commentary** on Li's study. One difference in New York City is that most apartment bathrooms don't have floor drains. But even so, there are other drains with U-shaped traps, like those in unused bathtubs, that could dry out.

"There's no reason it couldn't happen," Peccia says. But if it does, he suspects "it's a rare event."

What's the bottom line for apartment building dwellers, and people in general?

There are several steps people can take to reduce their exposure to such fecal aerosols, Gormley and others say. Chief among them is good hygiene—washing hands, cleaning the toilet, and keeping the lid down when flushing. If you live in a high-rise apartment building, make sure U-shaped traps are filled—that's easily done by regularly running water in tubs and sinks. But gases can also leak from aging pipes, Li notes. "If [you] can smell the drain odor in your bathroom, do something."

sciencemag.org, 4 September 2020

https://www.sciencemag.org

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Vaping links to Covid risk are becoming clear

2020-09-04

Twenty-year-old Janan Moein vaped his first pen a year ago. By late fall, he was blowing through several THC-laced cartridges a week — more, he said, than most people can handle.

Then in early December, he found himself in the emergency room of Sharp Grossmont Hospital in San Diego with a collapsed lung and a diagnosis of vaping-related lung illness. His hospital stay plunged him into a medically induced coma, forced him onto a breathing machine and stripped nearly 50 pounds off his 6-foot-1-inch frame in just two weeks.

At one point, Mr. Moein said, his doctors gave him a 5 percent chance of survival. He resolved that the wax pen he had vaped before his hospitalization would be his last.

His hospital stay plunged him into a medically induced coma, forced him onto a breathing machine and stripped nearly 50 pounds off his 6-foot-1-inch frame in just two weeks.

When he contracted a mild case of Covid-19 during a family barbecue three months ago, he knew he had quit not a moment too soon. "If I had caught Covid-19 within the week before I got really ill, I probably would have died," he said.

Since the start of the pandemic, experts have warned that the coronavirus — a respiratory pathogen — most likely capitalizes on the scarred lungs of smokers and vapers. Doctors and researchers are now starting to pinpoint the ways in which smoking and vaping seem to enhance the virus's ability to spread from person to person, infiltrate the lungs and spark some of Covid-19's worst symptoms.

"I have no doubt in saying that smoking and vaping could put people at increased risk of poor outcomes from Covid-19," said Dr. Stephanie Lovinsky-Desir, a pediatric pulmonologist at Columbia University. "It is quite clear that smoking and vaping are bad for the lungs, and the predominant symptoms of Covid are respiratory. Those two things are going to be bad in combination."

Last year's vaping crisis, during which thousands of people like Mr. Moein were sickened and hospitalized with severe lung and respiratory illnesses, underscored the hazards of many e-cigarette and vaping products, especially illicitly sold marijuana-based vapes.

But while several studies have found that smoking can more than double a person's risk of severe Covid-19 symptoms, the data on the relationship between vaping and Covid-19 are only beginning to emerge. A team of

researchers recently reported that young adults who vape are five times more likely to receive a coronavirus diagnosis.

Much of what underlies the relationship between smoking, vaping and the coronavirus remains unclear. Doctors aren't sure why vaping makes some people seriously sick, but seems to spare others. And Mr. Moein's unexpectedly mild encounter with the coronavirus remains mysterious as well.

These and other lingering questions have made the risks of smoking and vaping during the pandemic tough to communicate.

James Ippolito, a 26-year-old Army veteran who lives in Hingham, Mass., has been hooked on vaping nicotine for about six years. "I vape every day, all day long," Mr. Ippolito said.

The looming threat of the virus doesn't intimidate him. "I hate to say it, but if I got the virus, I would still be vaping — I wouldn't even think it was related," he said.

Such stubbornness troubles experts, who pointed out that Covid is hardly the first disease to hit smokers and vapers harder.

"Lungs aren't designed to regularly breathe in smoke and vape," said Dr. Drew Harris, a pulmonologist at UVA Health in Virginia. These products, he added, "do just about everything bad you can think of."

