The effect of magnetized water on the growth of(*Coli form*) bacteria in water

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Abstract :
This study highlightes the impact of magnetized water on the growth of *E. coli* , 50 samples of water were taken from houses in different areas of the city of (Koya) in Kurdistan region /Iraq from the period
6 -2012 to12 -2014, the samples were polluted by bird droppings as a source of (*coli form*) bacteria. then Each sample divided into two sections, the first section cultured directly in (MacConkey broth) , the second part of the samples was pass in the magnetic funnel to magnetize it and then cultured in (MacConkey broth) and then incubated for a period of 24 hours at 37 C, the results showed that all normal water samples gave positive results during the period of 8-18 hours, while only 31 water magnetic samples gave positive results during the periods of 16-24 , 13 and, 8-18h.

Introduction :

Magnetized water:
Water influenced by a magnet undergoes certain physical and chemical changes. Its physical properties like center of crystallization, pH value and nitrogen dissolving capacity are suitably altered. Such magnetized water when consumed, is known to improve health. Magnetized water improves digestion, reduces acidity, acts like a diuretic and dissolves kidney stones. Magnetized water also relieves women of their menstrual problems. It also prevents the deposition of cholesterol on the inner surface of blood vessel, when consumed regularly. It strengthens and invigorates the natural resistance power of the body. Hence it is useful for treatment of viral diseases, common cold, etc.(Coey J M D,2000).

Magnetic water treatment:

Magnetic water treatment (also known as anti-scale magnetic treatment or AMT) is a controversial method of supposedly reducing the effects of hard water by passing it through a magnetic field, as a non-chemical alternative to water softening. Scientific studies into the efficacy the treatment have had mixed results, though several studies have produced significant effects and proposed possible mechanisms for the observed decrease in water scale. **(**Szkatula*, et al* .2002). Some commentators

regard the treatment as unproven and unscientific.(Keister, T 2008) (Chaplin, M. 26 July 2011).

Magnetic treatments may be cheap and chemical-free, but there is little firm evidence of their effectiveness.

Preparation of Magnetic Water:

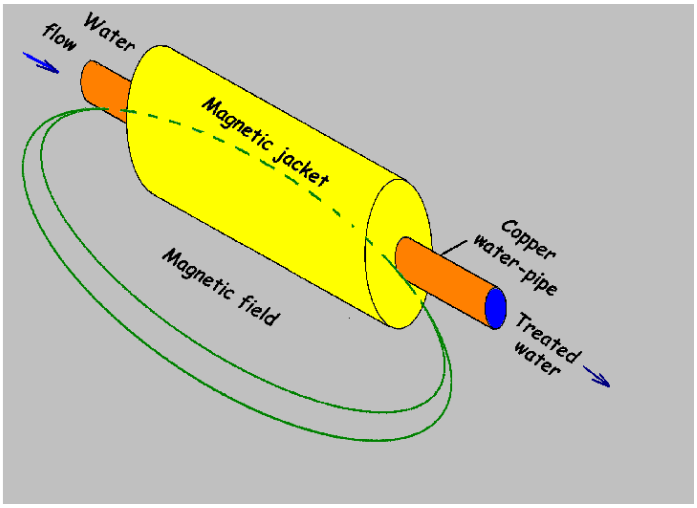
Here in this article, we are only concerned with the common use of B-Polar Water, and thus have limited our comments to the preparation of the most common type of 'Magnetic Water.' Take a strong magnet for which you intend to prepare magnetic water; (This can be either north or south pole oriented), then find a suitable tumbler that will sit on the upper surface of the magnet. From a medical point of view, glass vessels are the best for preparing 'Magnetic Water,' because they are have no acidic or alkaline reaction with a magnet. Vessels made from earthenware, brass , silver, steel, iron & copper, can be used, but are not as effective, and certain techniques must be observed regarding the placement of the magnet in relation to the glass, and these can be divided into three sections:

