



Cartwright Consulting Co.

United States Office

8324 16th Avenue South
Minneapolis, MN 55425-1742
Phone: (952) 854-4911
Fax: (952) 854-6964
pscartwright@msn.com
www.cartwright-consulting.com

European Office

President Kennedylaan 94
2343 GT Oegstgeest
The Netherlands
Phone: 31-71-5154417
Fax: 31-71-5156636

Is Reverse Osmosis (RO) product water dangerous or harmful to our health?

Over the years, I have received numerous inquiries from consumers and water treatment professionals related to potential health and corrosion problems associated with RO permeate (product water).

The act of “purifying” water involves removal of contaminants such as suspended solids, dissolved organics, dissolved salts (minerals), and gases. There is no doubt that water containing fewer contaminants, particularly dissolved salts, is more aggressive than normal water supplies. The question is, is this aggressive water harmful to one’s health, and will it tend to dissolve materials such as copper pipe?

First, regarding concerns that drinking RO water will extract electrolytes and other necessary chemicals from the body and affect one’s health, extensive studies and a mountain of anecdotal evidence indicate that:

- 1) The human body, from the mouth through the esophagus and down into the stomach, contains sufficient electrolytes in saliva and mucus membranes which immediately neutralize any aggressive characteristics of the purified water.
- 2) Reverse osmosis permeate is generally not pure enough to possess strong solvent properties.

RO technology works by removing a percentage of the salts in the feed water supply, and most water supplies requiring RO treatment are sufficiently high in dissolved salts so that the resulting permeate quality is often no better than that in some normal drinking water supplies such as found in Boston, Portland, Lake Tahoe, and Seattle. These locations have drinking water containing dissolved solids in the range of 20 to 70 ppm (mg/l). Additionally, sailors on submarines have consumed distilled and RO water supplies with salt levels below 3 ppm for more than 40 years without ill effect. And NASA has reported no ill effects from the consumption of water containing less than 0.05 ppm salts on space flights.

These conclusions are summarized in a white paper published by the Water Quality Association in March, 1993 (www.wqa.org).

Now, with regard to the possibility of RO permeate attacking or dissolving materials of construction such as copper piping, tests have indicated that water containing more than 10 ppm of dissolved salts is generally not aggressive on normal household materials in contact with water supplies. As indicated above, most household RO water permeate has quality levels above 20 ppm. Therefore, it is safe to conclude that RO permeate will have no effect on the normal components in direct contact with this purified water.



PETER CARTWRIGHT SHORT BIOGRAPHY

Peter Cartwright has been in the water purification and wastewater treatment industry since 1974, and has had his own consulting engineering firm since 1980. He has a degree in Chemical Engineering from the University of Minnesota (1961) and is a registered Professional Engineer in that state. Peter has authored over 125 articles, written several book chapters, presented more than 125 lectures in conferences around the world, and is the recipient of several patents. He is a founding member of the Technical Review Committee for *Water Conditioning & Purification* magazine, on the Editorial Advisory Committee for *Industrial Water World* magazine, the Reader Advisory Board for *Processing Magazine*, and the Editorial Advisory Board of *Filtration News* magazine. A peer reviewer for the *Journal of Membrane Science*, he is also on the faculty of the University of Wisconsin-Madison College of Engineering annual course, "Process Piping Systems Design and Operation." Peter is a recipient of the Award of Merit from the Water Quality Association, and is the Technical Consultant for the Canadian Water Quality Association.