

## 'Sharing is Caring'

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**1. Potential cancer-causing chemicals have been found in black spatulas, takeaway containers. Is it time to throw them out?****Introduction**

The onions are caramelized in your pan, you flip them over with your black spatula, but in doing so you've probably laced your dish with hidden chemicals. That's what a recent study published in the journal *Chemosphere* concludes — household black plastic items have been silently releasing harmful chemicals.

Researchers tested various household objects made from black plastic to see if they had traces of toxic substances usually found in recycled materials. The study's lead author Megan Liu, a science and policy manager for US-based environmental advocacy organization Toxic-Free-Future, said 85% of the products tested contained chemicals used as flame retardants.

**Why are black plastics harmful?**

Plastics used in electronic and electrical products contain flame retardants to prevent them catching fire.

Decabromodiphenyl Ether (DecaBDE) was one of the most commonly used flame retardants until the European Union banned its use in electronics in 2006. Since then, similar chemicals have replaced it. However, obsolete additives like DecaBDE can slip through the cracks. When electronic plastics are recycled, these chemicals can make their way into household objects.

Recycled parts from old electronics like TV casings are often used to make black household plastics, but these recycled products are not strictly checked for the presence of harmful fire-retarding chemicals.

That's why Liu's team only tested black plastics for flame retardants and not other colored variants.

**What health risks do black plastics have?**

Flame retardant plastics, particularly DecaBDE, have been linked to cancer, hormonal imbalance, nerve and reproductive damage. Potentially, it's a package of hidden health risks.

Similarly, another chemical compound called 2,4,6-Tribromophenol in black plastic is, "associated with thyroid disruption in humans and mice and has been detected in serum, breast milk, and placenta," the study states.

These flame retarding plastics have been known to leach from household electronics like televisions into the environment, according to 2015 research published in the journal Science of The Total Environment. The consequences are greater when these contaminants travel from cooking utensils into food and from toys to saliva.

It's not just black plastic, though. In 2024, the Research Council of Norway identified a quarter of all plastic chemicals — not just those found in black recycled plastics — are hazardous to human health and the environment.

### **Is it time to throw your black plastic cooking utensils away?**

In Liu's study, the highest leakage of harmful chemicals was observed in a sushi tray — a simple black takeaway box.

The study further observed high risk in kitchen utensils like peelers, spatulas and spoons. Notable contamination was also found in children's toys, including plastic cars, a traveler's checker set and a pirate coin medallion. Liu's team also expressed concern these fire retarding plastics were more often found in consumer products sold at small retailers catering to immigrant communities or specific ethnic groups.

But tracking contamination is difficult, particularly where recycled materials are involved. Bethanie Carney Almroth, an ecotoxicology researcher at the University of Gothenburg in Sweden, said recycling programs like those used to recycle plastic drink bottles often mix waste products indiscriminately. "We know very little about which chemicals are present in recycled materials," Carney Almroth told DW.

Households could address exposure to these chemicals by avoiding toys with black plastic components and replacing utensils made from these materials with wooden ones.

Other simple measures to reduce exposure include not reheating food in black plastic containers, and throwing away chipped or dented plastic utensils.

But Carney Almroth says such measures alone won't cut it. "Given the pervasive presence of plastics in products, and the lack of information available to the public, people should also support systemic changes necessary around plastics governance, including bans and restrictions on chemicals, changes in product design and shifts to reuse or refill systems," said Carney Almroth.

Relevance: GS Prelims; Science & Technology

Source: Indian Express

## 2. Norovirus cases rising in the US: How it spreads, what precautions can be taken

### Introduction



The stomach infection norovirus is causing alarm in the United States, with the first week of December seeing more than 90 cases recorded.

According to The New York Times, at least 80 people fell ill from norovirus linked to raw oysters served at a restaurant event in Los Angeles this month. They were sourced from British Columbia, Canada, and had been sold in 14 US states before being recalled.

In India, norovirus has previously affected people in Kerala, although on a much smaller scale compared to the numbers in the US. Here is what to know about the disease, its symptoms,

precautions and treatment.

### What is norovirus and how does it spread?

Norovirus is a highly contagious virus that is also sometimes referred to as the 'winter vomiting bug'. It can be transmitted through contaminated food, water, and surfaces. The primary route is oral-faecal.

It is similar to diarrhoea-inducing rotavirus and infects people across age groups. Disease outbreaks typically occur aboard cruise ships, in nursing homes, dormitories, and other closed spaces.

According to the WHO, emerging evidence suggests that "norovirus infection is associated with intestinal inflammation, malnutrition and may cause long-term morbidity".

It adds that an estimated 685 million cases of norovirus are seen annually, including 200 million cases among children under the age of five. The US Centers for Disease Control and Prevention's website further states norovirus is the leading cause of foodborne illness in the United States, causing 58% of all foodborne illnesses in the country.

### What are the symptoms of norovirus?

The initial symptoms of norovirus are vomiting and/or diarrhoea, which show up one or two days after exposure to the virus.

Patients also feel nauseous and suffer from abdominal pain, fever, headaches and body aches. In extreme cases, loss of fluids could lead to dehydration.

### **What precautions can one take against norovirus?**

One may get infected multiple times as the virus has different strains. Norovirus is resistant to many disinfectants – such as hand sanitisers – and can withstand heat up to 60°C. Therefore, merely steaming food or chlorinating water does not kill the virus.