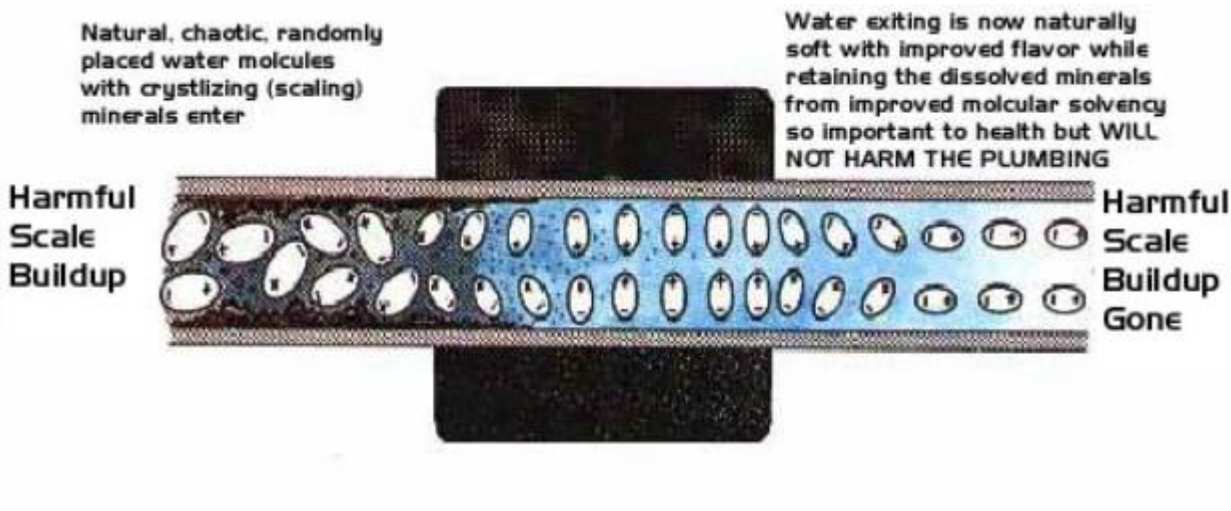
- **Preparing Single Pole Water**
  The vessel must be placed directly on the surface of the magnet, with the base of the vessel or glass in direct contact with the magnetic pole required. The vessel is left in this position for several hours, and some find it more convenient to leave it overnight so that the magnetized water can be consumed early the next morning.
- **The Preparation of Bi-Polar Water**
  This is done by placing two high powered magnets side-by-side at a distance of at least 1"-2" (2.5 – 50 cm.) apart; - This is necessary to create the desired magnetic field between the two poles. It is very interesting to note that if the two magnets are kept together, the polarity of the North Pole may dominate that of the South Pole; - This creates a field of non-healing, and activates an acidic force, so the poles of both of these magnets should be opposed to each other. For example, if one magnet is facing upwards with the North Pole, then the second magnet should face upwards with the South Pole. This technique can be done more conveniently by using a 'Matlea' water stand, magnetic disc and magnetic water glass.
- **Selecting The Power of Magnets**
  For best results it is recommended that the power of the magnets should be between a 1,000 - 2,000 'gauss' reading; ('gauss' is a scientific measurement to determine magnetic power of various items). In this regard, it is necessary to use such power in order to kill any harmful bacteria in the water. Lower powered magnets may ionize the water, but it will take a long time to have the effect of producing high quality 'Magnetic Water,' and chronic types of diseases require more powerfully magnetized water to bring them under control. Thus, it is better to prepare 'Magnetic Water' with powerful or super high powered magnets, if you want to get miraculous results.

Mechanism:

Ultra pure water is an electrically inert chemical compound with the simple chemical formula H2O which is not conductive of electricity nor affected by magnetism.Duration of exposure and field strength, gradient, rate of change, and orientation along or perpendicular to flow are variously cited as important to the results (Chaplin, M. 26 July 2011). Magnetic water treatment proponent Klaus Kronenberg proposed that the shapes of solute lime molecules are modified by strong magnetic fields, leading them to precipitate as spherical or round crystals rather than deposit as sheets or platelets of hard crystals.(Keister, T ,2008). Simon Parsons of the School of Water Sciences at Cranfield University proposed that the magnetic field reduces the surface charge on small particles, increasing the tendency to coagulate as large particles that stay with the flow rather than depositing as scale. Some proponents propose that formation of the polymorph aragonite over the more common calcite is favored in the presence of a magnetic field. However, an internal study in 1996 at Lawrence Livermore National Laboratory found no difference in preferred crystal structure of scale deposited in magnetic water treatment systems. **(**Krauter, *et al* 1996).

