

Effectiveness Magnetized Water On Multi-Drug Resistance (Mdr) *Pseudomonas Aeruginosa*

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ABSTRACT

In this research *Pseudomonas aeruginosa* was chosen and developed in a special growth medium, then, exposed to magnetized water in order to studies effectiveness of *P.aeruginosa*, magnetization process acquired new characteristics differ from the original characteristics before placing inside the device including surface tension, electrical conductivity, pH and crystallization by changing characteristics of bacteria in life with killing. Magnetic water preparation by exposed water with different volume 2ml, 4ml, 8ml and 10ml into magnetic device for 1/2 hrs., 1 hrs., 2hrs. the results of colony after exposure to magnetic water for 24hrs. were colony(killing of percentage%) 19(99.2%), zero(99.2%),zero(99.6%) colony when exposed to 4ml magnetic water to 1/2 hr., 1hrs., 2hrs. respectively; results of colony after exposure to magnetic water were 5(99.2%), zero(99.1%),zero(99.8%) colony when exposed to 8ml magnetic water for 1/2 hr., 1hrs., 2hrs. respectively and the results of colony after exposure to magnetic water were 4(99.7%), 9(99.1%),zero(99.3%) colony when exposed to 10ml magnetic water to 1/2 hr., 1hrs., 2hrs. respectively

Keywords: Magnetized water, Magnetization and *Pseudomonas aeruginosa*.

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INTRODUCTION

Magnetism played an important role in associated with magic works were taking the powder as a medicine to treat many internal diseases affect on human, used to treat back pain. Magnetization of water was used as an important method for treating water for employment in various fields (1) Some of the unwanted ways to get rid of toxic waste and factory waste increased by the number of desalination plants, offset by an increase in sea and river water pollution(2).

One of the most important modern methods used to reduce the negative effects resulting from the use of local water is the special magnetic tubes through which water passes and magnetic tubes work to magnetize the water so-called magnetic water, the magnetic field will affect the angle of attachment of two hydrogen molecules with oxygen in water molecule where cluster groups in them decrease to 6_7 molecules compared to water in its natural state which is up to 10_12 molecules (3)

Magnetic water obtained by passing pure water through a magnetic field or by placing a magnet inside or near distilled water for a certain period of time and therefore a change in physical properties, the water polarized when passed into hard water. Exposure of water to a magnet will greatly change of properties including organizing charges (+, -, +, -) and image is completely different from the shape of water used in normal daily life. The molecules arranged in the form (-, -, +, +) called dead

water preferable to for treatment, magnetized water used to eliminate bacterial growth through effect on cytoplasm and nucleus(4,5,6).

P.aeruginosa is an important bacterial species, oppourtunistic pathogen, found in water, soil and plants cause infections in humans and animals as skin(7), burn or wound leading to damage to tissue, bloodstream, leukemia, Septicemia, bacteremia especially in Immunodeficiency (8,9), inflammation, meningitis, urinary tract infections, Eye infection and Cystic fibrosis(10,11).

P.aeruginosa is a gram negative bacterium, non spore forming difficult to treat because it possesses acquired resistance for many antibiotics including aminoglycosides and beta-lactam antibiotics (13). found on medical equipment including catheters and cause infection (14), as well as swimming pool water causing infections of the ear or eye, respiratory tract infections(15,16).

MATERIALS AND METHODS

Preparation Magnetized water by exposition to Magnetic water device:

Magnetized water prepared when exposed to magnetic water device, magnetized water prepared 2ml, 4ml, 8ml and 10ml exposure to magnetic device for 1/2 hrs., 1 and hrs. 2 hrs.

