The Change in Physical Properties of Magnetic Water

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Abstract

This research investigates the influence of magnetic water on its some physical and chemical properties such as surface tension, density, pH and conductivity. A 330 ml of normal water was magnetized using a neodymium magnet. Results show that the conductivity and PH of magnetic water increase 71.4% and 7.14% more than that of normal water respectively, while the density and surface tension decreases 4.4% and 4.62% respectively.

Keywords: Magnetic treatment; Magnetic field; Electric conductivity; PH; Surface tension.

1. Introduction

Magnetic force has been one of the mysteries of life, where this force plays a great role in the arrangement of all atoms and molecules of matters whether they are solid, liquid or gas. Recently, people have started to change the fundamental elements of this planet, which led to a lot of disorder in atomic structure for all objects on the planet[1].

Water is diamagnetic, it is composed of tiny particles called molecules. Each drop of water is made of millions of molecules, and each molecule is composed of smaller objects called atoms. Every water molecule contains three atoms linked together by a covalent bond, two hydrogen atoms are linked with one oxygen atom in a 105º angle in a unique shape as shown in Fig.1. The final installation of the water molecule will have similar qualities of a magnetic pole, where the oxygen is slightly negative, whereas the hydrogen is slightly positive. Due to that, water molecules will attract each other in the opposite end, creating a covalent bond [2, 3].

It is believed that when water is subjected to a strong magnetic field, the water molecules will arrange in one direction as shown in Fig.2, and the bond angle decreases to less than 105º because magnetic field squeezes the bond pairs to be closer together. This change in water molecules composite may cause a change in some physical and chemical properties. So, magnetized water means that water subjected to treatment by a magnetic field, which is found to change certain properties of water [4].

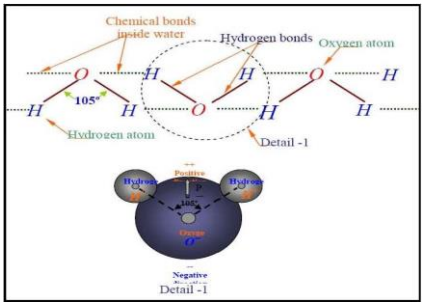

Figure 1: Water Molecule

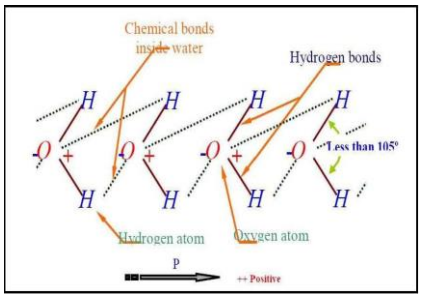

Figure 2: Directional arrangement of water molecule under effect of magnetization

Some researchers reported that magnetic field effects on water properties, such as light absorbance, surface tension and pH balance [5-7]. However, these effects have not been confirmed in other studies [8, 9]

Amiri and Dadkhah in 2006 [10] observed that the reduction in surface tension of magnetic water can be a good indicator for presence any physical or changes in the water.

In 2013, Pang and Shen [11] invested the effect of magnetic field on electromagnetic properties of water, the results showed a decrease in dielectric constant and resistance but an increase in electric conductivity of magnetic water.

In this paper, we study the change in some physical water properties when exposed to magnetic field. We studied the following properties:

- **Density**; is a ratio of how much mass a substance in comparison to unit volume for a material [12].
- **Surface tension**; is the physical property of liquids results from an imbalance of intermolecular attractive forces in which exposed surface tendency contract to the smallest possible area [11]
- **pH balance** is a measurement of how acidic or alkaline a solution is, refers to hydrogen ion activity [1].
- **Electrical conductivity** is a measure of a material's ability to conduct an electric current [13].

2. Experimental

A neodymium magnet was used to study the effect of magnetic field on 330 ml of normal water at room temperature for 7 days. Some lab experiments were done to observe the change in density, surface tension, pH and electrical conductivity of water under the effect of this magnet.

Figure3: water under effect of Nd magnet

2.1Density

The magnetic water was placed in a 250 ml volumetric flask. Then, its mass was measured using sensitive balance as shown in Fig.4.
The density of magnetic water can be defined as

$$\rho = \frac{m}{V} \quad \text{.....(1)}$$

where, m is mass and v is volume

Figure 4: Measuring the mass of magnetic water by sensitive balance

2.2 Surface tension

To measure the surface tension, we used a microscope, lattice tube and two sample of water; one is nature and the other is magnetic as shown in Fig. 4.
The diameter of the capillary pipe was measured by a microscope. Then, it was immersed in 250ml of magnetized water until it rises inside the tube. The height of water inside the tube was calculated by subtracting the partial rise inside the beaker from the total height of water as shown in Fig5.a.
The surface tension was calculated by

$$\gamma = \frac{1}{2}\rho g r \left(h + \frac{r}{3}\right) \quad \text{..... (2)}$$

where, ρ is the density, r is the radius of the capillary, g is the acceleration due to gravity and h is the height the liquid is lifted.

In the same volume and temperature, we measured the surface tension of normal water, fig5.b.

Figure 4: tools of measure surface tension

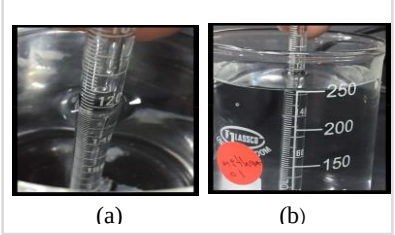

Figure 5 : measuring the surface tension of (a) magnetic and (b) normal water

2.3 pH balance

A pH mater was used to measure pH of the water after and before magnetization as shown in Fig.6, which is an instrument used to measure hydrogen ion activity in solution, consists of a rod from a thin membrane glass and electrode filling solution.

