

Stories by YUEN MEIKENG meikeng@theira.com.my

Eating and breathing in plastic

We need to pay more attention to microplastics after they were found in living human lungs and blood for the first time. Until then, an international study, including researchers from Malaysia, are looking at the sources of microplastic in this region.

One credit card per week

Humans, on average, could be ingesting about 5 grams of microplastics a week - that's about the weight of a credit card. This was suggested in a study by the University of Newcastle, Australia, commissioned by the World Wildlife Fund (WWF) in 2019.

"The largest source of plastic ingestion is through drinking water. Another source is eating shellfish as they are eaten whole including their digestive system after a life in polluted seas," WWF.

Makewin plastics initiative interim manager Tabriz Mohamed Arif tells *Sunday Star*.

But the WWF isn't asking the public to stop drinking water or eating shellfish, but wants to raise awareness that there are very low levels left in the impacts of plastic ingestion by humans.

It's also time for everyone to be more aware of this problem and do our part to manage plastic waste, in line with Earth Day, marked on Friday April 22.

"Primary microplastics come from products like microbeads in shower gels.

"Secondary microplastics are from larger plastics such as degraded plastic bags," Tabriz says. To alleviate the problem, she says waste reduction should be given the top most priority, followed by re-use strategies and recycling.

Nevertheless, the believes Malaysia's aim to reach a 40% recycling rate by 2025 is achievable.

"Malaysia has sufficient infrastructure to process large quantities of recycled waste materials.

"However, most recyclers ingest recyclable waste.

"As a result, the recyclables generated here may end up in landfills and dumpsites, or are filtered in the environment, eventually leaching into the ocean," she points out.

"Tabriz says it is estimated that between 90 and 120 million tonnes of plastic have accumulated in oceanic vents worldwide by now, at a continuously increasing rate.

"Even if all plastic pollution into the ocean were to stop today, the presence of plastic degradation from the accumulated waste would still continue.

"It would lead to the mass of microplastics in oceans and beaches more than doubling between 2020 and 2050," she says.

What it means for us

For humans, the effects of microplastics in our bodies are still unknown but the signs don't look good.

In the laboratory, microplastics have been shown to cause damage to cells, says Assoc Prof Dr Chan Kok Meng, from the Universiti Kebangsaan Malaysia's faculty of health sciences.



Needles, which are plastic pellets used to make other plastic products, are a common source of microplastic pollution.

"It's been shown to cause inflammation, damage to DNA and inducing cell death in cell culture and laboratory animals," says Dr Chan, who is UKM's Center for Toxicology and Health Risk Studies chairman.

He leads the Health Ministry's idea to conduct a study on microplastics, as there is growing interest about its impact.

Dr Chan believes the most concerning part is the leaching of chemicals from the microplastics into our body.

"For example, some plastics are added with chemical dyes to give it colour.

"Certain dyes, especially from benzidine-based ones from the 1970s and 80s are known to cause cancer," says Dr Chan, a registered



Plastic pollution: Microplastics from our plastic waste have been a problem in our environment, and now they are being detected in the blood and lungs of living people for the first time. - AFP

However, Dr Chan disagrees, as fish is an important part of a healthy diet.

"What we can do is to carefully select certain types and sizes of fish for consumption.

"There are fish that build up less amounts due to their diet.

"Professory fish like catfish tend to accumulate more pollutants compared to more predatory fish like carp," he says.

Another important aspect is to clean the fish properly including removing its guts before cooking it, he advises.

He also notes that farmed fish will be generally safe because the Department of Fisheries Malaysia closely monitors all aquaculture activities here.

"For codlins and spicers, if you can't determine the source, it is best to avoid them because they are filter feeders and may accumulate pollutants," Dr Chan adds.

"Filter feeders are animals that feed on particles strained out of water by circulating them through their system.

Malaysian Medical Association president Dr Koh Kar Chai says the public should be concerned as evidence shows that we are exposed to microplastics via inhalation and things we consume daily.

"Plastics contain chemicals which are known to be disruptive to the endocrine system (the system controlling our body's hormones) and can trigger chronic inflammation.

"However, the jury is still out on the actual extent of the harm that microplastics cause in our body," he adds.

Dr Koh suggests that manufacturers look into alternatives to plastic in items they produce.

"As such initiatives will be supportive towards the health of the population, the government could look into incentives for companies that use biodegradable materials," he says.

Simple steps such as separating garbage to be recycled can make a

big difference too, he says. However, there is no denying that plastic needs to be part of our lives.

As one of the key components of medical equipment and protective gear, plastic plays an essential role in keeping hospitals running and protecting frontline workers during the Covid-19 pandemic.

But these, among others, caused a spike in packaging waste. Tabriz says this begs the urgency of having a waste management system that is able to take on the high amount of waste.