The magnetic water device is designed as shown below:



Figure (1): installation of the magnetic water device

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Magnetic water device composed of 3 square aluminum plates fixed from the four sides penetrated by a hole in a circular and a diameter (6.4cm), this circular opening surrounds a group of 75 magnets. the magnetic field strength is measured from the middle of the circle in the

device, then putting a bottle inside this device contains a tube that contains a group of other magnets installed vertically in order to increase the magnetic field as figure(2):

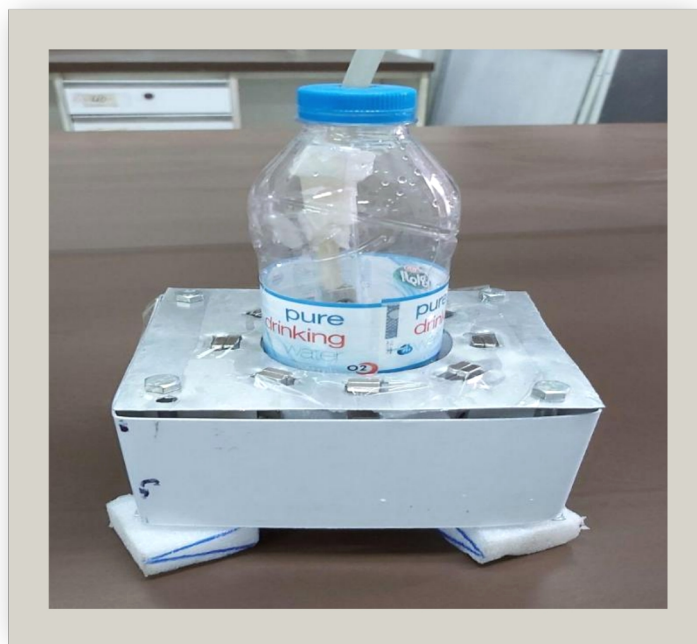


Figure (2): Magnetic water device

Sample collections:

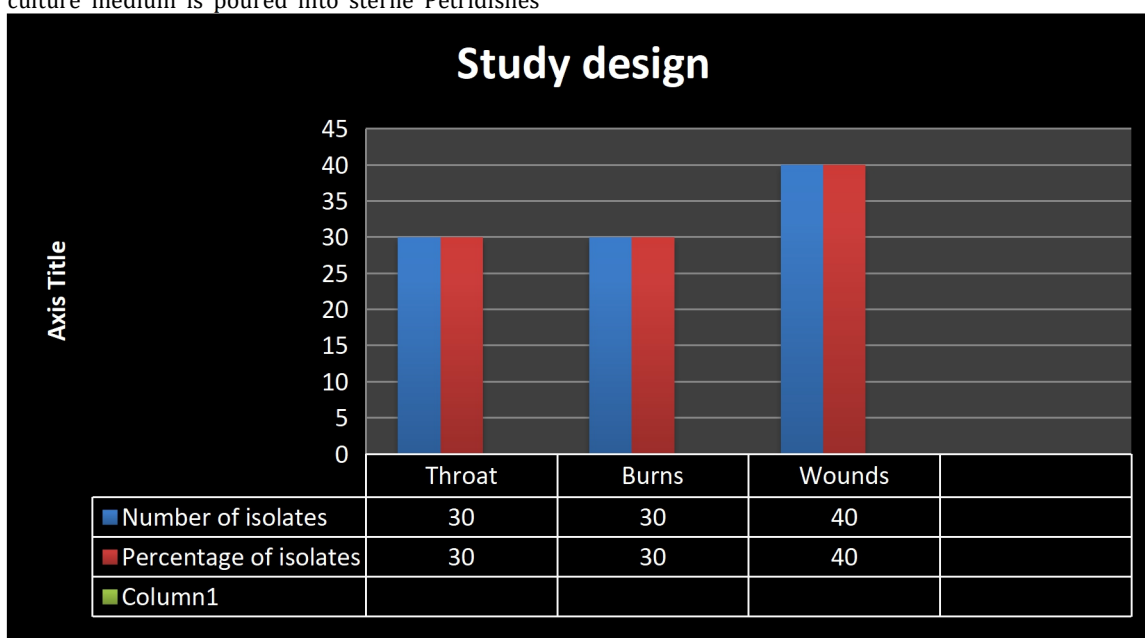
Sample collections from different sources from patients of Iraq hospitals Al -Hilla Teaching Hospital and Imam Ali Hospital in Babel Governorate and isolated and purified in the laboratories of the Department of Life Sciences in the College of Science through period 2019- 2020 from the throat (pharynx), skin secretions disease including wounds, burns by dissolving certain proportions of culture media into 100ml distilled water, then sterilized in an Autoclave at 121 degrees for a period of half an hour, culture medium is poured into sterile Petridishes

left to solidified on the plates and placed in the refrigerator to ensure it solidifies, then cultivated on growth medium *Pseudomonas* agar , Nutrient agar, MacConkey agar medium at 37 °c for 24 hrs.(17).