Liu *et al.* Liu, C. Z.; *et al* (2010). and Coey and Cass (2010 , 2000) demonstrated that magnetic treatment causes water containing minerals to favor formation of a more soluble form of calcium carbonate (aragonite rather than calcite), and the resulting removal of calcium carbonate deposits from a steel substrate. Furthermore, in their 2010 publication, Liu *et al*. conclude that "The magnetic treatment of scaling waters was proved to be efficient. The efficiency obtained with this very simple magnetic device can be very much improved if the geometry is better devised . Kozic and Lipus concluded in their 2003 paper that the effects of magnetic treatment on water indeed results in reduced formation of limescale and that this effect lasts approximately 200 hours (Kozic, V; Lipus, LC 2003).





Health Benefits :
Some people claim that water conditioning with magnets helps in reduction of hard water problems. Doctors have claimed that magnetic water is a great energy booster and it helps in detoxing and cleansing body waste. Many people having arthritis pain and urinary bladder problems have claimed to benefit from the healing effects of magnetized water. Some of the claims that have made it very popular are related to its good taste and its increased alkalinity in comparison to normal water. It also has therapeutic effects in burns, cuts and wounds. Its molecules have been found to have positive effects on the functioning of the nervous system. Problems of kidney stones, liver, digestive system and indigestion have been put on a check due to drinking magnetized water over a period of time. Nowadays, there are special wands being manufactured that you can keep in water and magnetize it within 15 - 20 minutes!! To make this type of water at home, you have to perform simple experiments like placing glass bottled water on a magnetic bar and leaving it undisturbed for 2-3 days, to let it occupy the properties of a magnet.

It has to be understood that these claims may or may not be true. Tests on magnetized water have been conducted all across the globe and those who're really excited about magnet therapy treatments are trying to consistently test effects of magnetized water on people and document their results to come to a conclusive statement.

Some medical experts who don't support the idea of magnetized water seem to be opposing it since its inception. Certainly, it will take years of medical research to prove the efficacy of magnetic water. Surely, knowing the various water facts will make you believe that water has tremendous health benefits and unique chemical properties. Going by these chemical properties of water, the concept of water being magnetized does seem a great possibility! But how healthy is it to us can only be established after tremendous research. It is, for sure, going to be a part of our life, most probably, in the next decade! Let's wait and watch!
http://www.buzzle.com/articles/magnetic-water.html

Bi-polar magnetized water (treated with both North and South poles) is the most often used form of magnetized water for alleviating most common ailments. The Russians are the pioneers in the use of magnetized water. They call it "Wonder Water".

Magnetized water was first used in Russia by three specialists: Drs. G. Gerbenshchikow, I. Shetsov and K. Tovstoles, all three specialists in urology at the Kirov Military Medical Academy in Leningrad. They had their patients drink bi-polar magnetized water. This simple treatment was very effective in breaking up kidney and gall bladder stones into small enough particles to be passed through urine without any pain or danger to the patient. The water also prevented further formation of stones in the kidneys and gallbladder. Soviet physicians have been giving internally magnetized water to patients for over 30 years for digestive, urinary and nervous problems, ailments like mastitis, pains and swellings, painful urination and many other disorders. (Gursche, Siegfried, *et a*l ,1997) , (Burton Goldberg Group,1993)

Because magnetized water is wetter and therefore more penetrating, it furthers better assimilation of the various nutrients and vitamins in the cells. The Soviet biologist Kumarov had experimentally doubled the life span of flies by feeding them magnetized sugar.

In his book "Magnets For Your Health" Dr. Louis Donnet, M.D., wrote, "magnetized water can be helpful in weight control, as an adjutant to a correct diet." He states that he has seen over 100 successful cases. Because this water improves metabolic activity, it may be helpful in burning up excessive fatty tissue.

Similarly to the way magnetized water dissolves the settled salts on the wall of boilers and radiators, so it has been reported to help unclog the arteries and veins of deposits of cholesterol and salts and normalize the circulatory system. (Johnson, K.E., et al, 1998)

Magnetized water has been found effective in alleviating colds, coughs, bronchitis, all types of fever and more. Dr. H. L. Bansal found it helpful in the regularization of women's menses.

Magnetized water has been reported helpful for tiredness in daily activities. Biophysicist Albert R. Davis, a pioneer in magnet therapy research, wrote in his book "The Magnetic Effect" that he and his co-workers found they could overcome the early afternoon letdown by drinking a glass of magnetized water while relaxing for a few minutes.