(a) **(b)**

Figure 6: pH of (a) magnetic and (b) normal water

2.4 Electrical conductivity

A 10-volt battery connected with ammeter was used to measure the current value as shown in Fig.7. By placing copper and carbon electrodes in the water, and running the battery as illustrated in Fig.8, the current was measured at the certain distance.

Using Ohm's Law, the resistance was calculated . Then, by drowing the relationship between resistance and distance between electrodes, the conductivity was found by

$$\sum = \frac{1}{A\,.\,slop} \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where, A is the submerged area from electrod.

Figure 7: Battery

Figure 8 : Copper and carbon cathodes

3. Result and discussion

3.1 The change in the density

As known that the normal water has a density of 1000 kg/m3. While the density of magnetic water was found to be 955.6 kg/m3 when using Eq.1. Fig.9 shows that the density of magnetic water decreased by 4.4% less than it for normal water, which makes the solubility process of organic matter easier.

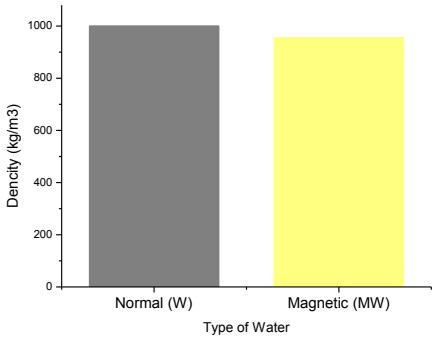

Figure 9 the change in density for magnetic water

3.2 The change in the surface tension

The surface tension of normal and magnetic water was found by using Eq.2. Results are summarized in table 1. As shown in Fig.5 that the surface tension of magnetic water decreased by 4.62% less than it for normal water, this reduction simplifies the transmission of the fluids during the thin membranes for organisms.

Table 1 Results of the surface tension for magnetic and normal water.

Radius of lattice tube (r) = $3.275 \times 10^{-3} m$.		
Type of water	Height of water *m*	Surface tension *N/m*
Magnetic water	3	0.0627
Normal water	3	0.0656

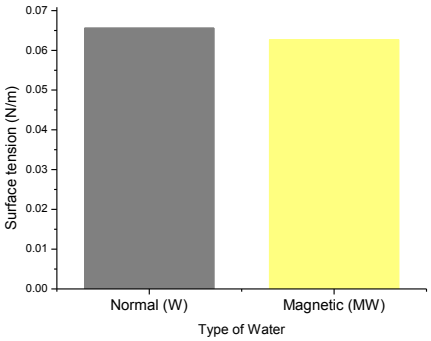

Figure 10 the change in surface tension for magnetic water

3.3 The change in the pH balance

It was found that the pH of magnetic water increases by 7.14 % for normal water as illustrated in Fig. 11, helping to reduce acidic substances in the medium because of the configured more of hydroxyl ions – OH.

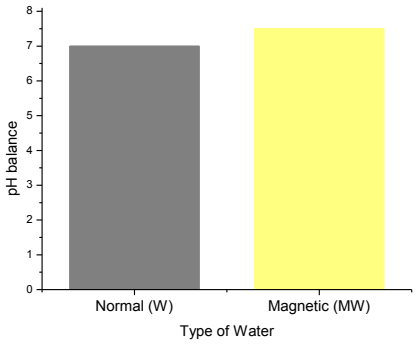

Figure 11 the change in pH for magnetic water

3.4 Electrical conductivity

Fig.12 shows the relation between resistance and distance between electrodes for magnetic and normal water**.** The slope of each line was found, then, the conductivity was calculated using Eq.3

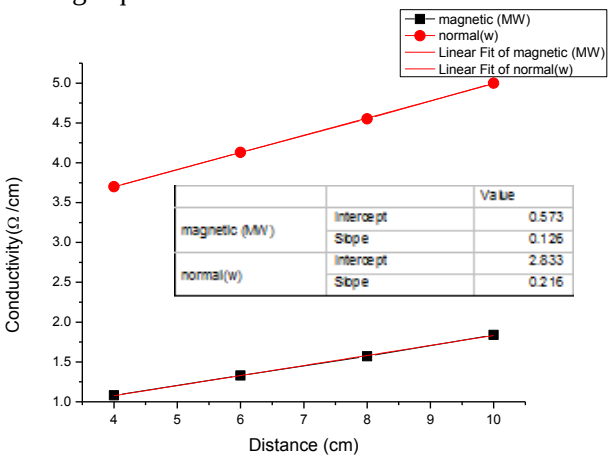

Fig.12 the relation between resistance and distance between electrodes for magnetic and normal water

Results show that the electrical conductivity of magnetic water increases by 71.4% for normal water as illustrated in Fig.13. This increase works to increase the transmission of weak current such as internal currents of the human body.

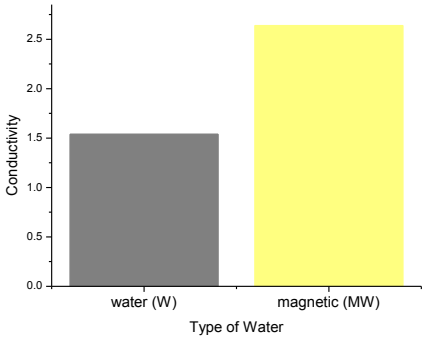

Figure 13 the change the conductivity of magnetic water

4. Conclusion

In this study, we found that the surface tension, density, conductivity and PH of magnetic water were changed. This means the change its vital Properties. This work can be extended to other properties to examine its change on magnetic water and which property is useful for Treatment of certain diseases and increase the body's immunity

5. Acknowledgement

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