RESULTS AND DISCUSSIONS

Study design

Study design for this research is cross-sectional study design in descriptive study design for 100 isolates collected from different sources including 30(30%) isolates from throat, 30(30%) isolates from burns and 40(40%) isolates from wounds.



Figure(3): Study design of sample collections from different clinical sources.

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Figure(4): *P.aeruginosa* on Nutrient agar (control) before exposure to magnetic water.

Effectiveness Magnetized water on *P. aeruginosa*

Magnetization water carried out by placing water inside the designed device in order to creation water with very strong concentration (18).

Magnetic water preparation by exposed water with different volume 2ml, 4ml, 8ml and 10ml into magnetic device for 1/2 hrs., 1 hrs., 2hrs. the results of colony after exposure to magnetic water for 24hrs. were

colony(killing of percentage%) 19(99.2%), zero(99.2%),zero(99.6%) colony when exposed to 4ml magnetic water to 1/2 hr., 1hrs., 2hrs. respectively; results of colony after exposure to magnetic water were 5(99.2%), zero(99.1%),zero(99.8%) colony when exposed to 8ml magnetic water for 1/2 hr., 1hrs., 2hrs. respectively and the results of colony after exposure to magnetic water were 4(99.7%), 9(99.1%),zero(99.3%) colony when exposed to 10ml magnetic water to 1/2 hr., 1hrs., 2hrs. respectively.

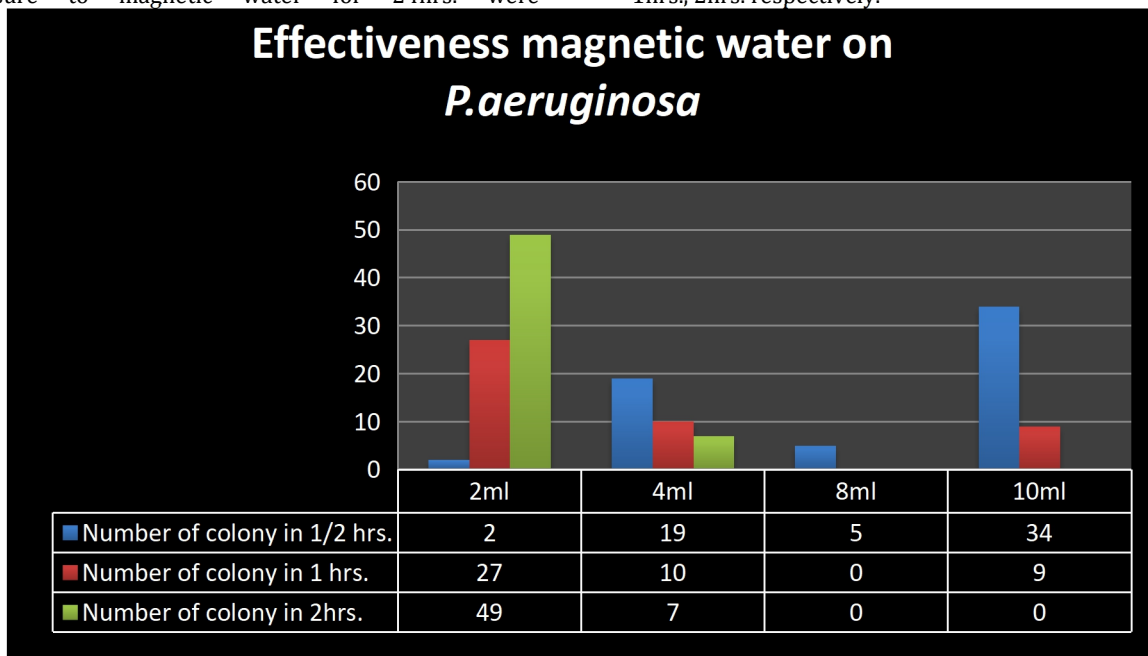


Figure (5): Effectiveness magnetic water on *P.aeruginosa*.

