

Niquette et al. (2004) reviewed substitutes for aluminum-based coagulants and their impacts in drinking water treatment. The potential impacts (i.e., technical, economical, social, and environmental) of such substitutions are based on valuable technical and practical considerations. They have also shown that each alternative to Al-based coagulants has inherent advantages and shortcomings. However, their justification for a substitution is based on health risks of Al coagulants to humans (mainly as a neurotoxicant):

“Orally ingested aluminum is acutely toxic to humans despite the widespread occurrence of this element in foods, drinking water and many antacid preparations (WHO 1998). It has been hypothesized that aluminum exposure is a risk factor for the onset of Alzheimer’s disease in humans (WHO 1998).”

This passage from their Introduction has not only skewed the World Health Organization’s (WHO) guideline, but also erroneously cited its content. The WHO (1998) actually states that:

“There is little indication that aluminium is acutely toxic by oral exposure…”

Furthermore, their stance on the risk of Al does not conform to that of the Federal-Provincial Subcommittee on Drinking Water (FPSDW 2001) of Canada, also cited by them. The FPSDW (2001)—and WHO (1998) for that matter—states that the guideline for aluminum levels in drinking water is not health-based. A positive causal relationship between Al and the onset of Alzheimer’s disease (AD) cannot be totally dismissed (WHO 1997); hence water treatment recommendations to minimize Al residuals are of a precautionary nature regarding health risks. Other problems (not mentioned by Niquette and coauthors) due to elevated concentrations of Al in alum-treated waters could be taken into account to justify the substitution of Al-based coagulants. These potential problems are listed in Driscoll and Letterman (1988), Van Benschoten and Edzwald (1990) and references therein.

Studies on the substitution of Al-based coagulants or the reduction of aluminum residuals can certainly contribute to a holistic approach to water treatment in a positive and constructive manner. However, it is important to emphasize that the justification of many investigations is still based on a precautionary approach to possible health risks. An unreasonably large apprehension over possible harmful chlorination by-products contributed to one of the largest reported cholera epidemics in modern history (Salazar-Lindo et al. 1993). Generating so-far unwarranted fear over possible AD risks associated with aluminum-based coagulants could have an impact on decisions made by less-informed professionals. The outcome will definitely not have the scale of a cholera epidemic, but can affect the operations of treatment plants that do not have the capacity to switch coagulants (e.g., in developing countries).

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References


