

NEW FINDINGS IN WATER PURIFICATION TREATMENT: Free Vortex Technology

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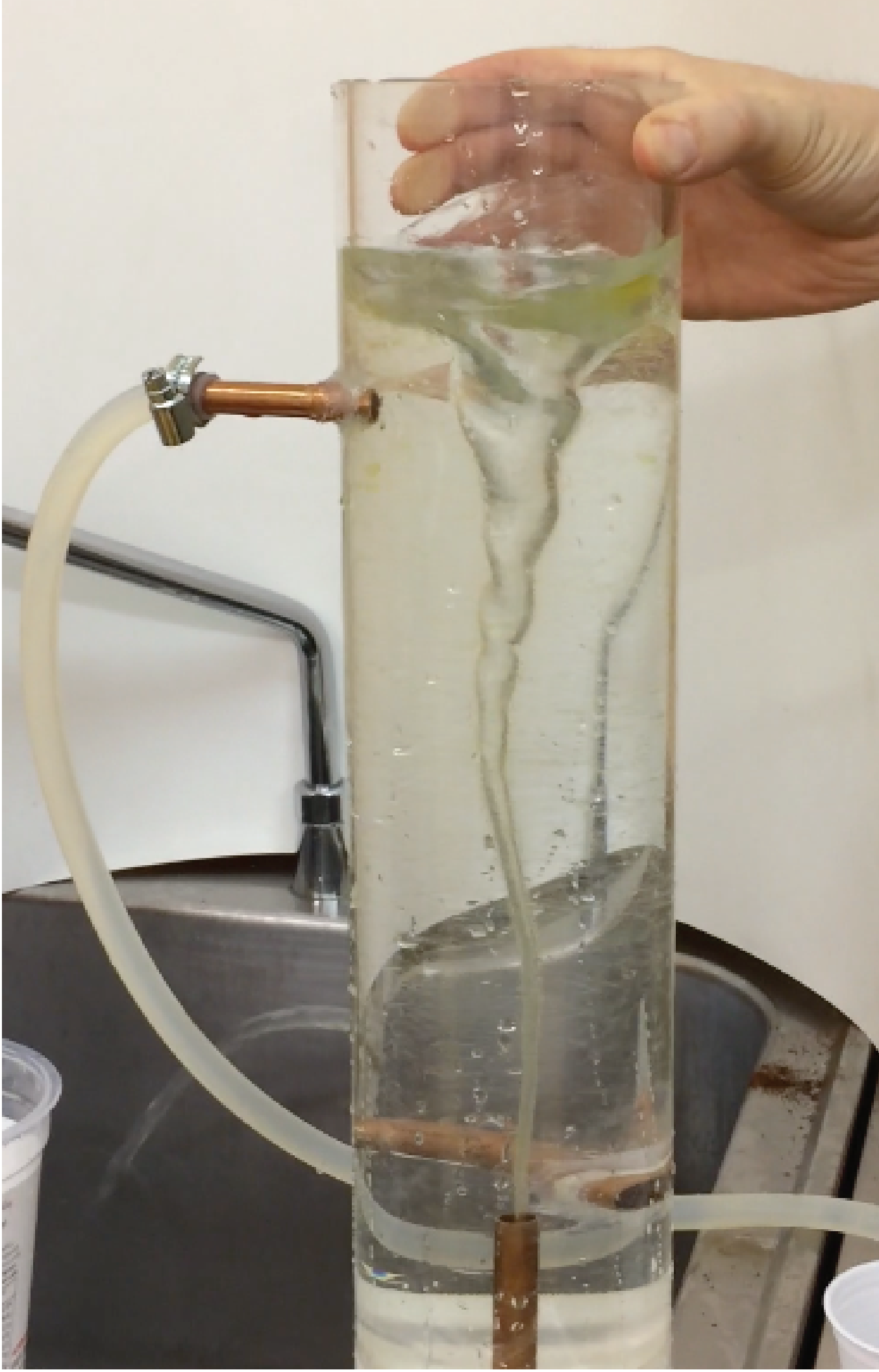
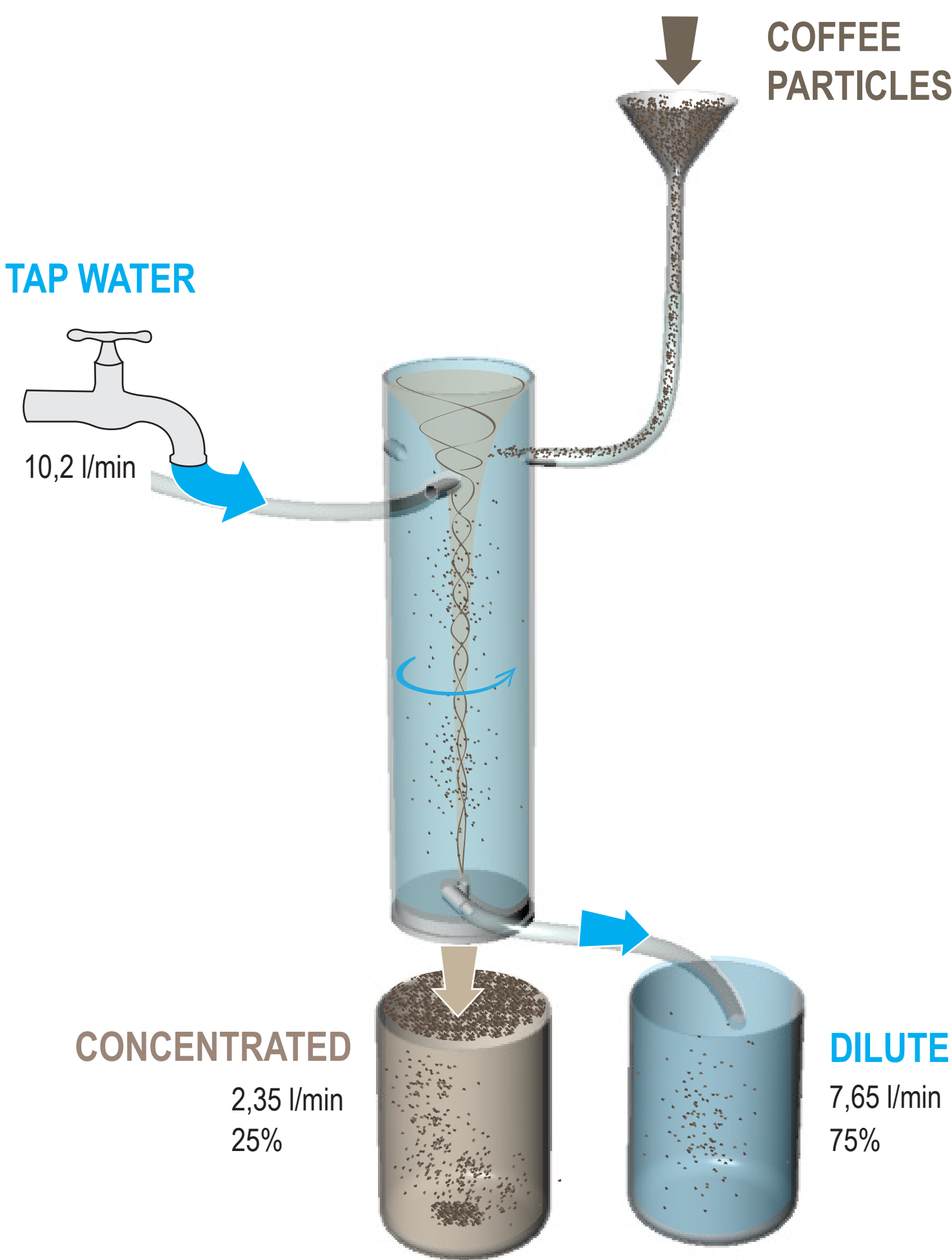
ABSTRACT

