Water Research Center
Tel Aviv University

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In the period between Dec. 2016 and May, 2017, a series of scientific experiments was conducted at Prof. Dror Avisar's hydrochemistry laboratory at the Israeli Water Research Institute, in order to examine the claim that Aquanity fresh water technology creates a better quality and tastier water compared to tap water. This work may shed new light regarding the possibility that this technology does improve the quality of drinking water. This research was conducted using purely scientific tools and methods. Samples of tap water and oxygenated tap water were used as control groups. The research team included Prof. Dror Avisar, the head of the Water Research Centre at Tel Aviv University, and the head of the Hydrochemistry lab as a senior tutor, Mr. Gili Levine, a water and environment engineer, who initiated and managed the research, and Miss Rima Gnaim, a third year biology and geography student, as part of an Honors program in which she participates.

Experiment #1 - Solubility - Determining the degree of solubility of coarse salt and white sugar in various water samples

Experiment 1a: Solubility of coarse salt in water

The rationale of this experiment was to examine whether solubility values in Aquanity water differ from those of tap water. Solubility is usually determined by the maximum amount (in grams) of dissolved matter in 100 ml of a solvent up to a saturated solution in a certain temperature. First, 50 grams of coarse salt were weighed, mixing each time a few grams of the salt until a saturated solution is reached. The amount of salt left is weighed again and subtracted from the total amount to determine the amount of dissolved matter. Table 1 shows the differences in coarse salt (NaCl) solubility using different types of water. Differences were found in the solubility of salt in Aquanity water compared to the solubility of salt in tap or oxygenated tap water. The average of the three salt solubility measurements is shown in the table below. The solubility of salt in 100 ml of Aquanity water is 34.3 grams, and is 2.3 grams lower than tap water (36.6), and 5.6 grams lower than oxygenated tap water (38.9). The percentage of variance between Aquanity water to tap water is -6.28%. The difference shown in this experiment between the water

types is not significant, therefore this measurement is not efficient in testing the quality of Aquanity water compared with tap water.

Table 1: Solubility of coarse salt in 100 ml of different water types

Total coarse salt dissolved in water (gr/100 ml water)					
Water type	**Measure 1**	**Measure 2**	**Measure 3**	**Mean**	**Standard Deviation**
Aquanity water	34.0	34.2	34.6	34.3	0.3
Tap water	36.5	36.7	36.6	36.6	0.1
Oxygenated tap water	40.7	36.1	39.8	38.9	2.0

Experiment 1b: Solubility of white sugar in water

A similar experiment was done with the solubility of white sugar. The results in table 2 show that the total amount of dissolved white sugar in Aquanity water is 207.8 grams, in tap water 211.0 grams, and in oxygenated tap water - 210.3. That is, similarly to the solubility of salt in water, here too, the difference between the water types, as observed in this experiment, is negligible, and therefore this measurement is not effective in examining the quality differences between Aquanity and tap water.

Table 2: Solubility of white sugar in 100 ml of different water types

Total sugar dissolved in water (gr/100 ml water)					
Water type	**Measure 1**	**Measure 2**	**Measure 3**	**Mean**	**Standard deviation**
Aquanity water	209.3	212.0	202.0	207.8	5.2
Tap water	211.0	208.0	214.0	211.0	3.0
Oxygenated tap water	211.9	209.0	210.0	210.3	1.2

Experiment #2 growing plants

Experiment 2a: Growing plants using various water types for watering

The rationale of this experiment was to examine whether Aquanity water enables better growth and longevity of plants under controlled conditions. Therefore, this experiment was conducted in the laboratory, under suitable and controlled conditions enabling growth of plants. The plants' growth was done in planters. Each planter contained the types of plants watered with Aquanity water, planter 4 - watered with tap water. In each planter three types of plants were planted (flowers, celery and broccoli), as well as twelve seeds of baby leaves. The observation lasted for a period of several months. Every week, plant development data was taken (height of plant and number of new leaves). The results show that tap watered plant leaves turned yellow within 6 weeks (planter 4), in comparison with Aquanity watered plants, which kept vital for a period of three months (planter 3). Additionally, the number of sprouts in Aquanity watered planter 3 (10 sprouts) was significantly bigger than tap-watered planter 4 (only 5 sprouts). The photos were taken four months after the beginning of the experiment.

Picture no. 1:

Experiment 2b: Measuring different water types' turbidity after growing Chrysanthemums

The rationale of this experiment was to examine whether Aquanity water may inhibit organic material decomposition and create anoxis conditions that increase turbidity values. Turbidity is a measure of the presence of solid particle suspension in water, which may affect the quality of the water. Turbidity measurement is considered a key test of water quality. Using a calibrated turbidity meter (HACH2100Q Elhamma company), the turbidity value of each of the different water types was measured, by measuring the. decline of light intensity as it passes through a sample of water. This experiment lasted about two weeks, in which we placed chrysanthemum in three large glass bottles, each filled with 1 liter of Aquanity water, tap water or oxygenated tap water. This experiment demonstrates very clear results. In picture no. 3, it is clearly shown that tap water had the most turbidity (bottle no. 4), whereas Aquanity water (bottle no. 3) remained the clearest. Additionally, the Chrysanthemum leaves and stems in tap water (bottle no. 4) became more black compared to Aquanity water.

According to the results in Table 3a, it is seen that the average turbidity of tap water is the highest, with the value of 6.17 (NTU), the average measurement of Aquanity water turbidity is of 1.01 (NTU) and is the lowest, , and the average measurement of oxygenated tap water turbidity is 6.07 (NTU). The deviation percentage between Aquanity water turbidity and tap water turbidity is 83.2%.

The difference between tap and Aquanity water turbidity is most significant, and indeed, this dimension enables differentiation between water types and and

determine that regarding turbidity, Aquanity water has the best water quality result. The photos were taken two months after the beginning of the experiment.

Table 3a. Turbidity with Chrysanthemum

Turbidity (NTU)					
water type	**Measure 1**	**Measure 2**	**Measure 3**	**Mean**	**Standard deviation**
Aquanity water	1.00	1.02	1.02	1.01	0.01
Tap water	5.58	6.12	6.82	6.17	0.6
Oxygenated tap water	6.1	6.45	5.67	6.07	0.4

Picture no. 3

Aquanity water Tap water Oxygenated tap water

Experiment 2c: Measuring the different water types turbidity without growing Chrysanthemums

Using a calibrated turbidity meter (HACH2100Q Elhamma company), the turbidity value of each of the different water types was measured, without growing Chrysanthemum. The results in Table 3b below show clearly that the average measurement of tap water turbidity is the highest, with the value of 5.5 NTU, while the average measurement of Aquanity water turbidity is the lowest with the value of 1.56 NTU. The average measurement of oxygenated tap water is 2.5 NTU. This difference between tap and Aquanity water turbidity is large and most significant. Therefore, it can be clearly determined that, regarding turbidity, the Aquanity water has the best water quality.