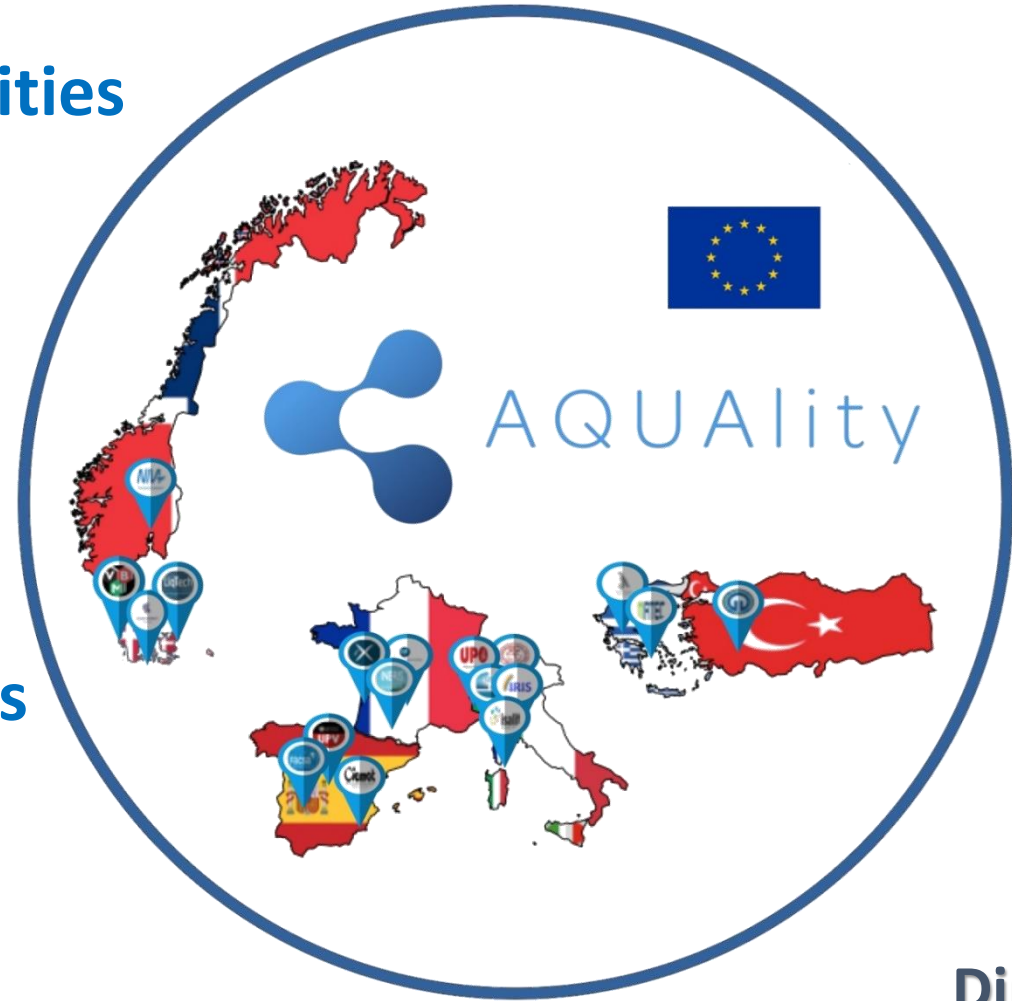


Interdisciplinary cross-sectorial approach to effectively address the removal of contaminants from water

7 Universities

3 Research Institutes

8 Companies



AQUALity Lab.
20 February 2019

**Università di Torino,
Dipartimento di Chimica**



Ore 9.00-9.30 lesson -aula Avogadro



- **Lesson** with the introduction of the AQUALity team and laboratory experiences (Paola C.).

9.40-12 Laboratory practise (T37 and T39).

- **Experimental details**

Experience 1) ReHorti

Description of fungi strains and how can be employed for the decontamination. Extraction of dyes from vegetables and flowers.

Experience 2) flocculation and toxicity.

Toxicity Screening Test using the *Thamnocephalus platyurus* fairy shrimp. 1. Prehydration of the cysts, 2. Transfer of the prehydrated cysts into a hatching petri dish, 3. 20-22 hours of incubation at 25 °C under continuous illumination, 4. Transfer of the larvae from the hatching petri dish to the test wells; 5. Transfer the samples in the test wells; 6. Score the mortality data.

Flocculation Mechanism. After flocculating the suspended particles into larger particles, they are generally separated from the fluid by a sedimentation technique as there is a density difference between suspended matter and the liquid. They can also be separated by other techniques like filtration, floatation and straining.

Flocculation is a physical and chemical process which is used for the removal of the visible sediments and material from water which makes it a colloidal solution. It can be done by adding flocculating agents. Colloidal solution is a heterogeneous mixture in which the colloidal particles can't be seen by the eye and can pass through a filter paper.

Experience 3) Preparation of magnetic materials and their use for dye adsorption:

Under the hood, in a 100 mL beaker mix 1.54 g $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ + 1.05 g $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ in 25 mL MilliQ water and keep under magnetic stirring. Then, add 2.5 mL of NH_4OH 30% and 12.5 mL BBS (0.5 g/L). A magnetic precipitate is formed (use a magnet to show it).

Part of the solution is transferred in a Petri dish and the solid is recovered with a magnet. **Then, show that this material can be used for the elimination of pollutants.** The prepared material is washed with water and then transferred in a Petri dish together with a Crystal violet solution (10 ppm), where it is captured by the dye.

Experience 4) Photocatalytic degradation using catalyst in powder

The students are subdivided into 3 groups, 1 of them degrade a dye (ethyl orange) in a reactor, the other two degrade other two different dyes (acid blue and crystal violet) in Pyrex cells under UV-A light. Once the cells irradiation/reactor is in progress, we can show them different catalysts in powder (characterized by different colours), hydrogels and films. Groups 7-8 prepare the catalysts and the dyes dilution and put cells under irradiation. The rest of the groups collect samples, filtrate them and comments what's going on. If there is time, some of them could measure the spectrum in the spectrophotometer.

Conclusion with a final show (all together) using liquid N_2 ; Caterina the dancer, balloons, waterfall, experiments with food (how to cook an egg and how to put a boiled egg in a flask, prepare a salad, cut peppers, to plant a nail with a banana).