Vortex Technology, it is based on the ability of water to self-organize in a free vortex that affects the physical/chemical characteristics of water compared to that of bulk water. Thanks to the collaboration with the Pollack Laboratory (UW, Seattle-WA) and the IET (Malmo - Sweden), we made some prototypes to test the physical separation of suspended solids. The positive results

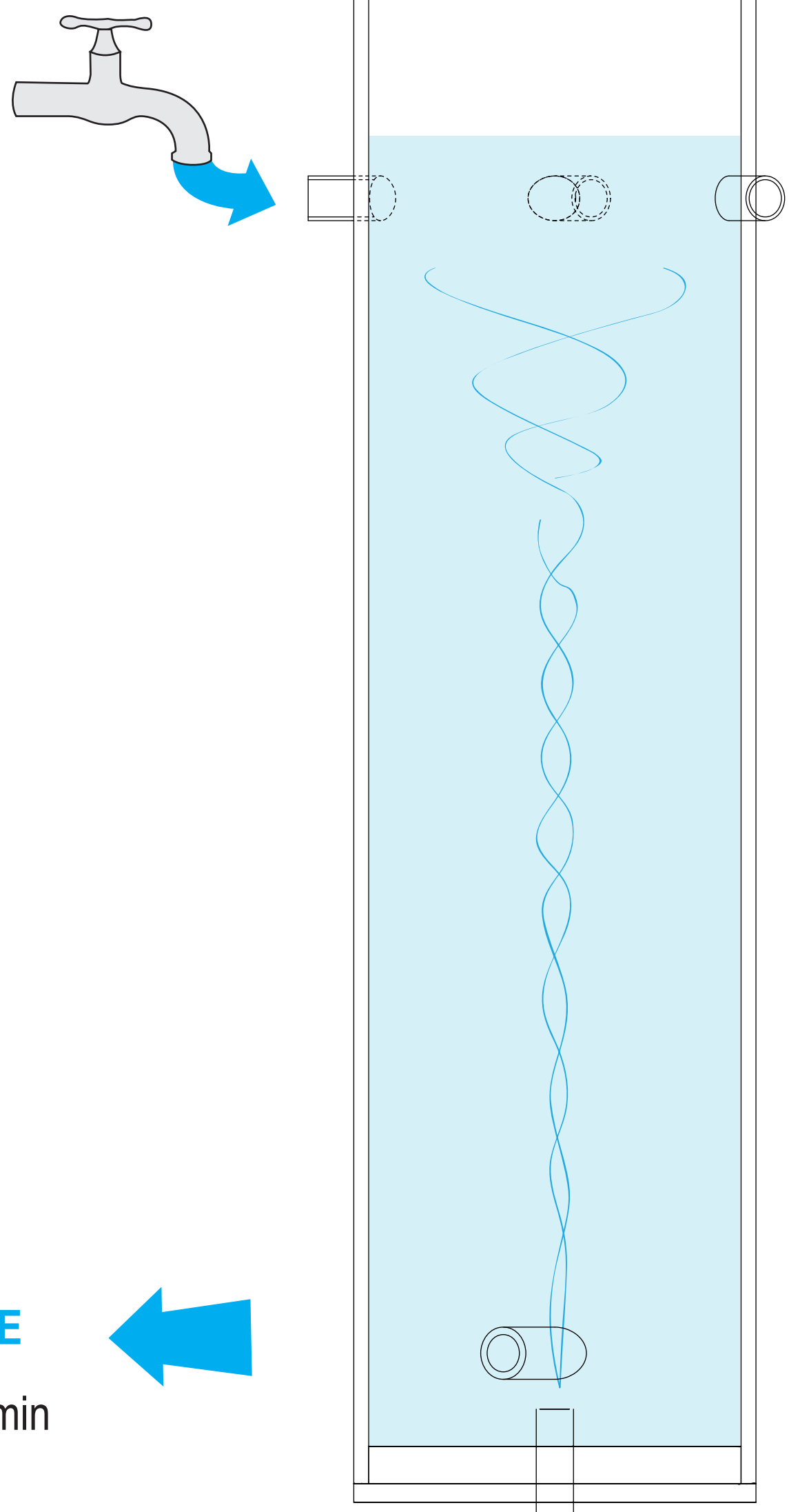
achieved allow us to hypothesize the use of this technology, wich does not require mechanical handling and therefore energy, as a pretreatment before the water purification process. In addition, we have experienced a tangible benefit (in term of dry mass, and time of growht) in plant growth by using the water treated with vortex.

MATERIALS and METHODS

The setup used for the separation experiments is shown in this section.
An acrylic tube with one inlet and two outlets is used to generate a free vortex. The inlet is connected to the tap water using a silicone tube and the water inflow is properly adjusted to generate a free

