

# Good example of total dissolved solids and tap water report

[Technology](#), [Development](#)



## **Introduction**

This is well documented that the chemical composition of water affects the taste, color, odor, and so forth. Some of these salts also pose a threat to human health. The chemical composition of water is based on different dissolved solids. Total dissolved solids are referred to matters in tap water or water bodies that left in a container as residue after evaporation and drying of a water sample. WHO and EPA recommended that it should be below 500 mg/L (Broséus et al., 2009; EPA, 2013).

## **Classification of Dissolved Solids**

The dissolved solids comprised of various salt contents present in the water as well as other organic and inorganic compounds. Water quality having high solids pose threat to human health in many ways. The water with high dissolved solids exhibit inferior palatability and may develop unfavorable physiological issues. The matter dissolved in water are included in total solids. Total solids can be classified as follows (Sincero & Sincero, 1996):

Figure 1: Classification of Solids

## **Source of TDS in Tap Water**

TDS in tap water may originate from many natural and manmade sources. Natural source may include rocks, springs, carbonate deposits and mineral present under water-bearing strata. The manmade source includes industrial effluent, waste water, agriculture run-off and storm water discharge into the water bodies like rivers, streams and so forth. The cations and anions also

contribute in increased amount of total dissolved solids (Sincero & Sincero, 1996).

### **Determination of Dissolved Solids**

The tap water sample can be heated in porcelain evaporating dishes at 550°C for 1 hour in a muffle furnace. After that, the evaporating dish should be stored and cooled in the desiccator. The evaporating dish should be labeled before weighing. The residue should be dried in the oven at 103°C - 105°C for at least 1 hour. After one hour removed the dish from the oven and cooled in the desiccator so that the temperature could be stabilized before weighing. The completely cooled sample should be weighed. The weight of the dish together with the residue is recorded. The quantity of total dissolved solid will be measured by subtracting the weight of the dish (Sincero & Sincero, 1996).

### **Removal of Total Dissolved Solids**

Many technologies are available to remove TDS from water sources including tap water that is provided by relevant authorities. Ion exchange, reverse osmosis and electrodialysis are the most widely used techniques to minimize the concentration of TDS. Ion exchange and electrodialysis are costly and complicated process compared to reverse osmosis. Reverse osmosis come under membrane techniques and a feasible technique in the context of cost and simplicity. But high volume of sludge is produced during this process along with wastage of water (Broséus et al., 2009). Ion exchange method facilitates the operation with high stability and electric conductivity by using activated carbon. Despite these benefits, this technique has operational and

capacity issues at large scale (Broséus et al., 2009).

The presence of the excessive amount of total dissolved solids levels has not direct threat to human health. The prime issue related to TDS is taste, staining, and other nuisance issues. Tap water having high concentration of TDS can damage plumbing networks present in the home and other buildings

## **Health Impact of Total Dissolved Solids**

Tap water having total dissolved solids contents more than 500 mg/L has a laxative and many other negative health effects on the populace who are not adjusted with its consumption. The removal of total dissolved solid is necessary that may contain nitrates, fluoride, chloride, sulfates, ammonium ions and so forth.

Fluoride content is essential in a specific range to protect the teeth particularly in the case of children. The concentration higher than 1.5 mg/L in tap water can create dental and skeleton fluorosis. Many studies reported that fluoride consumption can cause carcinogenicity and still baby birth.

Sulfates and chlorides present in dissolved solids effect the taste and flavor of water. In addition, consumption of water having higher levels of sulfate develop laxative and intestinal problems (Bashir, Salmiaton & Bashir, 2012; Muhammad & Rasheed, 2012).

Nitrate content having amount greater than 10mg/L as N is responsible for methemoglobinemia in children and pregnant women. The prolonged consumption of tap water having excessive nitrate contents considered carcinogenic that has a tendency to develop various cancers like intestine and stomach cancer (Bashir et al., 2013). Bashir et al. (2013) also reported

high concentration of nitrate in tap water and associated health issues in various countries including India, China, Pakistan, Canada, Nigeria and so forth.

As a matter of fact, excessive levels of TDS have not any direct threat itself, but the contents present in it have a wide range of impacts. Some chemicals or inorganic solids can cause corrosion of metal pipes like lead, iron and so forth. Consequently, these metal get dissolved in tap water. These metals pose a serious threat to human health.

## **Conclusion**

The determination of total dissolved solids facilitates to evaluate the suitability of water supply. This also helps to decide water treatment technique before discharging water in public supply network. In addition, the probable presence of impurities in the form of dissolved solids can be detected. It could be used as monitoring parameter for water quality control. The concentrations of dissolved solids or salts need to keep within the standard limit to make water drinkable. The amount of TDS greater than 500mg/L makes the tap water brackish and has potential health effects. Many techniques are available to reduce TDS including RO and Ion Exchange method.

## **References**

Bashir, M. T., Ali, S. Ghauri, M., Adris, A. & Harun, H. (2013). Impact of excessive nitrogen fertilizers on the environment and associated mitigation strategies, Asian Jr. of Microbiol. Biotech. Env. Sc. 15(2), 213-221

Bashir M. T., Salmiaton, A., & Bashir, A.(2012). Health Effects from Exposure

<https://assignbuster.com/good-example-of-total-dissolved-solids-and-tap-water-report/>

to Sulphates and Chlorides in Drinking Water, Pakistan Journal of Medical Science, and Retrieved November 14, 2014 from [http://pjmhsonline.com/JulySept2012/health\\_effects\\_from\\_exposure\\_to%20Sulphates.htm](http://pjmhsonline.com/JulySept2012/health_effects_from_exposure_to%20Sulphates.htm)

[http://pjmhsonline.com/JulySept2012/health\\_effects\\_from\\_exposure\\_to%20Sulphates.htm](http://pjmhsonline.com/JulySept2012/health_effects_from_exposure_to%20Sulphates.htm)

Broséus, R. Cigana, J., Barbeau, B., Daines-Martinez, C., & Suty, H.(2009).

Removal of total dissolved solids, nitrates and ammonium ions from drinking water using charge-barrier capacitive deionization, *Desalination*, 249, 217-223

EPA ( May 30, 2013) Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals, Retrieved November 15, 2014 from <http://water.epa.gov/drink/contaminants/secondarystandards.cfm>

Muhammad, T.& Rasheed, M. (2012). Fluoride in the Drinking Water of Pakistan and the Possible Risk of Crippling Fluorosis. *Water Eng. Sci.* 5: 495-514

Sincero, A. P. & Sincero, G. A (1996). *Environmental Engineering: A design approach*, Prentice Hall, NJ