About 34 million adults smoke cigarettes in the United States, many of them from communities of color and low socioeconomic status — groups already known to be more vulnerable to the virus. And more than 5 million middle and high school students recently reported using vapes.

The active contents of cigarettes and vapes vary immensely, ranging from nicotine to THC, the high-inducing ingredient in marijuana. But many experts are more concerned about the other ingredients that tend to accompany them: additives like heavy metals and vitamin E acetate, which bathe the lung in toxins and ultrafine particles that can poison or pulverize delicate tissues.

Decades of research have unmasked smoking's ability to put the immune system on the fritz. The punch of harmful chemicals packed into each puff is thought to discombobulate the system of checks and balances needed to direct disease-fighting cells and molecules toward harmful invaders like germs, while waylaying any misguided attacks on healthy tissues.

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A body hamstrung by a smoking habit can struggle to rouse a sufficient defense against viruses — but has little trouble turning its arsenal of weapons inward. Eventually, deteriorating lungs can become chronically inflamed and awash with mucus, narrowing the airways and stymieing the flow of oxygen into the blood. Certain patients may end up with lungs pockmarked by scar tissue, further impeding the movement of air.

Dr. Lovinsky-Desir describes the internal architecture of these tissues as bunches of gas-filled grapes, enmeshed in a network of blood vessels. "Chronic smoking destroys those grapes," she said. "They become saggy and floppy."

Smoke can also compromise little hairlike structures known as cilia that boot toxins and microbes out of the airways, making it easier for pathogens to set up shop in the lungs.

Should a virus then enter the mix, Dr. Lovinsky-Desir said, "it will cause more destruction," clogging the already damaged grapes with a glut of cellular debris. Years of data have borne out these relationships. Smokers who catch the flu, for instance, are more likely than nonsmokers to wind up in the hospital.

Less is known about vaping, a relative newcomer. But similar trends have been noted for e-cigarettes and vape pens. Several studies have shown that vaping makes mice more vulnerable to bacteria and viruses, and sends surges of inflammation throughout the body, beyond the boundaries of the lungs.

Mr. Moein was one of thousands who last year fell prey to a disease called e-cigarette or vaping-associated lung injury, or Evali. Many Evali patients had vaped products containing a sticky substance called vitamin E acetate, which has been found in the branded Dr. Zodiak cartridges Mr. Moein preferred.

Mr. Moein still recalls his hospital stay in vivid detail.

"My lips were blue," he said. "They had to tape my eyes shut. I was hallucinating the entire time that the nurses were trying to kill me, that the walls were made of human skin. It was a really bad situation."

Nearly a year later, Mr. Moein, a towering athlete who played competitive sports in high school, said he was now once again "very healthy."

But Dr. Laura Crotty Alexander, a pulmonologist and vaping expert at University of California San Diego and one of Mr. Moein's doctors,

said experts were still teasing apart the potential long-term effects of vaping, even brushes briefer than his.

"Just because he feels 100 percent recovered doesn't mean his lung function returned to 100 percent," she said.

After peaking last September, emergency department visits linked to Evali plummeted. But the Centers for Disease Control and Prevention has not updated their counts since February, leaving experts worried that concerns over vaping have fallen to the wayside. "This has not gone away from patients," said Michelle Eakin, a pulmonary disease expert at Johns Hopkins University.

Dr. Crotty Alexander noted that she and other researchers have struggled to follow up on many of last year's Evali cases, paradoxically thanks to a pandemic that might hit some of these patients especially hard.

Early evidence hints that the virus may have an easier time breaking into the bodies of smokers and vapers. Smoking appears to alter the surfaces of certain cells, prompting them to coat themselves with more of a molecule called ACE-2 — the protein the coronavirus uses to break into its targets.

"If you have higher expression, you're going to have more virus entering cells," Dr. Crotty Alexander said. "I'm now seeing the same sort of data come out on the vaping side."