Place a glass or plastic container filled with water on the Magnetic Drinking Pad. Leave the container on the pad and add water as needed. You have magnetized

water or fluid at all times. Fluids like juice, milk, tea, coffee and liquid type foods can be magnetized the way water is magnetized. Similarly oils, ointments and lotions used in ailments like rheumatism or for beauty can be magnetized. Magnetic facial cream is already available commercially. (Callahan,1995)

Drinking magnetically treated water can benefit your health in the following ways:

- Reduces acidity and helps regulate the body's pH level.
- Cleansing skin affected with acne, burns, ulcerated areas, boils and bedsores.
- Influences the autonomic nervous system.
- Beneficial for kidney ailments, gout, obesity and age-related illness.
- Use as a basic therapy for chronic problems where acidosis is a contributing factor to the disease.
- Promotes better digestion.
- Aids in any general internal cleansing of the body.
- Rinsing the eyes twice a day relieves the irritation of dry eyes and the need for artificial tears.
- Used in Russian clinics to relieve pain, reduce swelling help to prevent kidney stones.
- Dissipates toxic deposits within the body's connective tissues.
- Has a generalized therapeutic effect on the body, especially the digestive, nervous and urinary systems. (Narvaez, Thomas.1997)

Physical Changes

A physical change is any change NOT involving a change in the substance's chemical identity. Here are some examples:

(1) any phase change. Moving between solid, liquid and gas involves only the amount of energy in the sample (this amount is the subject of future lessons). There is no effect on the chemical identity of the substance. For example, water remains water, no matter if it solid, liquid or gas.

(2) grinding something into a powder. Or the reverse process of making a bigger lump of stuff, say by melting lots of small pellets of copper into one big piece.

(3) iron (and other metals) can be made to be magnetic. This change in no way affects the chemical identity of the element. Iron that is magnetized rusts just as easily as iron that is not magnetized. (Yes, rusting is a chemical change. Rust is chemically different from iron.)

Now would be a good time as any to list the names of the various phase changes:

Change	Name of change
Solid to liquid	melting, fusion
Liquid to gas	boiling, evaporation
Solid to gas	sublimation
Gas to solid	deposition
Gas to liquid	condensation, liquefaction
Liquid to solid	Freezing, solidification

. www.**chem**team.info/Matter/Physical**ChemChanges**.html

Materials and Method:

1. Materials :
   1-1 laboratory instruments :
   1. Autoclave
   2. Incubator

   1- 2. Medias :

   MacConkey Broth

1-3 Instruments :

1. Test tubes
2. Durham Tubes
3. Swabs

2. Method :

Internationally adopted method (MPN) has been applied to inspect contaminated drinking water samples (Collins; 1984) to culture normal and magnetized samples, by which (MacConkey broth) has been used as culture media for(Coli Form) bacteria.
The culture media was prepared by dissolving the media powder in distal water according to attached instructions using normal and double strength methods. According to these instructions , 5ml of normal strength has been allocated into each of 5 test tubes , as well as 10 ml of double strength dispersed into each of 5 test tubes .(Durheam tubes) has been added to each of the 10 tubes and closed by tight stopper, then sterilized by autoclaving .
After cooling down , the water

Samples have been cultured in the media by adding 5 ml of the module in each of the 5 test tubes(which contains 5 ml of normal strength of the culture media) and 10 ml in each of the 5 test tubes that contains 10 ml of double strength of the culture media . the test tubes then incubated for 24 h at 37 C .
The positive results have shown changing in the media colour from blue (Photo 1) to reddish yellow accompanied with accumulation of gas in Durham tubes (photo 2).

Results and discussion :

Table (1) Bacterial growth times in biological models of contaminated drinking water

