



**Healthy You Foundation**

## SAFETY ISSUES CONCERNING STORAGE WATER PURIFIERS

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**SAFETY FIRST, CLAIMS LATER**

**By**

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This document stresses the importance of consumers' safety in making the choice of a suitable water purifier and the various safety and regulatory issues associated with the same.

The consumers in India have the right to access safe portable drinking water. There are several studies with valid scientific evidences which have established how in an irresponsible manner the manufacturers, service providers, food regulators and the policy makers are not concerned with the health and safety of the consumers in India by depriving them from access to safe portable water.

The World Bank estimates 80% of communicable diseases in India are water related. Water borne diseases such as diarrhea, cholera, and other gastrointestinal disorders are a cause of prime concern and children, elderly and sick people are especially the most vulnerable population segments. Pollution of ground water and surface water sources also pose a serious risk for public health. With the growing awareness among the consumers for hazards of unsafe drinking water and multitude of diseases caused by water borne pathogens, demand for water purifiers providing safe portable water has been growing.

In India, the weak water distribution infrastructure combined with questions on effective municipal water treatment plants have made point-of-use (POU) water purifiers a primary defense mechanism to remove various contaminants to make the water safe to drink.

There are a number of water treatment devices available in market today which can be divided into following categories:

1. Pitchers: These are gravity based systems usually stored in refrigerators or on dining tables.

2. Tap mount: These are directly attached to the taps and convenient to use but have other limitations
3. Online Wall mount/Counter top: This is connected directly to the water supply in kitchen and may use electricity to drive some of its features.
4. Under-the-counter online: This type of system is usually installed under the sink and is online with a small faucet coming through the sink at the top.
5. Storage water purifiers: These are systems which rely on gravity filtration and are typically chemical or resin or ultraviolet (UV) based. They come in both electric and non-electric models.

The number of consumers seeking cheap and reliable water purifiers is increasing in metros as well as towns all across India. The water purifiers available in the market typically achieve a desirable level of water quality through three main stages of water purification:

1. Physical treatment (sediment removal) – this is done through the sediment filter made of polypropylene
2. Removal of organic matter – activated carbon is generally used to remove the organic matter present in water through surface adsorption and
3. Microbiological treatment (disinfection or entrapment) – it is accomplished through number of technologies available namely chemical purification, ultraviolet treatment and filtration, ozonation, ion exchange, electro-deionization, or various membrane filtration processes such as ultrafiltration, nanofiltration, and reverse osmosis.

## **Storage water purifiers**

While UV and reverse osmosis (RO) are amongst the most prevalent and safest types of technologies used in domestic water purification, these are high end technologies using electricity for purification process.

Lower initial costs and reasonably good performance can also be achieved by chemical-based purification systems which, however, need continuous replenishment of chemical agent. The chemical agent can be delivered in either of two forms:

- a) tablet or powder that dissolves into water releasing the chemical or
- b) more advanced contact-disinfectant resins that release very little of chemical agents to accomplish the same objective.

These are generally the technologies of choice for gravity-based, non-electric STORAGE WATER PURIFIER systems that cater to the mass market.

## **Important factors to be considered while choosing Chemical Based Technologies**

While Chemical based water purifiers are generally cheaper than UV and RO systems and they don't require electricity or running water, the most important factor to consider while evaluating the option of a chemical based purifier is whether the underlying technology is **safe** for long term disinfection of drinking water. Generally, chemical based purifiers cannot remove Dissolved Solids from

water, and thus, not recommended in areas with high hardness or other dissolved solids.

### **Risks**

It is of paramount importance that the output water should be free of the chemicals that were used to purify it as well as and their decomposition products. There is a great risk of formation of Disinfection-by-products if the residual chemicals are not completely and reproducibly removed from the output water. The adverse health effects of active chemical agents are broad ranging and can be enormous. Even the most common disinfectant, chlorine, generates disinfection by-products which are of grave concern.

This risk is directly related to the dosage levels of chlorine, so chlorine at 1 ppm poses a lower risk than at, 10-20 ppm, which is considered high dosage. In at least one of the products it has been revealed from information made available on public domain that one of the chlorine-based water purifier used high dosage level, which is not permissible. Hence the use of chlorine is carefully governed, by agencies administering the same, and regularly monitored to ensure dosage is administered under safe level in the interest of public health and safety.

Some other disinfection chemicals decompose themselves during the process and generate innocuous looking decomposition products, which when combined with other routinely used material can result in massive public health issues. *In laboratory animals and sample populations, the adverse health effects of by-*

*products of indiscriminate use of chlorine and chlorine bearing chemicals, range from metabolic disorders to even renal failure and cancer.*

### **Competent regulatory authorities**

In 1991 the Standard setting body in India, Bureau of Indian Standards (BIS) made available the water standards IS 10500-1991. Subsequently after great amount of pressure put on BIS and Ministry of Consumer Affairs, Government of India, standards for Natural Mineral Water and Packaged Drinking Water was formulated under IS:13428:1998 and IS:14543:2004 respectively and made mandatory under the provisions of Food Adulteration Act. 1954.

