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A LITTLE TOO PURE?

Issues raised by a prominent chemist about the possibility that drinking ultra-pure water is robbing us of essential minerals prompt SIRIPORN SACHAMUNEEWONGSE to ask if it is time to review drinking water regulations in Thailand

Health is a priority above all others these days. And why not? After all, good health means a longer and better life. Consequently, we eat the right types of foods, watch our calorie intake and some even detox once in a blue moon to try to achieve a state of perfect health.

But as all that glitters is not gold, an investment meant to bring good health can actually turn out to be a health setback. Ironically, Perspective recently learned that drinking pure water, which most of us consider a superior health practice, could be damaging to health.

Dr Phichai Tovivich, a former chemistry professor at Chulalongkorn University, told Perspective that he has never forgotten a lesson learned in his very first chemistry lab - pure water is not meant for drinking.

"Pure water should be used as drinking water only temporarily, for detoxing or in special conditions, but other than that, it is better left for the industrial sector. It is ideal for car batteries, pharmaceutical manufacturing and laboratories," he said.

He explains that drinking totally pure, which also means mineral-free, water on a regular basis lowers the concentration of minerals in the blood. Minerals from the body's cells and organs are then drawn to the blood in a balancing mechanism.

"In fact," said Professor Phichai, "pure water acts like a perfect solvent. When it is left in open air, it becomes acidic easily as carbon dioxide dissolves in it, in turn making it more efficient at dissolving and draining minerals from our cells.

"Drinking pure water not only denies cells and organs the minerals normally contained in drinking water, it also robs them of their mineral content," he warns.

This leaching process, which has been noted by other biologists and chemists, could lead to multiple mineral deficiencies in the body, with a variety of side effects. For example, it increases a person's risk of cardiovascular diseases, osteoporosis, osteoarthritis, hypothyroidism, high blood pressure, diabetes, coronary artery disease and premature aging.

"Drinking this type of water clearly poses a threat to ruin even a fit person's health," exclaimed Dr Phichai.

He proclaimed water which has been treated by the process of reverse osmosis (RO) in particular as "the worst" drinking water.

In fact, RO is an effective method for filtering water and has been well received by waterworks authorities around the globe. Especially in the Middle East, where water is a scarce natural resource, RO has proven effective in purifying sea water, which of course is extremely rich in minerals.

Unlike the filter layers used in conventional water purifying systems, the RO process involves a semi-permeable membrane which acts as an extremely fine filter. As a result, water filtered by RO is almost totally free of not only minerals, but also micro-organisms and pollutants, which is why many people consider that it is the best water for drinking.

However, said Dr Phichai, minerals must be added back into the water before consumers drink it, or else it may translate into the afore-mentioned health concerns.

Dr Phichai also had criticisms of resin filters, which have been escalating in popularity in Thailand: "Resin filters are popular in Thailand because they remove chlorine from tap water effectively, but most people do not know that these filters also remove calcium and magnesium from the water. Again, as is the case for RO water, drinking such de-mineralised water on a regular basis poses a threat to health, especially since both these minerals play such important roles in the human body."

He said that a magnesium deficiency alone could lead to about 50 diseases or conditions - premature aging, aggressive behaviour, Alzheimers, brain damage, cancer, diabetes, immune disorders, kidney stones, high blood pressure and rheumatoid arthritis, just to name a few. One can then imagine the lengthy list of hazards with multiple deficiencies of other important minerals.

Dr Phichai noted that human beings can survive for weeks without food, but normally less than 4 days without water.

Biochemical reactions in the cell take place in an aqueous, mineral-rich solution. Minerals are often necessary for these essential reactions to take place. Accordingly, said Dr Phichai, one should drink at least 2 litres of clean, unpolluted mineral-containing water each day.

PURIFIED TREND

Despite the concerns of Dr Phichai and others, RO and other water purifiers are driving a thriving business in Thailand. Many people who can afford it install RO or resin filters at home, and others take advantage of the water vending machines using the RO purification technique that seemingly sprang up overnight all over Bangkok.

Surirath Eiamton, a sales officer for a supplier of such machines, revealed to Perspective that the firm she works for had seen a drastic increase in sales over the past 9 years.

"It's typical to have a customer who bought 10 water vending machines last year come back and buy another 20 this year," she said. She specifically mentioned one client who recently purchased 30 machines to be placed in Bangkok.

From a business point of view, operating and servicing the machines is clearly not a bad pick. All that is needed is a small area, less than one square metre, and 60,000-80,000 baht for this particular brand. The investor is guaranteed a 24-hour income source, without the worries of inventory or labour expenses.

Each vending machine provides up to 600 litres of water per day at the cost of only 20 satangs per litre. The customer pays typically one baht per litre, and are happy to do so as the cost of bottled water runs from 6 to 10 baht per litre.

Surirath said that when she lived in an apartment, before she bought her house, she herself relied greatly on these coin-operated water vending machines.

Today, like many home owners, she has an RO filter system installed in her kitchen and finds this an even better choice.

THE DEBATE

When informed of Dr Phichai's concerns, Banyat Petchlert, the managing director of one RO water vending machine supplier, told Perspective that water from his machines is not pure to the extent that it has been de-mineralised. He said it is 90-95% pure.

"Drinking absolutely pure water is harmful for health," agreed Banyat. "That type of water is only meant for industrial purposes. The water from our machines isn't that pure."

He then went on to list some obvious benefits of RO-treated water: "It will not have things that you do not want in your drinking water, like rat's faeces, which may be present in poorly treated water and can actually be very harmful."

