



EL MANANTIAL

BULLETIN

ON MEASURING THE DOSE OF CO₂ INJECTED TO DESALINATED WATERS

Estimating the dose of CO₂ from pH measured *in situ* after dosing can lead to significant errors.

The data shown on Figure 1 illustrate a frequent error when measuring the CO₂ dose into desalinated waters. The figure allow to compare the result of obtaining the CO₂ level by three methods: (a) directly from the CO₂ flowmeter; (b) by measuring the pH *in situ* after dosing and the alkalinity in the lab, and (c) by using pH and alkalinity as measured in the laboratory.

The samples were taken in consecutive days during approximately 3 weeks. The lines to connect the points have been drawn to better illustrate the differences.

As can be seen the CO₂ estimated from the pH in situ is considerable lower than the actual dose as given by the CO₂ flowmeter and corroborated by the laboratory results.

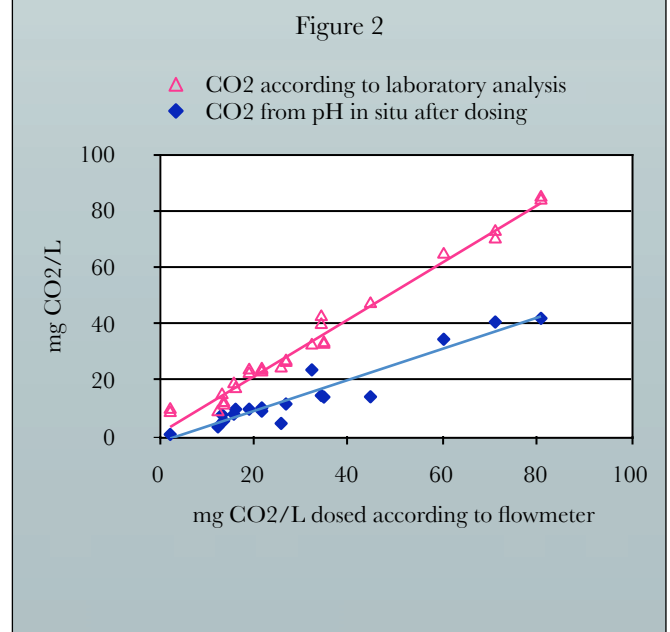
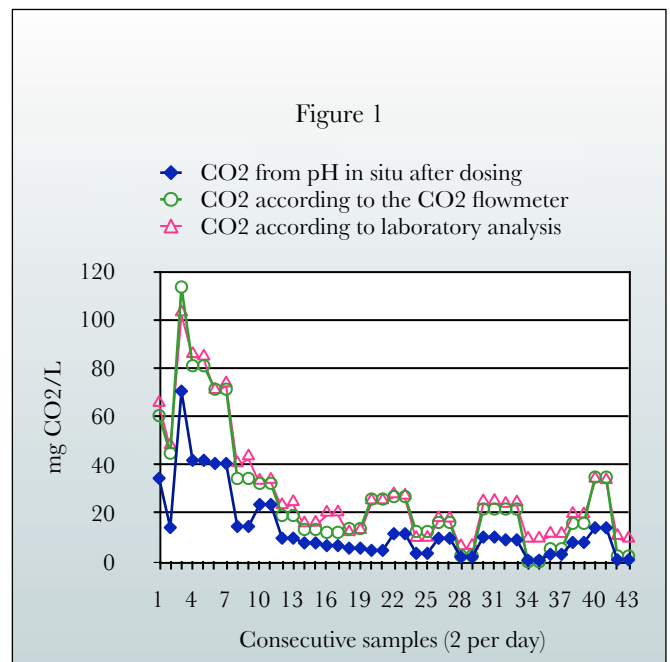
The error in the estimation of the CO₂ dose can be significant, in particular when dose above 40 mg CO₂/L.

As Figure 2 illustrates, the difference between estimating the CO₂ content of the water using the pH as measured *in situ* after dosing, versus using the pH as measured in the laboratory increases with increasing CO₂ dose.

According data, not shown here, difference in pH could be in the order of 0.3 pH units for dose higher than 60 mg CO₂/L. For the dose used in remineralization of 20-30 mg CO₂/L a difference of 0,25 pH units has been detected.

The explanation given to this difference is that CO₂ is not totally dissolved and therefore the reactions have not proceeded sufficiently for the pHmeter to reflect the real dose.

This, as well as other studies, are part of the CENIT - SOST-CO₂ project carried out in collaboration with the company Agbar.



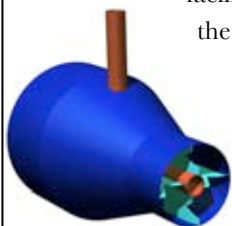
A recurring problem: supersaturation of CaCO₃

Is a frequent problem in the dosing system of lime slurry and CO₂.



The CaCO₃ forms because pH stays above 10 at the mixing zone between the lime slurry (pH: 12.5) and the CO₂ during several seconds.

The presence of an impact surface right after the mixing zone facilitates precipitation of the suspended CaCO₃.



The solution is usually dosing the lime slurry at consecutive stages in order to maintain water pH in the mixing zone

below 9.2.

It also helps to use a venturi with a static mixer inside, but allocated before the lime slurry dosing point. This way turbulences are generated but the impact against the mixer surfaces where the CaCO₃ precipitates is avoided.



Giant eductors for brine outfalls

Elmasa Water Technology has released a new type of giant eductor in GRP for the brine discharge outfalls of desalination plants, developed with different partners.

The design allows to reduce considerably the length and the number of mouths of brine emissaries, thus reducing implementation costs.

Depending on the differential pressure across the mouth of the venturi, the equipment allows a mixture of brine / seawater ratio between 1/3 and 1/5 which significantly reduces the potential environmental impact.

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GLOBAL INTEREST IN EMERGING TECHNOLOGY

Through proposals, as well as sales of equipment, studies of technical problems, and consulting on process engineering for design and construction of desalinated water post-treatment plants, the FCCA has significantly increased its international presence during 2011.

This increase reflects a global interest in the advancements of the FCCA and the extensive technical documentation published, as well as the scientific dissemination work that is carried out.

On this basis it is expected that 2012 and 2013 will serve to consolidate the reputation of the Foundation and thus its development, thereby fulfilling one of the most difficult objective of the foundations, that is projecting the Canary Island as Development and Research Center on special water issues.



EXPANSION OF THE FCCA ACTIVITIES IN 2011



Four years without backwashing

This is how long it has been since the calcite bed with continuous feeding of Bocabarranco in Gran Canaria has been in operation with no backwashing and no changes in performance from day one. The plant is designed for 10,000 m³/day, and built inside the treated water tank and therefore discharged directly into it. The permeate CO₂ are about 53 mg/L in a natural way because the desalination plant receives water from coastal wells rich in CO₂.

Calcite comes from mainland Spain and has a purity of 99.2%. Turbidity has remained between 0.35 and 0.83 NTU, without observing any tendency to increase.