That pattern, layered on top of the ways in which vaping weakens the lungs, may help explain why a recent survey of more than 4,000 people ages 13 to 24 found that vaping was strongly linked to catching the coronavirus. But Bonnie Halpern-Felsher, a pediatrics researcher at Stanford University and an author on the study, said that there was probably more than biology at play.

People who vape often do it socially, sharing spaces and equipment. And vaping, like smoking, involves a lot of hand-to-mouth movement, providing germs an easy path into the airway, Dr. Eakin said. "And if you're smoking or vaping," she said, "you're not wearing a mask."

Still unclear are the long-term consequences of Covid's effects on those who smoked or vaped. Accumulating evidence suggests that the coronavirus can wreak havoc on blood vessels, seeding clots that suffocate and warp tissues, including the lungs — most likely making any smoking or vaping after Covid even more dangerous than before.

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"Some of these patients will have permanent issues," said Dr. Anne Melzer, a pulmonologist at the University of Minnesota.

Arlie Frahmann, a longtime smoker who picked up her first cigarette at the age of 9, hesitated to give up cigarettes when the coronavirus first infiltrated her community in Damariscotta, Maine, this spring. "The last thing I wanted was to be stressed out during quarantine," she said.

As of this week, though, Ms. Frahmann is eager to quit. She started a new job at a bakery, where she will have to interact with strangers.

"It was one thing to explain it away to myself when I wasn't going into public at all," she said of her smoking. "But now I can't justify it."

A few early reports suggest that some people may be shelving their cigarettes or vapes. As schools reopen for in-person learning, though, it might become easy to relapse.

And Dr. Lovinsky-Desir worries that the stressors brought on by the pandemic may be pushing some people to smoke or vape even more.

Mr. Moein recalls brushing off warnings from his father, who used to send him articles about the dangers of vaping.

"I used to tell him, 'You're out of touch, vaping is safer,'" he said. "At one point, I was getting so many articles that I blocked his number."

But last year's events flipped Mr. Moein's worldview. The pandemic, he said, is another reminder that the risks of vaping simply aren't worth it: "There's no way in hell that vaping helps Covid-19."

nytimes.com, 4 September

https://www.nytimes.com

2,200-year-old Chinese text may be the oldest surviving anatomical atlas

2020-09-08

A series of 2,200-year-old Chinese texts, written on silk and found buried in ancient tombs, contain the oldest surviving anatomical atlas, scientists say.

The texts were discovered in the 1970s within tombs at the site of Mawangdui in south-central China. The tombs belonged to Marquis Dai, his wife Lady Dai and their son. The texts are challenging to understand, and they use the term "meridian" to refer to parts of the human body. In

Additionally the texts "both predate and inform the later acupuncture texts, which have been the foundation for acupuncture practice in the subsequent two millennia,»

a paper recently published Sept. 1 in the journal The Anatomical Record, a research team led by Vivien Shaw, an anatomy lecturer at Bangor University in Wales in the United Kingdom, argues that these texts "are the oldest surviving anatomical atlas in the world."

Additionally the texts "both predate and inform the later acupuncture texts, which have been the foundation for acupuncture practice in the subsequent two millennia,» the researchers wrote in the study. The find «challenges the widespread belief that there is no scientific foundation for the ‹anatomy of acupuncture,› by showing that the earliest physicians writing about acupuncture were in fact writing about the physical body,» they added.

Challenging texts

The texts, which are written in Chinese characters, are difficult to understand. "The skills necessary to interpret them are diverse, requiring the researcher firstly to read the original Chinese, and secondly to perform the anatomical investigations that allow a re-viewing of the structures that the texts refer to," the researchers wrote in the paper.

But if the texts are read carefully, it can be seen that the "meridians" refer to parts of the human body. For example, the text says (in translation) that one meridian starts "in the center of the palm, goes along the forearm between the two bones following straight along the tendons, travels below the sinew into the bicep, to the armpit, and connects with the heart." The researchers contend that this description of a "meridian" actually refers to the path of the ulnar artery, the main blood vessel of the forearm.