Besides, he said, while it is true that the RO process removes valuable minerals, there are many other and better sources of minerals easily available. He said it is necessary for people to be aware that they need to consume minerals.

Surirath also argued that water is not a necessary source for minerals, "as we mainly get minerals from the food we eat." Her view was that mineral water is preferable to pure water only when a person has lost minerals rapidly and needs a replacement for them immediately. She gave the example of an athlete who had lost a lot of minerals through heavy sweating. In this case drinking mineral water may be important. Otherwise, she saw few drawbacks to drinking pure water, and did not believe that the practise actually robs the body of minerals, as Dr Phichai maintains. Her confidence seems to be bolstered by the fact that there have not been any restrictions placed on vending RO-processed water.

Dr Phichai agreed that the above arguments have some merit, and noted that the typical Thai diet is rich in minerals. However, he proposed that the extraction of minerals from food takes place mostly in the digestive system, while the extraction of minerals from water takes place mostly in the bloodstream. Moreover, he said, the role of pure water in draining minerals from the body's cells cannot be denied or ignored.

Dr Phichai is not alone in this view. Dr Zoltan Rona, MD and MSc in Biochemistry, an authority in alternative health practices, is another crusader against drinking pure water. Quoting from an article by Dr Rona which is widely distributed on the Internet: "The ideal water for the human body should be slightly alkaline and this requires the presence of minerals like calcium and

magnesium. Purified water tends to be acidic and can only be recommended as a way of drawing poisons out of the body. Once this is accomplished, the continued drinking of purified water is a bad idea...

"A growing number of health care practitioners and scientists from around the world have been advocating the theory that aging and disease is the direct result of the accumulation of acid waste products in the body..."

"There is a correlation between the consumption of soft water (purified water is extremely soft) and the incidence of cardiovascular disease. Cells, tissues and organs do not like to be dipped in acid and will do anything to buffer this acidity including the removal of minerals from the skeleton and the manufacture of bicarbonate in the blood. The longer one drinks purified water, the more likely the development of mineral deficiencies and an acid state. I have done well over 3000 mineral evaluations using a combination of blood, urine and hair tests in my practice.

"Almost without exception, people who consume purified water exclusively eventually develop multiple mineral deficiencies."

A QUESTION OF GOVERNANCE

Dr Phichai criticised the popular marketing campaign for RO water vending machines during the previous government. "Following the campaign, I addressed a letter to the former cabinet through the Ministry of Public Health, to inform the authorities of the harms related to drinking RO water," he recalled.

In reply, he was informed by the ministry that operators of water vending machines using RO were obliged to add minerals back into the purified water before selling it to consumers.

But Dr Phichai said he is not persuaded that this condition has been met. "It's impossible to monitor even the vending machines in Bangkok. There's no guarantee that suppliers across the nation will actually honour this requirement," he said.

And in fact, Banyat told Perspective that he wasn't even aware of the regulation.

The Food and Drug Administration (FDA) imposes a maximum limit for hazardous microorganisms and inorganic salts, such as coliform bacteria, lead and sulphates, that may be safely present in drinking water, but there are no minimum limits for minerals. This means that there are possibly several brands of drinking water in Thailand that have absolutely no mineral content.

Rather interestingly, the FDA itself does not certify that water from these machines is safe for drinking. Said Benjamaporn Permsup, a Public Relations officer at the FDA: "The FDA only certifies bottled drinking water - not water from vending machines and not tap water."

The anti-RO activist says this may be a case of no-one in government wanting to take responsibility. He noted that the FDA has authority with respect to all drugs and items for personal consumption sold in the country.

"Why then does the FDA deny their control over this type of drinking water?" he asked, adding that modifying the drinking water requirements wouldn't cost the FDA anything, but it could save a great number of lives.

Yet, he admits with regret that a national ban on selling pure water isn't likely to come about any time soon.

"There may not be such a ban in any country. Our government as well is unlikely to step up and take action," he remarked.

However, Dr Phichai noted that people living in the Middle East and in western countries, where water treated by RO is also widely sold, are more aware of the harms of drinking pure water. The suppliers of purified water in those countries are in most cases compelled to add minerals back into the water.

Therefore, Dr Phichai's mission is to raise public awareness in Thailand. He recalled a particular incident a few years ago before the RO machines were common in Thailand. "On the Thueng Luk Thueng Khon programme, an officer of the Provincial Waterworks Authority once said that he thought vending machines that supplied water treated by RO should be brought to Thailand, because he had tasted the water from such a vending machine in USA and it tasted very pleasant. Right away, I wanted to tell the officer that the water he drank in the USA was surely not 'pure' water, as pure water does not have any taste or smell. He was simply unaware that minerals had been added back, which was why it tasted good."

Although there are still no FDA regulations concerning water vending machines, there are some positive signs. One supplier remarked that the agency had lately been examining the water from their machines.

Dr Phichai also is encouraged that over the past few years more and more people have heard his warnings. He continues to advise drinking water that contains the important minerals - calcium, magnesium, sodium and phosphorous - in adequate amounts. Yet, he added that it is necessary to closely scrutinise the producers to be sure their water is what it is claimed to be.

For those who have an RO filter system installed at home, he recommended adding tap water filtered by a less stringent process to the purified water in a 50:50 ratio. Ideally, minerals could also be added to pure water before drinking. As for resin filters, he says that not re-charging the filter with sodium chloride, as is often advised by sellers, would do the trick.

These solutions will only work for those who are aware enough and care enough to use them, however. Perhaps it is time to review the current regulations on drinking water in Thailand and create some which are more appropriate. After all, water is the liquid of life, and there is nothing more important to good health.

This is the first part of a series on drinking water in Thailand.