"Given the trends that we have seen, there may be more fast fashion and other materials ending up in nature than before the crisis began.

"As such initiatives will be supportive towards the health of the population, the government could look into incentives for companies that use biodegradable materials," he says.

Simple steps such as separating garbage to be recycled can make a

With the rising concern on microplastic pollution, a group of international experts, including from Malaysia, are studying the source of these pollutants in this part of the world.

The project will track the sources of plastic pollution and study how it affects marine life here.

"Our study will look at the impact of such plastics, including microplastics, on organisms like fish.

"We will also come up with interventions and mitigation steps which can be presented to policy makers to reduce such pollution," says Prof Dr P. Agarwal from the Jeffrey Sachs Center on Sustainable Development at Stony Brook University.

Prof Agarwal, a solid waste management expert, is part of the first 10 experts from Malaysia, United Kingdom, Singapore and Thailand who will be conducting the project until the end of next year.

Titled "State and Maritime Marine Plastics in Southeast Asia", the project, which began last year, is led by British University of Essex.

Other researchers on the study are from organisations like Universiti Malaysia in Malaysia, National University of Singapore, Chulalongkorn University in Thailand and Plymouth Marine Laboratory in the United Kingdom.

The study will include a satellite monitoring exercise by releasing special

Malaysian experts join international study on plastic pollution



E-bottles which will be used to track plastics across the ocean in an international study on plastic pollution by researchers from Malaysia, United Kingdom, Singapore and Thailand.

plastic bottles, known as e-bottles, into the sea from Malaysia, Singapore and Thailand in June this year.

"This is to track the flow of these e-bottles and study how each plastic is degraded in the region.

"Each e-bottle comes with a transmitter chip attached to it and we will track its movement for six months through GPS.

"In Malaysia, we are planning to release three bottles into the sea from areas like Terengganu and Kuala Selangor.

"We will have to take a boat and travel about half a kilometre before releasing it into the water.

Prof Agarwal. But while the project is ongoing, Prof Agarwal says it is undeniable that plastic waste keeps increasing.

"The least that Malaysia can do is to be wary of their plastic disposal and try to stop using single-use plastics like straws," he says.

Malaysia has a target to have zero single-use plastics by 2030. Prof Agarwal disagrees that it should be eight years from now when it can be done sooner.

"Of course we cannot live without plastic. But we should try to reduce what we can," he stresses.

He suggests Malaysia consider India by introducing bags made from straw to reduce the dependence on plastic bags.

away and it becomes compact. The cost is roughly RM3 each but it is practical," he adds.

On the consequences of microplastics in the human body, Prof Agarwal says it is worrying as it can affect internal organs, such as the kidney.

"Kidneys filter our blood and with microplastics may accumulate there, possibly causing long-term issues like cancer or affect its function.

"This is especially for those who are diabetic, as their kidney function may have already been affected," he says.

As such, it is important to identify the source of microplastic pollution to ensure it is controlled.

"One potential way that microplastics end up in our body is by eating sea food like codlins and fish.

"Such creatures consume the microplastics in the sea and when we eat such seafood, the particles end up in our body," he says.

But Prof Agarwal points out that it is not only cause plastic to be in the ocean.

"A source of microplastic is microbeads which are added to cosmetic products like face creams.

Meanwhile, WWF-Malaysia plastics initiative interim manager Tabriz Mohamed Arif says dangerous thresholds of microplastic concentrations were reported in the Mediterranean, the East China and Yellow Seas and the Arctic sea too.

In the worst case scenario, such high levels of microplastic pollution could lead to adverse effects, including reduced marine life populations.

"The durable nature of plastic also means that the uptake of microplastic at the marine food chain will only continue to dangerous levels, if we do not cut our production and use of plastic now," Tabriz explains.

Encouragingly, in March of this year, she notes that the United Nations (UN) Environment Assembly unanimously agreed to develop a legally binding treaty by 2024 to end plastic pollution.

The resolution addresses the full lifecycle of plastic, including its production, design and disposal.

"The WWF welcomes this decision and urges the world's governments to seize this powerful moment for the eliminating plastic pollution.

"We hope nations can act just as strongly and decisively in developing the full content of the treaty by 2024," she says.

WE are moving towards endemically now, but the trend of clinical waste left behind during the Covid-19 pandemic continues to keep up.

The total weight of clinical waste in Malaysia has spiked by 43.8% last year compared to the previous year.

From 93,983 tonnes in 2020, the number swelled to a total of 137,361 tonnes last year, the Department of Environment (DOE) tells *Sunday Star*.

"Of this total, 5,002 tonnes of clinical waste were generated in Malaysia," it says, calling the production of such waste during the pandemic as "unprecedentedly high."

"Due to this, Malaysia is now facing problems in terms of storage and disposal of these wastes.

"In response to this, DOE has reviewed and considered the application for the installation of incineration incinerators.

