

# WANT TO BE SICK, DRINK BOTTLED / RO WATER EVERY DAY

**Ramachandra T V, Asulabha K S & Sincy V**

Energy and Wetlands Research Group, Centre for Ecological Sciences, Indian Institute of Science, Bangalore

URL: <http://wgbis.ces.iisc.ernet.in/energy/>, Phone: 080 22933099, email: [tvr@iisc.ac.in](mailto:tvr@iisc.ac.in)

- ❖ Indian Packaged Bottled Water Industry is expected to grow at a CAGR of 22 % to reach Rs.160 billion in 2018.
- ❖ The packaged bottled water industry is divided into: Packaged drinking water and Natural mineral water.
- ❖ The treatment methodology for packaged drinking water as per BIS includes pressure sand filtration, activated carbon filter, reverse osmosis, ozonation and UV treatment.
- ❖ BIS has recommended standards for packaged drinking water for physical (colour, taste, turbidity, etc.), chemical (trace and toxic elements, ions, etc.) and radioactive (alpha and beta emitters) parameters in its document IS 14543.

- ❖ **Packaged drinking water:** Includes water derived from any source of potable water and subjected to various treatments to meet the prescribed standard before being packed in a plastic/glass container.
- ❖ **Natural mineral water:** Includes water containing less than 250 ppm of TDS (total dissolved solids).
- ❖ RO technology generates safe potable water devoid of minerals.
- ❖ Reverse Osmosis (RO) removes contaminants from water by pushing the water under pressure through a semi-permeable membrane.
- ❖ It removes heavy metals such as cadmium, arsenic, lead, copper, fluoride and volatile organic compounds, sodium, nitrates, phosphate, total dissolved solids (TDS), agrochemical, petrochemical, pharmaceutical and biological contaminants etc.
- ❖ Long term consumption of demineralised water leads to adverse health effects.



## DISADVANTAGES:

- ❖ Use of low-mineral water for cooking food results in deficiency in total intake of some essential elements eventually causes diseases/disorders.
- ❖ Disinfection by-products (DBPs) like bromate, chlorate and chlorite that are formed during treatment of water are potentially harmful to humans causing cancer.
- ❖ Pesticides in bottled water samples can cause cancer, nervous system disorders, liver and kidney damage, reproductive failure, cellular and DNA damage, birth defects and disruption of the immune system.
- ❖ There is always a possibility of growth of microorganisms under favourable conditions in bottled water.
- ❖ Heavy metals such as cadmium in drinking water can lead to bone and kidney diseases, neurological disorders and cancers. Also Dioxins and BPA (bisphenol A) releases to water in packaged bottles.



**THE TIMES OF INDIA**  
**Verify FSSAI, ISI certifications of packaged drinking water online**  
19th Aug 2018, 12:20 AM IST  
TUTUCORIN: The demand for packaged drinking water has gone up with the soaring mercury levels. At the same time, this has also raised concern over the quality of water sold by the companies. To empower residents to check the quality of water and certifications obtained by their manufacturers, the district administration has asked people to check for Food Safety and Standards Authority of India (FSSAI) and ISI certification of the companies online.  
Drinking water manufacturers should print the licence number issued by FSSAI and ISI number issued by the Bureau of Indian Standards (BIS). This is applicable to 20 litre bubble top cans, five litre, two litre, one litre, 500 ml and 300 ml bottles and the 200 ml water sachets. Collector N Venkatesan said that people can check for the certification online at <https://sfswaterfssai.gov.in/Clearance/home> by entering the FSSAI or ISI number.  
Apart from knowing the validity and truth of details furnished by the companies, people would also be able to have a look at result of water samples tested from those companies for the last six months and one year, obtained from the periodical tests in National Accreditation Board for Laboratories (NABL) accredited laboratories for chemical and microbiological analysis.  
Designated officer for food safety, Tutucorin district, J. Thanga Vijayash said there are 40 packaged drinking water manufacturers that have their units in the district. Two of these units are closed for the last few months as they have not obtained the ISI certification, he said. The officer added that they collect samples from all packaged water sellers once in every six to eight months.

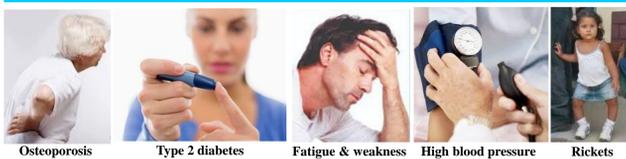
**Business Standard**  
**BIS raids Delhi firm for manufacturing packed water without licence**  
Press Trust of India | New Delhi, August 16, 2018 Last Updated at 17:35 IST  
The Bureau of Indian Standards (BIS) has raided city-based company H- Tech Aqua for manufacturing packaged drinking water of 20 litres without licence, the government said today.  
A huge quantity of 20-litre water jars manufactured under brands 'Treshler', 'Purif' and 'Blister' have been seized by BIS, it said.  
"The firm was manufacturing packaged drinking water in 20 litre capacity filled jars under brand 'Treshler' with spurious licence," the consumer affairs ministry said in a statement.  
A substantial quantity of empty 20-litre jars with brands 'Purif' and 'Blister' were also found in the premises, it said.  
"A large quantity of above mentioned jars were seized".  
The manufacturing of packaged drinking water without a BIS licence is a cognisable offence under Section 17(3) of the BIS Act, 2016.

