assessment of water quality in the alqueva reservoir (portugal) using bioassays

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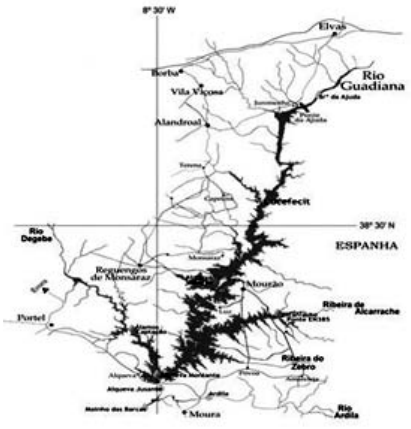

The Alqueva Reservoir is the biggest artificial freshwater reservoir in Europe and is an important water supply for human and agricultural consumption in the Alentejo region (Portugal). Pollution can impair environmental and human health status, and to assure water quality and ecological balance it is crucial to frequently monitor water supplies.

In this study, we used an ecotoxicological test battery to identify the potential toxicity of water from this reservoir. Water samples from the Alqueva aquatic system were collected bimonthly in 2006 from 11 different water points and their potential toxicity to algae, insect larvae and bacteria were evaluated.
Although in some sampling points pesticide concentrations (single and sum) were still below the legal maximum permissible concentrations, water samples showed high toxicities especially during the summer months. In addition, several sampling points showed pesticide concentrations above the permissible level which can pose a significant risk to humans and the environment.

Some recommendations and perspectives can be withdrawn from this study. On its own, chemical analysis is not enough to derive conclusions regarding the water quality and/or status; they must be complemented by laboratory bioassays with several test species. Single chemical, maximum permissible values and the sum of pesticide concentrations do not take into account possible patterns of synergism, antagonism, dose level dependencies, or even the dominance of several chemicals within a mixture. The Alqueva aquatic system, like other aquatic systems, should be maintained under strict biomonitorization programmes considering that unbalanced alterations caused by human activities (e.g. agriculture) can jeopardize the environment quality and human health.

Currently a bottom-up approach using binary mixture exposures in the laboratory is being carried out to continue this work, considering the herbicides more prominently found throughout the sampling seasons. The results are expected to drive to conclusions on the toxicity dominant chemicals in mixtures.