Water have two polar types, H₂O from non-polar H₂, O₂ when non polar molecules pass through a magnetic field that convert into dipole but for polar water molecules such as water when pass through magnetic field are arranged on a regular basis. Water molecules arranged correctly when exposed to magnetic field, then change

with some properties such as electrical conductivity and increase the percentage of dissolved oxygen in the water, crystallization, surface tension as well as ductility and susceptibility to the speed of dissolution of acids as well as salts, and also affects the disintegration of crystals (19,20).

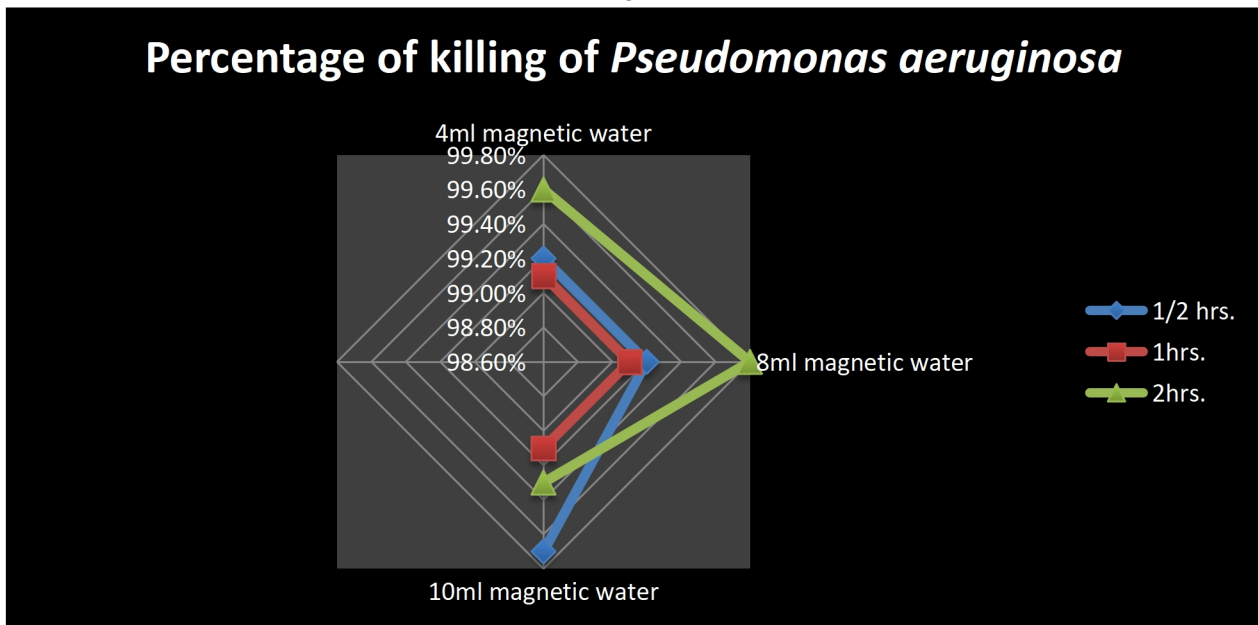


Figure (6): Effectiveness magnetic water on killing of percentage *P.aeruginosa*.