Another example from the ancient text describes a "meridian" in the foot that "starts at the big toe and runs along the medial surface of the leg and thigh. Connects at the ankle, knee, and thigh. It travels along the adductors of the thigh, and covers the abdomen." This "meridian" actually describes the "pathway of the long saphenous vein," the conduit that carries blood from the legs back to the heart, the researchers wrote.

The team concludes that the texts "represent the earliest surviving anatomical atlas, designed to provide a concise description of the human body for students and practitioners of medicine in ancient China."

Although the human body and ancestral remains were considered sacred in ancient China, the remains of law breakers were not always given this honor. The researchers believe that ancient Chinese medical researchers

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dissected the corpses of prisoners to help them understand human anatomy. For instance, the Han Shu (Book of Han), a tome that covers the history of the Han Dynasty, records the dissection of the criminal Wang Sun-Qing in A.D. 16, the researchers noted in the study.

Until now, the oldest known anatomical atlas of the human body was thought to be from Greece, done by ancient Greek physicians such as Herophilus (335–280 B.C.) and Erasistratus (304-c.250 B.C.) however most of their texts have been lost and are known only from what other ancient writers wrote about them. As a result, the Chinese texts are the earliest surviving anatomical atlas, the researchers said.

Vivienne Lo, a senior lecturer and convenor of University College London's China Centre for Health and Humanity who is not affiliated with the research, said that she is hesitant to use the word "atlas" to describe these texts, and thinks that "map" or "chart" is a more appropriate term. Lo said that the term "atlas" was a term that was used more during the 17th and 18th centuries and doesn't seem appropriate to apply to a 2,200 year-old text. Lo also noted that some of the finds discussed in the paper — such as the fact that prisoners were dissected to provide anatomical information — have been published by other researchers before.

TJ Hinrichs, a history professor at Cornell University who has conducted research into ancient Chinese medicine but is not affiliated with this research, also did not think that "anatomical atlas" was an appropriate term to describe these texts. Live Science has reached out to other experts not affiliated with the research, however most were not able to reply at time of publication.

livescience.com, 8 September 2020

https://www.livescience.com

Toxic pesticides and flame-retardants found in monkey, baboon, and chimpanzee poop

2020-09-09

Baboons in the U.S., howler monkeys in Costa Rica, and baboons, chimpanzees, red-tailed monkeys, and red colobus in Uganda are all getting exposed to dangerous pesticides and flame-retardant chemicals, according to new research.

"We were surprised both at the number of chemicals measured in the feces and the levels of some of these chemicals in animals, especially those

"We think a lot about habitat disturbance, logging, and hunting as threats to these species, while pollution has been overlooked," Wasserman said.

that are wild," Marta Venier, an environmental chemist at Indiana University and senior author of the study, told EHN.

The study, published today in *Environmental Science and Technology*, is the first to examine these chemicals in both wild and captive primates, and suggests that, as humans increasingly encroach on their habitat, such species are at a high risk of chemical contamination.

The researchers also caution the findings are a warning sign that such pesticide and flame-retardant pollution is harming people as well.

"The presence of numerous anthropogenic chemicals in primates living in protected areas warrants an evaluation of the possible biological effects resulting from exposure," the authors wrote.

Researchers collected feces samples from captive baboons at a primate sanctuary in Indiana; wild howler monkeys at a research station in Costa Rica; and wild baboons, chimpanzees, red-tailed monkeys, and red colobus monkeys from a national park in Uganda.

The red colobus and chimpanzees in Uganda are both endangered populations, Michael Wasserman, a researcher and assistant professor of anthropology and human biology at Indiana University and co-author of the study, told EHN.

"We think a lot about habitat disturbance, logging, and hunting as threats to these species, while pollution has been overlooked," Wasserman said.

They tested the samples for a suite of contaminants—21 legacy pesticides, 29 pesticides currently in-use, 47 halogenated flame-retardants, and 19 organophosphate flame-retardants.

They found a suite of chemicals across the species.