**Water packaged drinking water units shut down in Mysuru**  
Sakshi  
Mysuru: A joint team of Karnataka Police Enforcement Branch (EB) and Kolkata Municipal Corporation (KMC) has zeroed in on a section of factories producing packaged drinking water without a valid licence.  
The team is gearing up to take action against these with the help of state EB since some of these illegal manufacturing units are located outside the KMC jurisdiction.  
In the past five days, a joint team of EB and KMC raided several shops and manufacturing units producing packaged drinking water in and around Kolkata.  
During the raids, the joint team visited 23 units producing bottled water within the KMC jurisdiction. The joint team has planned a bigger operation next week when the EB is supposed to seal some of the manufacturing units which are running illegally.



| Parameters             | RO 1  | Tap water | RO 2  | Bottled Water | Water quality Standard IS 10500, 1991-2011 |               |
|------------------------|-------|-----------|-------|---------------|--|---------------|
|                        |       |           |       |               | Desirable                                  | Permissible   |
| Water temperature (°C) | 24.8  | 24.7      | 24.7  | 29.5          | -  | -             |
| TDS (mg/l)             | 26    | 434       | 14    | 83            | 500  | 2000          |
| EC (µS)                | 40.5  | 658.67    | 28.67 | 143           | -  | -             |
| pH                     | 7.55  | 7.86      | 7.8   | 7.71          | 6.5-8.5                                    | No relaxation |
| Turbidity (NTU)        | 0.32  | 0.5       | 0.27  | 0.2           | 5  | 10            |
| Alkalinity (mg/l)      | 40    | 336       | 34    | 88            | 200  | 600           |
| Chloride (mg/l)        | 12.07 | 99.4      | 10.65 | 25.56         | 250  | 1000          |
| Total Hardness (mg/l)  | 11    | 270       | 14    | 56            | 300  | 600           |
| Calcium (mg/l)         | 1.2   | 60.12     | 1.2   | 12.02         | 75   | 200           |
| Magnesium (mg/l)       | 1.95  | 29.25     | 2.68  | 6.34          | 30   | 100           |
| Ortho-Phosphate (mg/l) | 0.003 | 0.062     | 0.036 | -             | -  | -             |
| Nitrate (mg/l)         | 0.75  | 1.06      | 0.47  | -             | 45   | 100           |
| Sodium (mg/l)          | 11.1  | 123.7     | 7.8   | 24            | -  | -             |
| Potassium (mg/l)       | 0.4   | 4.4       | 0.4   | 9             | -  | -             |

**INFERENCE:**  
RO reduces minerals which can lead to deficiency in human body due to regular consumption.



| MINERALS  | IMPORTANCE/FUNCTION  | DEFICIENCY   |
|-----------|--|--|
| Calcium   | For skeleton and teeth, regulates cell function, heart beat, contraction of heart and muscle etc. and blood clotting   | Osteoporosis   |
| Potassium | With sodium, potassium regulates both the acid-base balance and water balance of the body. Potassium together with calcium regulates nerve and muscle activity   | Hypokalaemia, interfere with the storage of glycogen thereby causing weakness and muscular paralysis   |
| Magnesium | Required for many biochemical reactions in the body, proper heart and muscle function and nerve conduction, regulates blood sugar, helps in energy metabolism, protein synthesis, muscle relaxation, maintenance of calcium hemostasis   | Increased blood pressure, fatigue and muscle weakness, osteoporosis, asthma, mental disorders, muscle cramps, type 2 diabetes                                    |
| Sodium    | Key role in regulating muscle tone, regulate the acid-base balance of the body. Helps in normal nerve and muscle function  | Hyponatremia, nausea, vomiting, fatigue, weakness, headache, muscle cramps or spasms   |
| Chloride  | Chloride forms hydrochloric acid which is required for protein digestion, regulate the acid-base balance of the body and osmotic pressure  | Hypochloremia, fluid loss, dehydration, weakness or fatigue, difficulty for breathing, diarrhoea or vomiting   |
| Phosphate | Phosphate helps in the formation of bones and teeth, help nerves function and make muscles contract. Helps in carbohydrate, lipids and protein metabolism, regulate the acid-base balance in the body and functions as a cofactor in many enzyme systems. It is a part of cell membranes and DNA (deoxyribonucleic acid) | Hypophosphatemia, cause bone diseases such as rickets in children and osteomalacia in adults. Imbalance of phosphorus and calcium levels may cause osteoporosis. |