Changes that occur with physically magnetized water include an increase in number of molecules and a break in the hydrogen bonds, water is more liquid has a high ability to dissolve, given field affects in angle of correlation between the hydrogen and oxygen molecules that turns the water when exposed to hardware (21)

REFERENCE

- C.K.Stover , X.Q.Pharm ,A.L. Erwin ,S.D. Mizoguchi ,P. Warrenner and M.J.Hickey (2000). Complete genome sequence of *Pseudomonas aeruginosa* PAO1 , an opportunistic pathogen. 406:959-964.
- Barefoot, R. R. and C. S. Reich. (1992). The calcium factor: The scientific secret of health and youth. South eastern, PA: Triad Marketing; 5th edition
- Ibrahim, I.H. (2006). Biophysical Properties of Magnetized Distilled Water. Egypt. J. Sol., 29(2),850-857.
- Ichiro, O.; Ozeki, S. (2006). Does magnetic treatment of water change its properties. J. Phy. Chem. B.110, 1509-1512.
- حباس,نضال (2006) فوائد المياه الممغنطة. المؤتمر الدولي الرابع للمياه الصحية في العالم العربي -القاهرة (5_6_2006)
- K.Todar.(2004). *Pseudomonas aeruginosa*. University of Wisconsin - Madison, Department of Bacteriology.
- Jalil, M. B.; Abdul-Hussein, Z. R. and AL-Hmudi, H. A. (2017). Isolation and identification of multi drug resistant biofilm prducer with Burn Wound infection in Basra Provincel/ Iraq IJDR 7:11 pp.
- Sherris, J.C.K.; Ryan,J. and Ray, C.G.(2010).Medical Microbiolog 5th . Lange Medical books McGraw-Hill Co. Inc .U.S.A.
- Pedersen, S. S; Hoiby, N.; Espersen, F. and Koch, C.H. (2018). Role of alginate in infection with Mucoïd *Pseudomonas aeruginosa* in cystic fibrosis. 47: 6-13.
- Ullah, W.; Qasim, M.; Rahman, H.; Jie, Y. and Muhammad, N. (2017). Beta-lactamase-producing *Pseudomonas aeruginosa*: Phenotypic characteristics and molecular identification of virulence genes. Jcma., 80:173-177.
- Cicek, A.C.; Saral, A.; Duzgun, A.O.; Cizmeci, Z.; Kayman, T.; Balci, P.O.; Dal, T; Firat, M.; Yazici, Y.; Sancaktar, M.; Osman Birol Ozgumus, O.B. and Sandalli, C. (2013). Screening of class 1 and class 2 integrons in clinical isolates of *Pseudomonas aeruginosa* collected from seven Hospitals in Turkey: A Multicenter Study. J. Med. Microb., 3:227-233 .
- A.Y.Itah and J.P.Essien.(2005).Growth Profile and Hydrocarbonoclastic Potential of Microorganisms Isolated from Tarballs in the Bight of Bonny , Nigeria ". World Journal of Microbiology and Biotechnology. 21 (6-7): 1317-22.
- Deabreu, P.M. Farias, P.G. and Paiva, G.S. (2014). Persistence of Microbial communities including *Pseudomonas aeruginosa* in a hospital environment: a potential health hazard. BMC. Microbiol., 14:118.
- Alwan, M.J. ; Lafta, I.J. and Hamzah, A.M. (2011) . Bacterial isolation from burn wound infections and studying their antimicrobial susceptibility . Kufa J. Veterinary Medical Sciences . 2(1): 121-130 .
- Cahan, R. Axelrad, I. Safrin, M. ohman, D.E. and Kessler, E. (2001). Asecreted Aminopeptidase of *pseudomonas aeruginosa*. J. Biol. Chem. 276, pp: 4364543652.
- G.F.Brooks , K.C.Carroll , J.S.Butel and S.A. Morse .jawetz , Melnick ,and Adelbergs.(2007). Medical microbiology .24thed. McGraw - Hill. USA.(2007).
- Siegfried .G.andZoltan.R.(1997) .Encyclopedia of Natural Healing ,Alive Publishing Inc. Burnaby Caeda,400-407.
- Hilal, M. H.; and M.M. Hilal. (2000a). Application of magnetic technology in desert agriculture. I. seed germination and seedling emergence of some crops in a saline calcareous soil. Egypt J. Soil Sci. 40 (3): 413-422.Hilal, M.H.; and M.M.
- Hilal. (2000b). Application of magnetic technology in desert agriculture. II- Effect of magnetic treatments of irrigation water on salt distribution in olive and citrus field and induced changes of ionic balance in soil and plant. Egypt. J. Soil Sci. 40(3): 423-435.