Sam No	Normal Water			Magnetized water			Sam No	Normal Water			Magnetized water		
	0-8h	8-16 h	16-24h	0-8h	8-16 h	16-24 h		0-8h	8-16 h	16-24h	0-8h	8-16h	16-24h
1		+ve				+ve	26		+ve				+ve
2		+ve				+ve	27		+ve			+ve	
3	+ve				+ve		28		+ve				+ve
4		+ve				+ve	29	+ve					+ve
5		+ve				+ve	30		+ve			+ve	
6		+ve				+ve	31			+ve		+ve	
7		+ve			+ve		32	+ve					+ve
8	+ve				+ve		33	+ve					+ve
9			+ve			+ve	34		+ve				+ve
10			+ve			+ve	35		+ve			+ve	
11		+ve			+ve		36		+ve				+ve
12		+ve				+ve	37		+ve				+ve
13		+ve				+ve	38		+ve				+ve
14		+ve			+ve		39		+ve				+ve
15		+ve			+ve		40	+ve				+ve	
16		+ve			+ve		41	+ve					+ve
17	+ve				+ve		42	+ve					+ve
18	+ve					+ve	43	+ve					+ve
19	+ve				+ve		44	+ve				+ve	
20		+ve			+ve		45			+ve			+ve
21		+ve			+ve		46			+ve			+ve
22		+ve				+ve	47		+ve			+ve	
23		+ve				+ve	48		+ve			+ve	
24			+ve			+ve	49		+ve				+ve
25			+ve			+ve	50		+ve				+ve