| Age              | Calcium | Phosphorus <sup>1</sup> | Magnesium | Sodium <sup>2</sup> | Potassium <sup>3</sup> | Chloride <sup>4</sup> |
|------------------|---------|-------------------------|-----------|---------------------|------------------------|-----------------------|
| Unit             | mg/d    | mg/d                    | mg/d      | mg/d                | mg/d                   | mg/d                  |
| 0-3 months       | 525     | 400                     | 55        | 210                 | 800                    | 320                   |
| 4-6 months       | 525     | 400                     | 60        | 280                 | 850                    | 400                   |
| 7-9 months       | 525     | 400                     | 75        | 320                 | 700                    | 500                   |
| 10-12 months     | 525     | 400                     | 80        | 350                 | 700                    | 500                   |
| 1-3 years        | 350     | 270                     | 85        | 500                 | 800                    | 800                   |
| 4-6 years        | 450     | 350                     | 120       | 700                 | 1100                   | 1100                  |
| 7-10 years       | 550     | 450                     | 200       | 1200                | 2000                   | 1800                  |
| <b>Males</b>     |         |                         |           |                     |                        |                       |
| 11-14 years      | 1000    | 775                     | 280       | 1600                | 3100                   | 2500                  |
| 15-18 years      | 1000    | 775                     | 300       | 1600                | 3500                   | 2500                  |
| 19-50 years      | 700     | 550                     | 300       | 1600                | 3500                   | 2500                  |
| 50+ years        | 700     | 550                     | 300       | 1600                | 3500                   | 2500                  |
| <b>Females</b>   |         |                         |           |                     |                        |                       |
| 11-14 years      | 800     | 625                     | 280       | 1600                | 3100                   | 2500                  |
| 15-18 years      | 800     | 625                     | 300       | 1600                | 3500                   | 2500                  |
| 19-50 years      | 700     | 550                     | 270       | 1600                | 3500                   | 2500                  |
| 50+ years        | 700     | 550                     | 270       | 1600                | 3500                   | 2500                  |
| Pregnancy        | *       | *                       | *         | *                   | *                      | *                     |
| <b>Lactation</b> |         |                         |           |                     |                        |                       |
| 0-4 months       | 550     | 440                     | 50        | *                   | *                      | *                     |
| 4+ months        | 550     | 440                     | 50        | *                   | *                      | *                     |

<sup>1</sup> Phosphorus RNI is set equal to calcium in molar terms; <sup>2</sup> 1mmol sodium = 23 mg; <sup>3</sup> 1 mmol potassium = 39 mg; <sup>4</sup> Corresponds to sodium 1 mmol = 35.5 mg; (mmol – millimole) mg/d – milligram per day. A milligram is one thousandth of a gram µg/d – microgram per day. A microgram is a millionth of a gram

**REFERENCE:**

- ❖ <http://www.indiaenvironmentportal.org.in/files/file/Oxyhalide%20disinfection%20by-products.pdf>
- ❖ <https://pdfs.semanticscholar.org/1477/7e52b5e6a89b9e529051b24fad15808dffa.pdf>
- ❖ <https://www.cseindia.org/pesticides-in-bottled-water-532>
- ❖ [https://file.scirp.org/pdf/JWARP20100500013\\_68617291.pdf](https://file.scirp.org/pdf/JWARP20100500013_68617291.pdf)
- ❖ [https://file.scirp.org/pdf/JEP20110500013\\_85497086.pdf](https://file.scirp.org/pdf/JEP20110500013_85497086.pdf)
- ❖ <https://chemocare.com/chemotherapy/side-effects/hypochloremia-low-chloride.aspx>
- ❖ <https://www.healthline.com/nutrition/potassium-deficiency-symptoms>
- ❖ <https://www.valuenotes.biz/insights-publications/publications/packaged-bottled-water-market-in-india-2013-18/>
- ❖ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4384861/#ref6>
- ❖ <https://www.hindawi.com/journals/jep/2013/469590/>
- ❖ <https://www.health24.com/Medical/Digestive-health/Dehydration/Why-electrolytes-are-so-important-20130909>
- ❖ <https://www.webindia123.com/health/diet/nutrie/miner.htm>
- ❖ <https://www.deccanchronicle.com/business/in-other-news/160818/bis-raids-delhi-firm-for-manufacturing-packed-water-without-licence.html>
- ❖ <https://www.thehindu.com/news/national/karnataka/nine-packaged-drinking-water-units-shut-down-in-mysuru/article18362517.ece>
- ❖ [https://www.nutrition.org.uk/attachments/article/234/Nutrition%20Requirements\\_Revised%200c%202016.pdf](https://www.nutrition.org.uk/attachments/article/234/Nutrition%20Requirements_Revised%200c%202016.pdf)
- ❖ <https://www.omicsonline.org/open-access/packaged-drinking-water-a-trivial-necessity-a-study-in-kolkata-india-2169-0286-1000121.pdf>
- ❖ <https://online.library.wiley.com/doi/full/10.1111/j.1525-1497.2001.04189.x>
- ❖ [https://www.who.int/water\\_sanitation\\_health/dwq/nutrientschap12.pdf](https://www.who.int/water_sanitation_health/dwq/nutrientschap12.pdf)

**Netravathi basin provides 5 to 8 TMC of bottled water annually to Mumbai and other cities - Protect Netravathi**

**Water is precious, but do not drink contaminated water. Drink potable water that suffice your mineral uptake. But avoid water without minerals to keep diseases away. Enjoy good water and keep your children healthy.**