Key findings:

· Three legacy pesticides (α-hexachlorocyclohexane, β-hexachlorocyclohexane and hexachlorobenzene) were most prevalent at all test sites;

· Chlorpyrifos was the most prevalent currently used pesticide found in Costa Rica and Indiana primates;

· For halogenated flame-retardants, decabromodiphenyl-ethane was most prevalent in Costa Rica and Indiana primates, while BDE-47 was most common in Uganda primates;

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· Tris(2-butoxyethyl) phosphate was the most prevalent organophosphate flame-retardant across all sites.

They also found metabolites of the notorious chemical DDT across species, with the highest levels in red colobus and red-tailed monkeys.

It's unclear what health impacts the chemicals could be having on the primates, however, in both human and animal studies most of the compounds have been linked to health risks, including hormone disruption, developmental problems, and impacts to immune and reproductive systems.

Several of the chemicals "can have toxic effects at low doses," Venier said.

Also "animals, like humans, are exposed to multiple chemicals at once," which could worsen impacts, she said.

Venier and colleagues previously tested the air in the locations for the same chemicals, and the "levels of some of the chemicals in air were comparable to what we see in Chicago, which was really surprising," she said.

While there is pesticide-intensive farming in Uganda and Costa Rica, the source of the flame-retardants is less clear. The chemicals are found in everything from electronics like computers, tablets, phones, to mattresses and sofas.

"The areas we're looking at, the protected areas, forests are more remote, but surrounding these areas are human activities and remnants of tropical forest," Wasserman said. "In Uganda, there is some really high population density, with subsistence agriculture mixed with some industrial agriculture. These chemicals can move into the forest."

They found higher levels of chemicals in feces from red colobus and red-tailed monkeys, which are both mostly plant eaters. The researchers said this could be explained by different patterns of excretion among the species, or that exposure is coming from crops, soil, or wild plants, rather than bioaccumulation from eating animals smaller on the food chain.

"Crops, soil … through the air deposited on wild plants they consume, these are all possibilities," Wasserman said. He added that in some locations the primates could also be getting into human trash.

The study is in part a response to a major limitation of wildlife study—the ability to monitor what's getting into animals. Researchers typically can't draw blood or collect urine for wild animals—the two main ways

they check human exposure—so the new study shows feces can offer an effective, non-invasive way of monitoring certain wild species.

The method is limited in that it's unclear how much of the chemical load they find is from long-term exposure or "just flashing through the body and possibly not causing harm," said Venier. She said they hope to tease this out in future studies.

Wasserman said, as important this is for understanding wildlife exposure, it offers a peek into our own chemical contamination as well.

"Primates are our closest living relatives, many are endangered, and we have these long-term research projects on primates all over the world that give detailed pictures of their behavior and physiology," he said. "Adding this new method adds a novel insight into how these chemicals affect non-human primates—and humans."

ehn.org, 9 September 2020

https://www.ehn.org

Humans' construction footprint in the ocean qualified for the first time

2020-09-08

Human infrastructure occupies more than 30,000 square kilometers of the sea floor, according to a new study. What's more, factoring in the indirect effects of this development—alterations of water flow and chemistry, light and noise pollution, electric fields from underwater cables, and so on—expands our species' underwater footprint a hundred-fold, to roughly 2 million square kilometers, or 0.5% of the global ocean.

The study represents the first comprehensive attempt to quantify the total global extent of all types of marine development. To inventory this ocean sprawl, an international team of researchers gathered data on marine tunnels, bridges, oil and gas rigs, wind farms, ports, marinas, aquaculture farms, artificial reefs, cables, coastal defenses & breakwaters, and other structures.

Some of the data came from governments, international organizations, and corporate disclosures. The team also performed nearly 700 Google searches for more information, and combed through dozens of scientific articles for guidance on how to estimate the more distant effects of marine structures.

Today, "growth of coastal cities and sea level rise are driving a marine construction boom," the researchers write in Nature Sustainability.