"We have also looked into more applications for temporary storage of such waste," the department adds.

Currently, 13 temporary approvals have been given for mobile incinerators and temporary storage.

Clinical waste shot up by 43.8%



Spiked amount: Covid-19 clinical waste collected from healthcare facilities includes those from vaccination centres like the Sunway Pyramid Vaccination Centre PPV - IZZRAFID ALIAS/THE STAR

as to cope with the growing amount of waste.

"All clinical wastes should be disposed of by incineration," it says. Any waste generated from the health facilities during the Covid-19 pandemic period is categorised as clinical waste or its code SW 08.

"To further define clinical waste, the Health Ministry has included any waste which creates wholly or partly of human tissues, blood or other body fluids and secretions," the DOE says.

Other examples of clinical

wastes are drugs or other pharmaceutical products, needles or syringes, syringes, needles or other sharp instruments which may pose hazards to any person coming into contact with it.

The list also includes any other waste which may cause infection to any person coming into contact with the item.

This can be from the medical, nursing, dental, veterinary, pharmaceutical field or similar practices.

The waste produced from an investigation, treatment, care, teaching, research or the collection of blood for transfusion is also considered as clinical waste.

Last year, it was reported all licensed facilities treating clinical waste were now operating "at full and beyond their capacity" due to the heavy load of such waste.

The increase in clinical waste due to Covid-19 has generated facilities in such premises.

Currently, there are eight licensed premises in the country, with five approved by the government.

To deal with the issue, the department has given temporary approval to licensed facilities to set up mobile incinerators to expedite the treatment of clinical wastes.

Reducing global warming: Low cost ways

The world on Friday, April 22, observed Earth Day celebrating the environmental diversity of the earth and highlighting ways of protecting our habitat, the only place in the known universe where life can survive.

But are we doing enough to save our planet?

The latest UN's Intergovernmental Panel on Climate Change (IPCC) report doesn't suggest that.

The world's nations, 238 top climate experts say, are taking our future right to the wire.

The 2,800-page report documents "a tizzy of broken climate promises... and the results will be catastrophic," UN chief Antonio Guterres had said in a blistering letterhead of governments and industries.

The good news is that the IPCC report also says we can still make a change as not only do we have the tech to slash emissions and curb global warming by 2050, but half of available carbon-cutting options are cost-free or very cheap.

Wind and solar

In 2019, total emissions were 33 billion tonnes, or gigatonnes, of CO2 or its equivalent in other greenhouse gases. The range of options identified by the IPCC would enable a reduction in emissions of 31 to 44 gigatonnes by 2050.

There are four key areas where the total potential for carbon reduction is highest between now and the end of the decade - solar and wind energy, reductions in deforestation, and restoration of forests and other ecosystems.

Of these, solar and wind are also among the cheapest options available thanks to the steep drop in the unit costs of these technologies - down 89% and 50% respectively between 2010 and 2019, according to the report.

More investment in solar could see an emissions reduction of between two and seven gigatonnes of CO2 equivalent by 2030. Wind energy could save between 2.1 and 3.5 gigatonnes.

Most of that potential, according to the report, would have essentially negative lifetime costs because they are cheaper than fossil fuel alternatives.

Other energy-generation options have a higher cost, such as nuclear power and hydroelectricity.

Food and forests

Protecting and restoring natural habitats is the second most significant area for reducing CO2 emissions.

Forests are crucial for absorbing CO2 generated by human activities, and the IPCC found that limiting deforestation and the destruction of peatlands could reduce net emissions between three and almost eight gigatonnes, largely at a low cost.

Restoring these types of ecosystems would save one to five gigatonnes. But action in this category would be at the more expensive end of the range considered by the IPCC.

Shifting to "sustainable" diets and reducing waste food could save more than two gigatonnes, the IPCC said, but it did not give a cost estimate because of wide global variability and a lack of data.

Transport and construction

Electric vehicles (EVs) are the fastest-growing part of the auto-industry and if those cars and trucks are charged with low-carbon electricity they can significantly reduce emissions.

Changes like we travel - switching to public transport and bicycles - can also help. Electrification of global shipping and aviation sectors are also possible.

Most industrial processes in general can be decarbonised through a combination of technology using electricity and hydrogen, carbon capture and innovation in the circular use of materials like recycling and reuse. It is possible to make existing and new buildings in all parts of the world either nearly zero-energy or low-energy.

The construction of new high-energy efficient buildings have the greatest potential (between two and seven gigatonnes), although costs are (roughly) the highest end.

In industry, measurable amount of the options - beyond improving energy efficiency and cutting other greenhouse gas-emissions - are associated with higher costs.

But the sector still has significant potential for reducing emissions. In particular the switch to less carbon-intensive energy sources - Agencies/The Daily Star/ANN

