

Sawaliram: Does the plastic vaporizer leave toxins?

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The water in plastic bottles we normally use to carry or store drinking water in often starts smelling bad after using the bottle for a few months time. This indicates that something from the bottle's body has started reacting with the water. This means that certain types of plastic in use in our everyday lives react even with drinking water kept at atmospheric temperature. So, it isn't unreasonable to think that the plastic in vaporizers can react with and leach into the hot water and then the steam that we inhale, is it? Perhaps not, but the real question is whether that makes it (due to the plasticky taste and odour) unpleasant for us to use, or whether it becomes unsafe for us to use.

Plastic and water

So, first let's see what happens to plastic when it comes in contact with water. While plastics are quite resilient to degradation (which is why they are a boon to us), many polymers, especially over a period of time, do react with water, with the chlorine and other chemicals in it. Sometimes this is evident in the form of discolouration and cracking, but often we are unaware of any change in the plastic in contact with water. If the plastic has other organic substances in it – like polychlorinated biphenyls, bisphenol A, etc, these too can add to the toxicity of the water stored in it. While some of the chemicals (such as bisphenol A from PCP bottles) that leach into water do so in quantities that can be harmful over the long term, some others (for example, antimony from PET bottles) that leach into the water normally do so in quantities well below that are considered harmful to our health. The degradation of plastic and leaching of chemicals into material stored in plastic containers is accelerated with heat, so what about vaporizers then? What kinds of plastics are they made from, and does the water in them get contaminated enough for us to be concerned?

Not having used a vaporizer myself, to write this answer I personally went to two medical stores in Bhopal and asked them to show me a vapouriser. Both had a plastic machine from the same manufacturing company (figure 1). That bluish column which you see in its interior was marked as the insulator, and contains the heating element that runs on electricity. That opening near the

top is meant for the user to inhale the released steam. There were three markings placed along a vertical line on one side to indicate levels suggested for filling water.

Now, the packing box mostly told the user about the various benefits of utilising this machine – the only thing it had to say about the plastic used was that was is of “high quality”. Though the material of the heating element too was not mentioned – this part that can reach temperatures of 240C is usually made from ceramic or aluminium, not plastic. Interestingly though, it had one precaution mentioned on the packaging very clearly: “It is not recommended to add any salt for increasing vapour pressure or to use hard water.” It wasn’t clear whether the warning was because salt increases the boiling point of the water or whether it was to prevent the corrosion of the heating element or other parts of the vaporizer.

So, the answer to the question seems to be – we don’t know. Vaporizers are usually used intensively over short periods of time (and to great benefit). Whether during this time there is degradation of the plastic and whether this can affect our health, we don’t know.

Safe plastics

In many vaporizers you’ll see the description as made from ‘high quality’ or ‘first grade’ or ‘medical grade’ plastic. These descriptions mean little to users like us. However, there are plastics safe to use in vaporizers, for certain periods of time and these are also known as ‘food grade plastic’. These allow the storage of food and drink in them, they can also be subject to high temperature food and water, but all of them are not equal in their properties. An example of a food-grade plastic is polyethylene terephthalate or PET/PETE is often used in making water bottles. But if these bottles are used over and over again, then they can leach carcinogenic, hormone-disrupting phthalates (mainly used as plasticisers, which are substances added to plastics to increase their flexibility, transparency, durability, and longevity). Another is HDPE (high-density polyethylene). It has excellent chemical resistant properties. Regarding temperature-tolerance, it is considered safe for short periods up to 120°C, or for long periods up to 110°C. Now of course boiling water in vapourisers is around 10 to 20°C cooler.

Knowing what plastic you have hand

The quickest and most reliable way to check for whether a plastic container is food-safe is by consulting the recycling number. This number will be between 1 and 7 and will be stamped inside a triangle of arrows. As a general rule, the numbers that are safe for use with food are 1, 2, 4, and 5. HDPE is indicated by the "2" symbol and is the best type for long-term food storage. All plastic containers sold specifically for food storage will be made from this material. PET/ PETE, low density polyethylene (LDPE), and polypropylene (PP) – all acceptable for food storage – are represented by the numbers 1, 4, and 5 respectively. You can easily check for that number 1 label beneath a bottle of soft drink or mineral water.



To sum up, it is not always clear what kind of plastic is used in making vapourisers. In any case, even with high quality plastic, we users need to know when we must stop using it – a date of expiry will be good to have printed on the product. But whether we inhale toxic substances from plastic vaporizers, we don't know.