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Interactive Comment

Interactive comment on "Corrosion control using hydroxide and bicarbonate alkalising agents in water drinking processes" *by* P. Torres-Lozada et al.

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Corrosion control in drinking water distribution systems is an important aspect in drinking water production. This article deals with experiments with alkaline chemicals to increase pH, in which dosing levels are evaluated by their effect on water quality indices such as Langelier Saturation Index and others. The authors correctly conclude that water quality goals for this aspect should be included in the Columbian drinking water code for piped supply systems, as is common practice in many countries, by example as LSI > -0.2 (Netherlands) or as CCPP > -0.05 mmol/L (Germany) with additional minimum values for Alkalinity and/or Buffer capacity (i.e. in USA distribution

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systems pH change < 0.3). Such goals will substantially narrow the acceptable pH range.

Optimal process conditions in a water treatment plant will request for different pH values for coagulation (sedimentation and filtration), for disinfection, and for distribution. Such multi-step pH control allows the application of different alkalising agents.

The article needs improvements on the following aspects:

- bicarbonate (as NaHCO3) is not an appropriate alkalising agent as it does not react with CO2. It does not behave as NaCO3 as stated in the article

- in contrary to their statement CaCO3 (limestone) is an applicable alkalising agent since their tested water (pH 6.1) contains substantial amounts of reactive CO2. It might be applied as powder/slurry with coagulant dosing or as filtering material in the existing filters. Crushed or pulverized limestone is available in Colombia

- Table 1 should be completed with the initial values for their tested water. The absence of these values in the article hinders proper evaluation by readers

- the graphs should be improved or submitted at higher resolution as they lack proper readability

- Figure 3 should contain 6 graphs, according to its description, not 5 as presented.

The authors are strongly recommended to do chemical calculations parallel to their experiments, in order to validate their results and to support their conclusions. Such calculations are part of standard engineering practice in water treatment dealing with pH control. These calculations will show that the raw water (pH 7.1-7.2) already contains CO2, and that HCO3- in the raw water is converted into CO2 by the applied coagulant and disinfectant. Original and formed CO2 can be converted to HCO3- by alkalising agents which increase pH and Alkalinity (CO2 release to the atmosphere should be prevented). Such calculations are less expensive than laboratory experiments, and generally applicable for other conditions and locations. Moreover they are

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recommended to give some quantitative figures on observed corrosion in the Cali distribution system (pH increase, metal uptake) in order to support their conclusions.

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Please also note the supplement to this comment:
http://www.drink-water-eng-sci-discuss.net/8/C34/2015/dwesd-8-C34-2015-supplement.pdf

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