The basic precaution is also the most obvious – repeatedly washing hands with soap after using the lavatory or changing diapers. It is important to wash hands carefully before eating or preparing food. During outbreaks, surfaces must be disinfected with a solution of hypochlorite at 5,000 parts per million.

The US Centre for Disease Control and Prevention suggests that those infected should avoid contact with others and avoid preparing food for others while sick and for two days after symptoms stop.

### **What is the treatment for norovirus?**

The disease is self-limiting. The infection, even though it takes a lot out of the patient, normally lasts only two or three days, and most individuals who are not very young, very old, or malnourished can ride it out with sufficient rest and hydration.

Diagnosis is done by real-time reverse transcription-polymerase chain reaction. No vaccines are available for the disease.

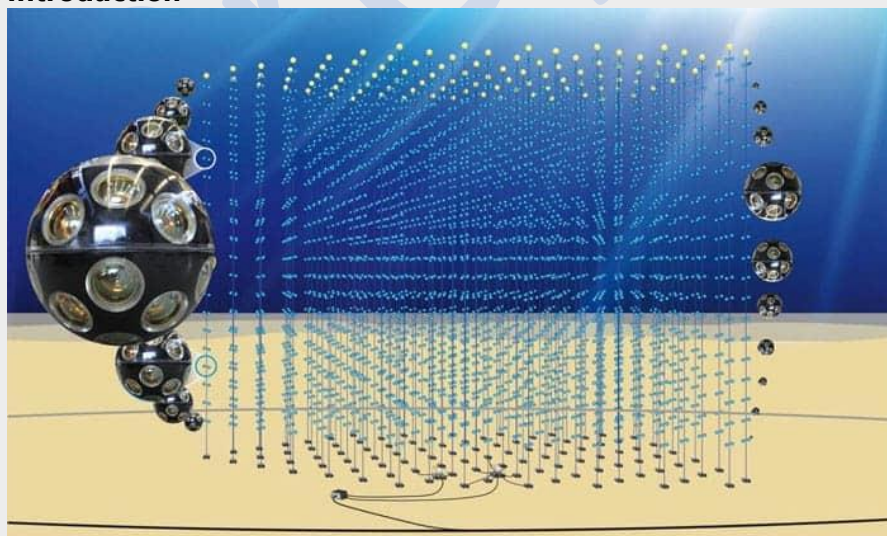
It is important to maintain hydration in the acute phase. In extreme cases, patients have to be administered rehydration fluids intravenously.

Relevance: GS Prelims; Science & Technology

Source: Indian Express

### **3. Why scientists are installing underwater telescopes to detect 'ghost particles'**

#### **Introduction**



Scientists are deploying two telescopes to detect high-energy neutrinos, also known as ghost particles, under the Mediterranean Sea. The two telescopes are part of the Cubic Kilometre Neutrino Telescope or KM3NeT. While one of the telescopes will study

high-energy neutrinos from space, the other will examine neutrinos from the atmosphere.

These telescopes are much like the IceCube Neutrino Observatory, which can detect high-energy neutrinos from deep space but is under the frozen ice in the Antarctic rather than being in the water.

Here is a look at what neutrinos are, why scientists want to study high-energy neutrinos, and why the neutrino telescopes have been placed deep under the sea.

### **What are neutrinos?**

Detected for the first time in 1959 — though their existence was predicted almost three decades earlier, in 1931 — neutrinos are tiny particles, very similar to electrons, but without any electric charge. They are one of the fundamental particles the universe is built of, and are the second most abundant subatomic particles after photons. Neutrinos are so numerous that about a billion of them pass through a cubic centimetre of space every second.

### **Why do scientists want to study high-energy neutrinos?**

Although neutrinos are everywhere, not each one of them is important to study. Scientists are interested in examining super-fast, high-energy neutrinos that have come from far, far away. Such neutrinos are rare and mostly originate from exotic events such as supernovae, gamma-ray bursts or colliding stars.

Studying high-energy neutrinos can help astrophysicists investigate those space mechanisms and regions like the centre of our Milky Way Galaxy which are shrouded in dust. Dust absorbs and scatters the visible light from objects, making them difficult or impossible to observe with optical telescopes.

Not only this, high-energy neutrinos can also give clues about cosmic ray production or even dark matter.

### **So why are scientists building underwater neutrino telescopes?**

High-energy neutrinos, however, are not just rare but also extremely difficult to detect. One reason is that neutrinos barely interact with anything — despite billions of neutrinos around us, an average of only about one of them will interact with a person's body during a lifetime. Even the IceCube, which has been operational since 2011 and was the first telescope to detect high-energy neutrinos, has been able to only spot a handful of these messengers.

To detect high-energy neutrinos, there is a need for a large volume of optically transparent material in a place where it is extremely dark. The location needs to be dark because the detectors look for flashes of Cherenkov radiation: light that neutrinos produce when they interact with a water or ice molecule.

These flashes help scientists trace the path of that neutrino, giving them details about its source, the amount of energy it contains, and its origins.

Although both frozen ice and deep sea waters provide conducive conditions for detecting high-energy neutrinos, experts suggest that underwater neutrino telescopes could be more efficient than IceCube.

That is because water scatters light less, which gives a more accurate idea about where the detected neutrinos came from. The one disadvantage is that water absorbs light more and as a result, there will be less light to examine.

Relevance: GS Prelims; Science & Technology

Source: Indian Express

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