As India does not have any existing Standards for Storage Water Purifiers or other water purifiers, under the circumstances, consumers must be aware of the competent regulatory authorities in other developed countries such as United States of America and Europe.

**United States Environment Protection Agency (EPA)** mission is to protect human health and to safeguard the natural environment - air, water and land - upon which life depends. It is with EPA that the regulatory responsibility rests to certify whether a particular chemical is suitable for use in Drinking Water use and its applications.

### **EPA and Legal Implications**

The EPA label is a legal document accepted as such in all the state, federal, appellate court systems and the Supreme Court of the United States as well as in other countries that follow U.S. EPA's guidelines on anti-microbial chemicals. Many countries such as Canada, Australia and European Union have similar regulatory agencies that largely follow the same restrictions that U.S. EPA has placed on EPA Label, either by their own effort or by following EPA's guidelines. This is not surprising because the public health risks posed by any disinfecting chemical are essentially the same regardless of which country the chemical is used. Indians, therefore, are no less vulnerable to the risks posed by chemicals or dosages deemed unsafe in USA or Europe.

In the U.S., avoidance, circumvention or action in contravention of EPA guidelines and directives results in direct Federal Action. EPA may issue a civil administrative complaint to any person or company who violates FIFRA. The complaint may impose a civil penalty, including recovery of any economic benefit of non-compliance, and may also require correction of the violation. EPA may also issue a Stop, Sale, Use or Removal Order (SSURO) prohibiting the person who owns, controls, or has custody of a violative pesticide or device from selling, using, or removing that product except in accordance with the provisions of the SSURO.

### **Restricted use or canceled chemicals**

EPA registers pesticides and their use on specific pests and under specific circumstances. For example, "Pesticide A," registered for use on apples, may not be used legally on grapes, or an insecticide registered for "outdoor use" may not

legally be used inside a building. In some circumstances, use of a registered pesticide may be restricted to pesticide applicators with special training.

EPA has a list of restricted use or canceled pesticides “Restricted use products report”. A product, or its uses, classified as "Restricted Use" may only be applied by a certified pesticide applicator or under the direct supervision of a certified applicator. Certification and training programs are conducted by states, territories, and tribes in accordance with national standards.

### **Suggestions to Policymakers on Consumer Safety**

As a start, we would recommend chemical-based Storage Water Purifier manufacturers must be mandated to include a certificate from an independent scientific body that the product uses an EPA-registered disinfectant chemical in accordance with the legally-binding stipulations of EPA label on directions of use. All other information, such as germ kill performance claims should also get validated by BIS or other appropriate testing labs but what is most important is the underlying safety of the technology used for water purification.

Today, there are numerous different brands of filters on the market and a lot of confusion in the consumer's mind. The industry has largely been self-regulated with some responsible manufacturers adhering to the standards set by the Water Quality Association (WQA) for recognition and approval. Since most of WQA's members are in the water conditioning and softening end of the market, there have not been consumer ratings and protection for drinking water systems.

Before investing in any water treatment device, consumers are advised to check the water quality at their home and identify contaminants of concern.

In our view, Ministry of Consumer Affairs along with BIS should encourage consumers to get their water tested free of cost to ensure the water quality is as per BIS Standards. In case the water is contaminated then BIS or an approved agency should educate the consumer on how to identify the systems which will remove the specific contaminant. If the water purification system uses a chemical technology, ask for full details of its use and proof of EPA registration of the chemical used (not whether it meets EPA germ kill criteria) in this product and whether it follows dosage norms set by EPA for the said chemical.

This is the most important purchase criteria on – ***safety first, performance next***. A small cup of household liquid bleach when added to a bucket of water can kill crores of bacteria and viruses, but this does not make the water safe to drink. Therefore, the only globally recognized and acceptable evidence of chemical disinfectant safety is EPA Registration and this also must be accompanied by a declaration from an independent body that the product is being used in accordance with the stipulations of the EPA label as proposed in the study. It is also important for the consumers to follow the instructions for servicing and maintenance of the unit, which may need cartridge replacement or other assistance to ensure the best performance in long term and provide safe water.

Consumers are also advised to compare not only filter prices, but also operating and maintenance costs for the different units before buying any water treatment system. Government can immediately legislate and take up initiatives like certifying water treatment devices to ensure reliability and start a national campaign through JOGO GRAHAK JAGO to educate and build awareness on drinking water quality standards and harmful effects of contaminated water for the end users and to help them make an informed choice. It is important for the regulator and the Ministry of Health and Family Welfare to immediately look into this issue and mandate labeling standards for all water purifiers, which should include detailed information including the ingredients statement, warnings and precautionary statements, and directions for use.

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