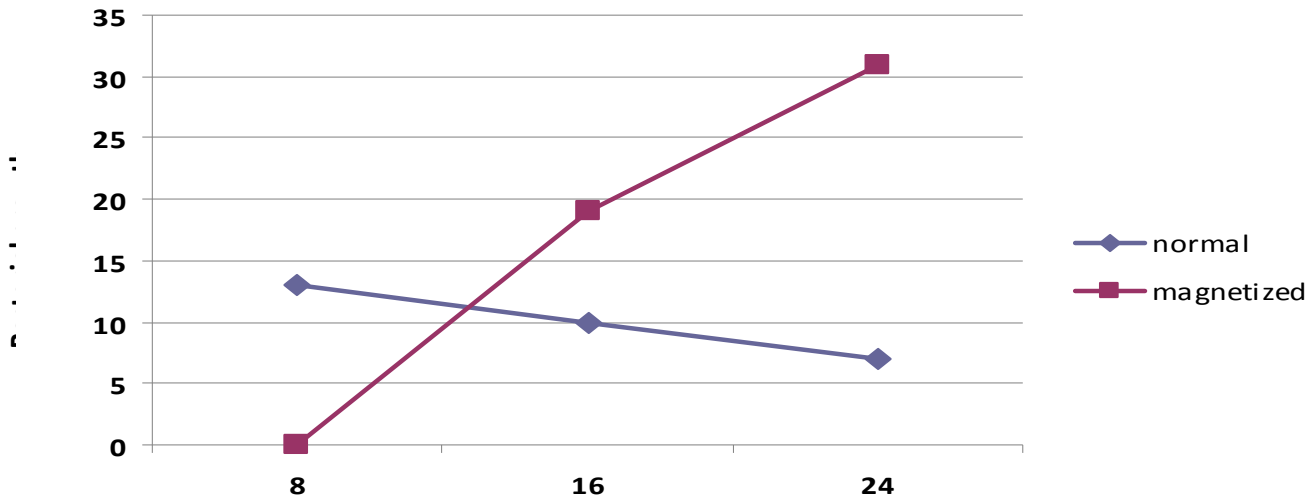


Diagram (1) times germ growth

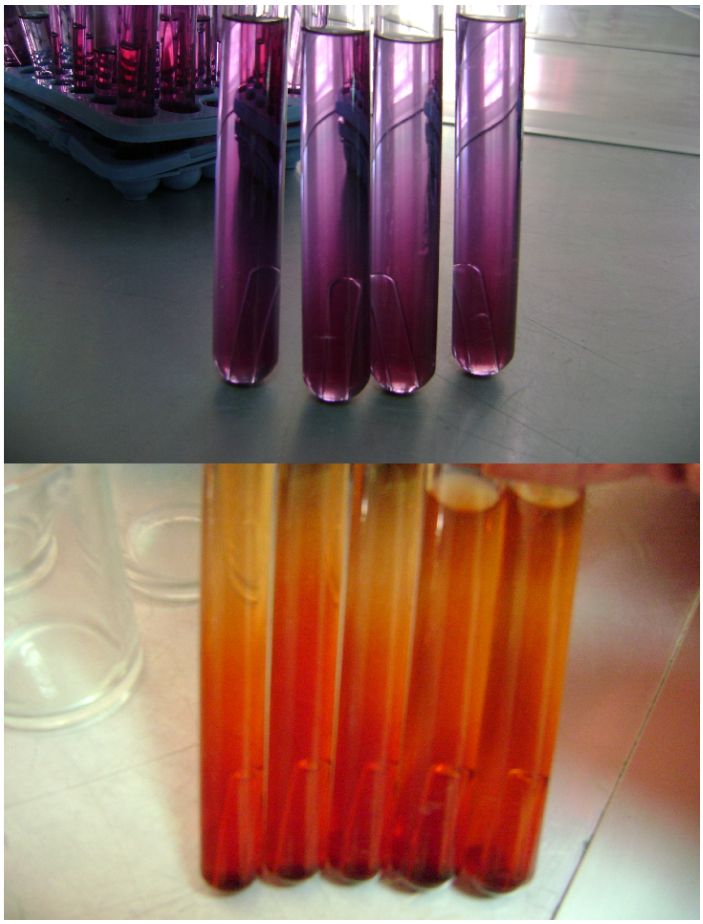


Photo No (1) standard color (Blue) of the Media (reddish yellow)

Photo No (2) positive results

The results of culturing (50) of normal contaminated water samples and (50) of magnetized contaminated water samples which are contaminated with (Coli form) bacteria have been illustrated in (Table 1) (Figure 1) .In case of normal water samples , the number of samples gave positive results during
(0-8 h) were (13 samples) , i.e. (26%) of total samples ,where as in the period (8-16 h) were (30) , i.e. (60%) ,while in the period of (16-24 h) the number were (7) ,i.e. (14%).
In case of magnetized water samples , the number of positive samples in the period of (0-8 h) were (0) , i.e. (0%) , in the period of (8-16 h) were (19) samples , i.e. (38%) and (31) samples ,i.e.(62%) in the period of (16-24 h) time.
From the results , we conclude that magnetized water has no lethal effect on Coli form bacteria , but has only inhibitory effect or delaying bacterial growth for (12-16 h) which is compatible with the duration period of magnetized water , i.e. (12-18 h).

Recommendation :

1. We recommend to connect the main water pipelines with water magnetizing devices , particularly the old ones , and connect this device with the new pipelines in case of unavailability of disinfectant substances that used for sterilizing drinking water , such as chlorine .
2. In case of private use (House and projects) , we recommend to connect water magnetizing devices with the main pipelines , in the aim of obtaining advantages of the magnetized water to inhibit bacterial growth , and in view of their many healthy benefits .

References :

1. Coey, JMD; Cass, S (2000). "Magnetic water treatment". *Journal of Magnetism and Magnetic Materials* **209**: 71–74. Bibcode:2000JMMM..209...71C. doi:10.1016/S0304-8853(99)00648-4.
2. Collins , C . H and Lyne , M . Patricia.(1984). Microbiological Methodes,Fourth Edition.
3. Szkatula, A; Balanda, M; Kopeć, M (2002). "Magnetic treatment of industrial water. Silica activation". *The European Physical: Journal Applied Physics* **18**: 41. Bibcode:2002EPJAP..18...41S. doi:10.1051/epjap:2002025.
4. Keister, T (2008). "Non Chemical Devices: Thirty Years of Myth Busting". *Water Conditioning & Purification*. Retrieved 2009-12-11.
5. Chaplin, M. (26 July 2011). "Descaling of Water". *Water Structure and Science*. London South Bank University. Retrieved 2012-03-26.
6,Krauter, PW; Harrar, JE; Orloff, SP; Bahowick, SM (1996). "Test of a Magnetic Device for Amelioration of Scale Formation at Treatment Facility D". *Internal Report* (Lawrence Livermore National Laboratory). OSTI 567404. Retrieved 2009-12-11.

7. Krauter, PW; Harrar, JE; Orloff, SP; Bahowick, SM (1996). "Test of a Magnetic Device for Amelioration of Scale Formation at Treatment Facility D". *Internal Report* (Lawrence Livermore National Laboratory). OSTI 567404. Retrieved 2009-12-11.

8. Liu, C. Z.; Lin, C. H.; Yeh, M. S.; Chao, Y. M.; Shen, P (2010). "Surface Modification and Planar Defects of Calcium Carbonates by Magnetic Water Treatment". *Nanoscale Research Letters* **5** (12): 1982–1991. doi:10.1007/s11671-010-9736-5. PMC 2991221. PMID 21170405.

9.Kozic, V; Lipus, LC (2003). "Magnetic water treatment for a less tenacious scale". *Journal of Chemical Information and Computer Sciences* **43** (6): 1815–9. doi:10.1021/ci0102719. PMID 14632427.