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Marine construction began thousands of years ago with construction of seaports and coastal armoring, but ramped up starting in the mid-20th century. Today, "growth of coastal cities and sea level rise are driving a marine construction boom," the researchers write in *Nature Sustainability*.

For now, most marine infrastructure hugs the world's coastlines. Ninety-nine percent of undersea development (pretty much everything except underwater cables) has occurred within 200 nautical miles of shore, within countries' exclusive economic zones (EEZs). The researchers calculated that marine construction affected about 1.5% of these EEZs in 2018, comparable to the proportion of global land given over to urban areas.

The global extent of marine development is also larger than that of some important coastal habitats, including mangrove forests and seagrass beds.

This development, especially of fossil and renewable energy infrastructure, is expected to expand into deeper waters in the future. There might also be new types of ocean development, such as deep-sea mining.

Forty percent of global marine development is found in Chinese waters, encompassing more than 1% of that country's EEZ. South Korea accounts for 10% of marine development which occupies more than 7.5% of its EEZ, and the Philippines 8% of marine development (and 0.1% of its EEZ).

Aquaculture accounts for more than 70% of the area directly affected by marine development (40% of which is in Chinese waters), commercial ports 14%, and artificial reefs 11%. Nearly half of offshore oil rigs are located in the U.S. Gulf of Mexico, while renewable energy infrastructure is concentrated off the coast of the United Kingdom.

When it comes to indirect effects, commercial ports have by far the biggest footprint, accounting for more than 96% of the total are modified by marine development. This is largely due to the far reach of noise pollution from ports, which can cause **difficulties for endangered species** inhabiting nearby waters.

Big data gaps mean that the numbers in the study are likely to be conservative estimates, the researchers say.

They also compiled data on planned marine infrastructure projects. **"**Construction will continue to sprawl into the ocean for the foreseeable future," they write, estimating that our direct underwater footprint will grow by nearly a quarter, to 39,400 square kilometers, by 2028. Alternative energy infrastructure such as wave, tidal, and wind farms is projected to increase especially rapidly.

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"Construction may, in some instances, produce notable environmental benefits," the researchers say. Offshore wind farms can protect areas of the sea floor from damaging trawl fisheries, and many underwater structures provide habitat for fish and invertebrates—especially if they are thoughtfully designed.

Still, just like on land, construction at sea destroys and fragments natural habitats and may introduce or provide stepping stones for non-native species. This development "can have unintended and sometimes hidden ecological and economic costs, as the natural habitats they replace or modify provide valuable ecosystem services that are not always explicitly documented or valued," the researchers write. In other words, what's out of sight underwater is all too often out of mind.

anthropocenemagazine.org, 8 September 2020

https://www.anthropocenemagazine.org

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(NOTE: OPEN YOUR WEB BROWSER AND CLICK ON HEADING TO LINK TO SECTION)

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Characteristics of exposure to multiple environmental chemicals among pregnant women in Wuhan, China

Embryonic toxicity of 3,4-dichloroaniline (3,4-DCA) on Javanese medaka (Oryzias javanicus Bleeker, 1854)

Neuroprotective effect of Costus afer on low dose heavy metal mixture (lead, cadmium and mercury) induced neurotoxicity via antioxidant, anti-inflammatory activities

ENVIRONMENTAL RESEARCH

Environmental management accounting and innovation in water and energy reduction

Chemical pollution imposes limitations to the ecological status of European surface waters

OCCUPATIONAL

The relationship between impaired lung functions and cytokine levels in formaldehyde exposure

Assessment of circulating miR-20b, miR-221, and miR-155 in occupationally lead-exposed workers of North-Western India

Evidence of Absence: Bayesian Way to Reveal True Zeros Among Occupational Exposures

PHARAMACEUTICAL/TOXICOLOGY

Plasma perfluoroalkyls are associated with decreased levels of proteomic inflammatory markers in a cross-sectional study of an elderly population

Monoacylglycerol acyltransferase 1 knockdown exacerbates hepatic ischemia-reperfusion injury in mice with hepatic steatosis