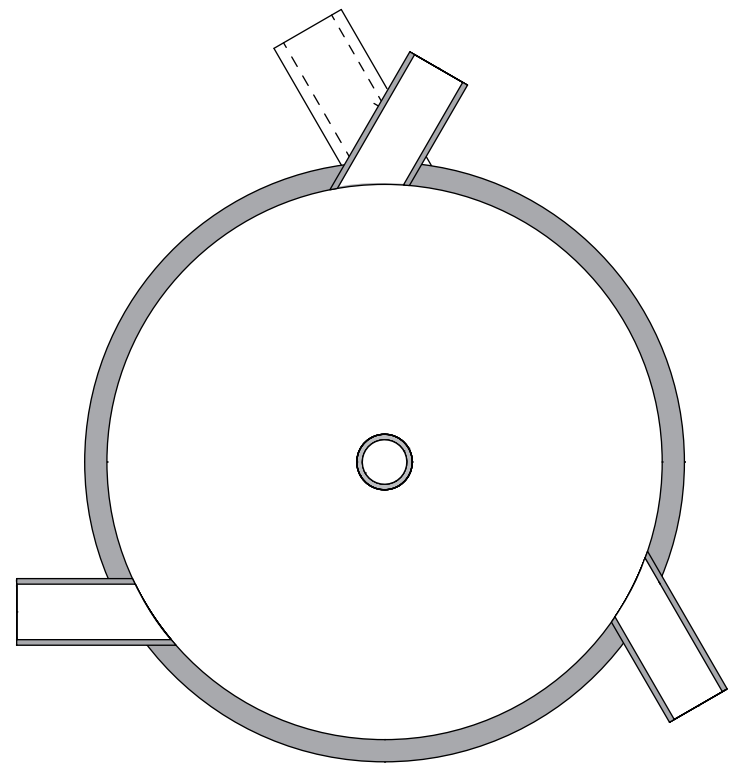


TAP WATER
10,2 l/min



DILUTE
7,65 l/min
75%

CONCENTRATED
2,35 l/min
25%



RESULTS and DISCUSSION

SUSPENDED SOLIDS SEPARATION



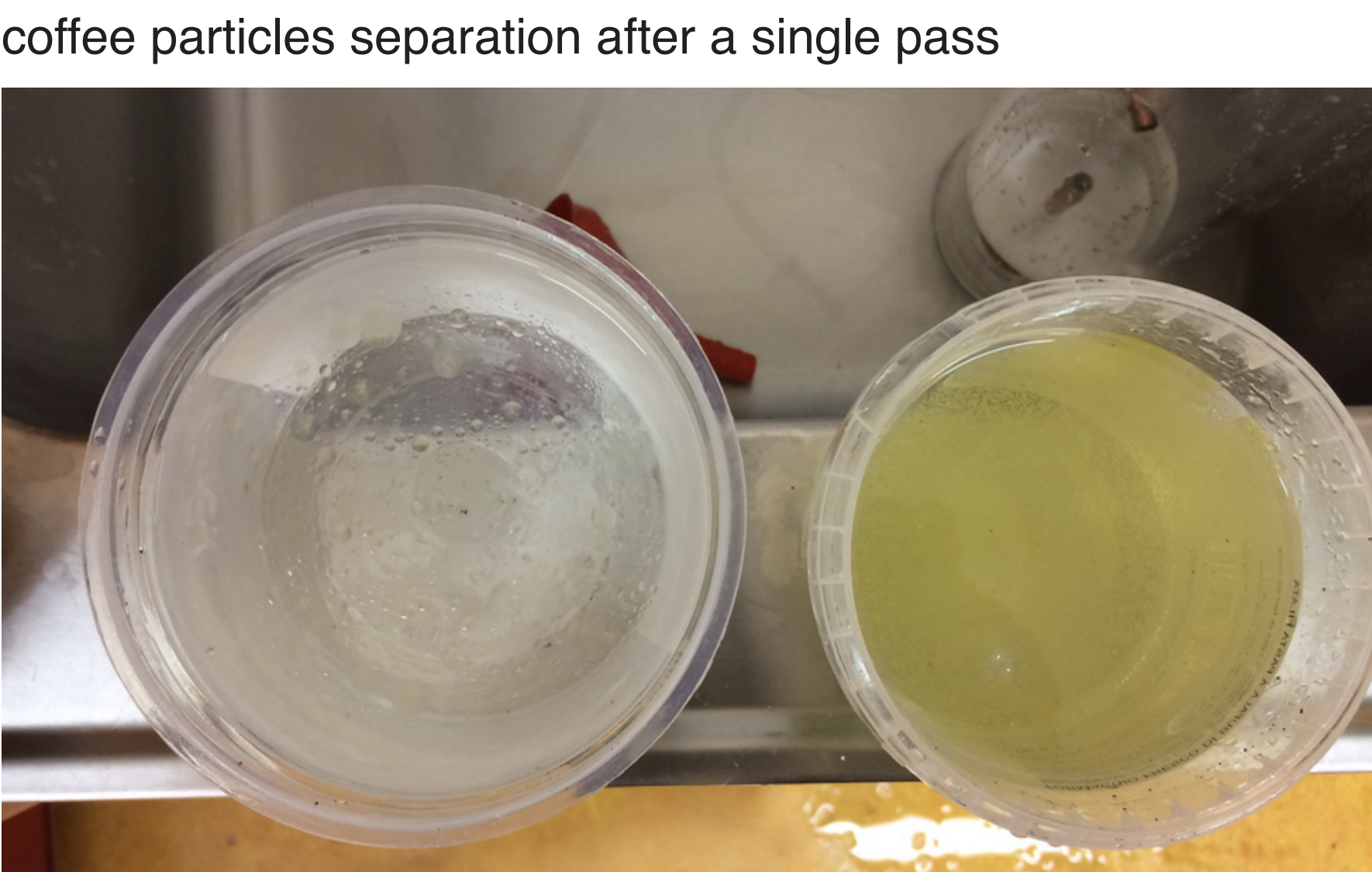
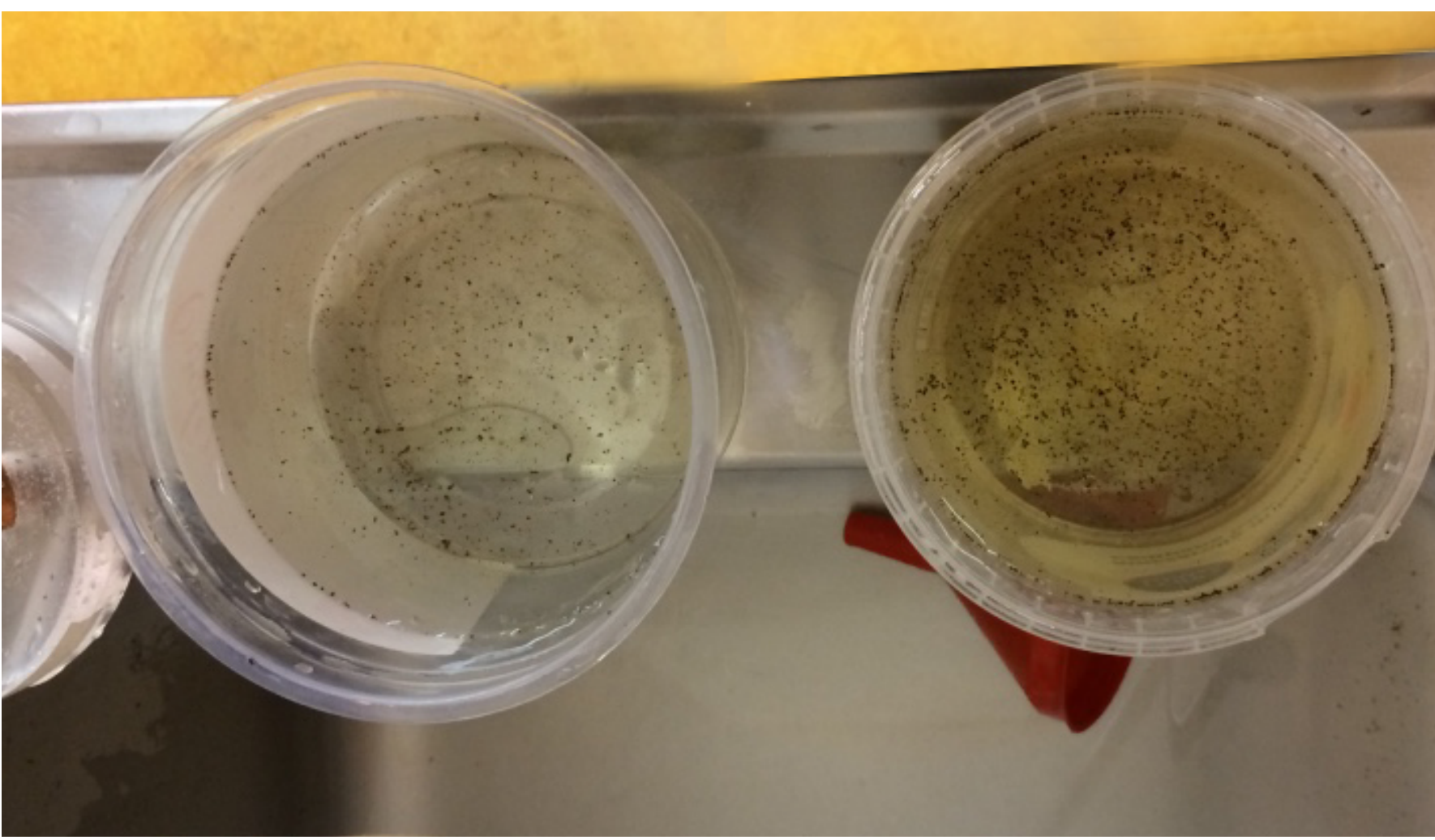
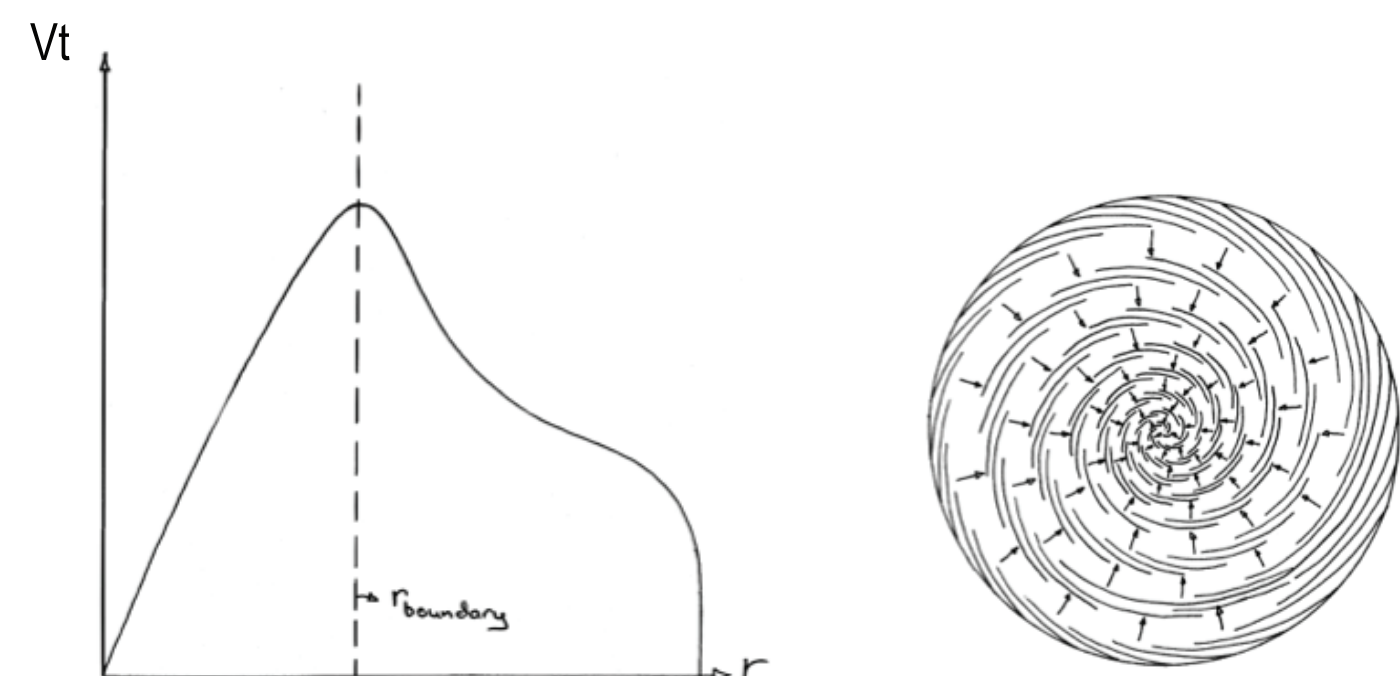
Natural Organic Matter
reduction (UV 254)

- 60%

Turbidity (NTU)

- 43%

FORCED VORTEX: the water mass is rotating rigidly, like in a centrifuge (where the angular velocity is constant we have $V_t = k \cdot r$)
FREE VORTEX the water is allowed to organize itself (e.g. in a tornado). The angular velocity varies with the radius and increase towards the centre.
A real vortex often consists of a superposition of a free and forced vortex, where the outer part is free, whereas the vortex centre is rotating rigidly.



coffee particles separation after a single pass

oil/water separation after a single pass

PLANT GROWTH EXPERIMENT