10. http://www.buzzle.com/articles/magnetic-water.html

11.Gursche, Siegfried and Rona, Zoltan. Encyclopedia of Natural Healing. Alive Publishing, Inc., Burnaby, Canada, 1997, pp. 400- 07

12.Burton Goldberg Group. Alternative Medicine:The Definitive Guide. Future Medicine Publishing, Inc., Puyallup, WA, 1993, pp. 330-38

13.Johnson, K.E., et al. The effectiveness of a magnetized water oral irrigator (Hydro Floss) on plaque, calculus and gingival health. Journal of Clinical Periodontology, Vol. 25, 1998, pp. 316-21

14.Callahan, Philip S. Paramagnetism: Rediscovering nature's secret force of growth. Acres U.S.A., Metairie, LA, 1995

15.Narvaez, Thomas. Letter to John McLoughlin, Grandby International Inc., August 9, 1998

16.www.**chem**team.info/Matter/Physical**ChemChanges**.html

کاریگەری ئاوی موگناتیسی لەسەر گەشە کردنی بەکتریای (*Coli form*) لە ئاو

ئەم توێژینەوەیە تیشک ئەخاتە سەر کاریگەری ئاوی موگناتیسی لەسەر گەشە کردنی بەکتریای (*Coli form*) بۆ ئەم مەبەستە (50)نمونەی ئاوی خواردنەوە وەرگیرا لە گەرەکەکانی شاری کۆیە / هەرێمی کوردستان لە ماوەی٦/2012 _2014/12 دوای ئەوەی نمونەکان پیسکران بە پاشماوەی باڵندە وەک سەرچاوەی بە کتریای (*Coli form*) دوای ئەمە نمونەکان دابەشکران بۆ دوو بەشی یەکسان, یەکەم بەش چێنرا لە شلەی مەکونکی , بە ڵام بەشی دووەم بە ڕێگای ڕحەتی موگناتیسی ئاوەکە کرا بە ئاوی مگناتیسی , دوای ئەمە چانرا لەناو شلەی ماکونکی , لە ناوحازینەی لەسەر پلەی گەرمی 37 بۆ ماوەی 24 کاتژمێردراندرا.

ئامانجە بۆسەتیقەکان دەرچوون , سەبارەت بە ئاوی ئاسایی (13) نمونە لە ماوەی(0_8) کاتژمێر و (30) لە ماوەی (18–16) کاتژمێرو(7) نمونە لە ماوەی (16–24) کاتژمێر بە ڵام نمونەکان لە ئاوی موگناتیسی(0) نمونە لە ماوەی (0–8) کاتژمێر و (19)نمونە لە ماوەی(8 _16)کاتژمێر و (31) نمونە لە ماوەی(16_24)کاتژمێر ئەمەش ئەیسلمێنێ کە ئاوی موگناتیسی کاریگەری کەم کردنەوەی گەشەکردنی هەیە.

تأثیر الماء الممغنط علی نمو جراثیم (*Coli form*) فی الماء

تسلط الدراسة الضوء علی تأثیر الماء الممغنط علی جراثیم (*Coli form*) فی الماء , أخذت (50) عینة من ماء الشرب من بیوت من مناطق مختلفة من مدینة کویة / أقلیم کردستان من فترة 2012/6 _ 2014/12 لوثت العینات ببراز الطیور کمصدر للجراثیم القولونیة ثم قسمت العینات الی جزئین متساویین , زرع الجزء الاول والذی هو الماء الاعتیادی فی مرق مکونکی , بینما الجزء الثانی تم تمریرة فی قمع مغناطیسی بهدف مغنطة الماء وزرع فی مرق مکونکی ووضعت فی الحاضنة علی درجة حرارة 37 م لمدة 24ساعة.

ظهرت النتائج الایجابیة فی حالة الماء الاعتیادی (13) عینة خلال الفترة (0_8) ساعة و (30) عینة خلال الفترة (8–16) ساعة و ((7) عینة خلال الفترة (16–24) ساعة بینما فی حالة الماء الممغط(0) عینة خلال الفترة (0_8) ساعة (19) عینة أظهرت نتائج ایجابیة خلال الفترة (8_16)ساعة و (31) عینة خلال الفترة(16_24) ساعة . وهذا یثبت التأثیر المثبط للماء الممغنط علی نمو الجراثیم القولونیة.