

Effect Of Magnetized Water On Several Biochemical And Physical Properties In Mice

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Abstract:

The effects of magnetically treated water (MTW) versus tap water on some biological parameters including Aspartate transferase (AST), Alkaline phosphatase (ALP), Adenosine deaminase activity (ADA) and glucose level and several physiological activities including feed and water consumption, body weight and metabolic factor. Thirty albino mice from both sexes were divided into three groups, T1 group, supplied with 1000 gauss (MTW), T2 group, supplied with 2000 gauss MTW and the control group (C), provided with tap water. Results showed that MTW significantly decreased the glucose level ($P < 0.01$). No significant changes in both AST and ALP activity was recorded in the treated groups comparing to control group ($P > 0.05$) among all groups. ADA activity was increased highly significant ($p < 0.01$) in T1 group when compared to control group. Feed consumption showed no significant changes ($p > 0.05$), while metabolic factor increased and body weight decreased only among T2 group animals ($p < 0.05$), the highest improvement was recorded in water consumption in both T1 and T2 groups ($p < 0.001$ and $p < 0.01$) respectively. It is concluded that 1000 gauss MTW is more beneficial and has less harm effect on living body than 2000 gauss MTW.

Key words: Magnetically treated water, glucose, mice, Adenosine deaminase

تأثير المياه الممغنطة على بعض الخواص الكيموحيوية و الفيزيائية في الفئران البيض

الخلاصة

في هذا البحث تم دراسة تأثير المياه الممغنطة بالمقارنة مع ماء الحنفية العادي، على بعض العوامل البيولوجية مثل انزيمي AST و ALP ، و فعالية انزيم ADA و مستوى الكلوكوز بالدم و بعض الفعاليات و الانشطة الفسلجية الاخرى مثل مقدار استهلاك الماء و الغذاء، وزن الجسم و العامل الايضي. استخدم في هذه التجربة ثلاثين فأراً مختبرياً من نوع Albino ضرب balb c من كلا الجنسين، و قسمت الى ثلاثة مجاميع و هي: مجموعة T1 و جهزت بالماء الممغنط بشدة ١٠٠٠ كاوس و مجموعة T2 جهزت بماء ممغنط شدته ٢٠٠٠ كاوس و مجموعة السيطرة جهزت بماء الحنفية العادي. أظهرت النتائج بعد المعاملات المختلفة بأن مستوى الكلوكوز قد انخفض في مجموعتي T1 و T2 معنوياً ($p < 0.01$)، لم يلاحظ أي تغير معنوي في كلا من AST و ALP لمجموعتي T1 و T2 عند مقارنتها مع مجموعة السيطرة ($p > 0.05$)، فعالية ADA شهدت ارتفاعاً معنوياً ($p < 0.01$) لمجموعة T1 عندما قورنت بمجموعة السيطرة، لم يتم ملاحظة أي تغير معنوي في استهلاك العلف بين المجاميع ($p > 0.05$)، العامل الايضي شهد ارتفاعاً معنوياً ($p < 0.05$) في حين ان وزن الجسم انخفض معنوياً ($p > 0.05$) في مجموعة حيوانات T2 ، و سجل ازدياداً معنوياً في شرب الماء الممغنط في كلا من مجموعتي T1 و T2 ($p < 0.001$) و على التوالي مقارنة مع مجموعة السيطرة. يستنتج من هذا البحث بأن الماء المعالج مغناطيسياً بشدة ١٠٠٠ كاوس أكثر فائدة و أقل تأثيراً ضاراً على الجسم الحي من الماء المعالج بشدة مغناطيسية ٢٠٠٠ كاوس.

Introduction:

Water is the blood of life. It is needed to transport compounds via the blood, it maintains cellular structural integrity, regulate temperature, etc., magnetic healing appears to date to ancient Greece [1]. The property of magnetism is present in every living cell [2] In the recent years, several studies have suggested possible bio-effect of magnetic fields on human health [3].

according to many researches, the equilibrium of living cells can be restored with the help of magnets [4] may be this comes from the fact that, water and water solution passes through magnetic field acquire finer and more homogeneous structures, which increases the fluidity, dissolving capability for various constituents like minerals and vitamins and consequently improves the biological activity of solutions, affecting positively the performance of human, animals and plants [5].

Water in living systems naturally gathers into structures of 14,17,21,196,280 or more molecules[6] the property of magnetism is present in every living cell [7,4], structured water can be formed by using magnets ,according to many researches that the equilibrium of living cells can be restored with the help of magnets[3]. There is a long history of the promotion of magnets to improve the quality and health benefits of water. Researchers found when a permanent magnet is kept in contact with water; it gets magnetized when kept in contact with water for a considerable period of time; the water gets magnetically charged and acquires magnetic properties. Such magnetically treated water has its effect even on the human body when taken internally and regularly for a considerable period of time. [1] . Magnets divided into three types, electromagnets, permanent magnets and temporary magnets [8], [9]. Considering the lack of consensus on the biologic effects of magnetically treated water, this work aims to investigate the beneficial effects of magnetized water in different treatments at the physiological level and which treatment is recommended.

Materials and methods:

Animals and housing:

The study included 30 mice from both sexes, their age ranged 6-7 weeks, and grouped into 3 groups (T1, T2, and C) each group was subjected to a different treatment T1 group included mice supplied with 1000 gauss MTW. T2 group included mice supplied with 2000 gauss MTW. Control group supplied with tap water CTW.

each group was subdivided into two groups depending on sex, each consist of 5 mice .Animals were housed in stainless steel cages at 23-25 C° under 12/12 light/dark cycle with free access to diet and water.

Preparation of MTW:

Water was passed through a magnetic funnel field at relatively low speed and collected into graduated containers for distribution, mice were provided with fresh MTW twice a day. Two types of magnets used, their strength were 1000gauss and 2000gauss measured by gauss meter.

Results:

The magnetized water was tested for several physical parameters (Table-1). The effect of magnetized water on several biochemical markers including glucose level, AST, ALP and ADA were studied, also some physical behaviors like water and feed consumption body weight and metabolic factor were put under the spotlight too.

(Table-1) Physical properties of magnetized water used.

Parameter	Control	T1	T2
Density (mn/m)	56.07	46.22	46.12
Conductivity(ms/cm)	1.08	1.07	1.07
DO2 * (ppm)	5.05	5.15	5.25
TDS** (mg/L)	487	487	587
PH	7.6	7.8	7.8
Salinity	0.3	0.3	0.3

*DO2,dissolved O2

**TDS, total dissolved salts

Biochemical parameters:

Remarkably, magnetized water decreased the blood glucose level, that the mean value for control group(C) was 130.5 ± 1.3 g/dl and for T1 group was 98.17 ± 2.6 g/dl referring to the presence of a significant difference between them ($P < 0.01$) while the mean value for T2 group was 87.9 ± 2.0 g/dl referring to the presence of a significant difference also ($P < 0.01$).

AST activity did not change significantly when mice supplied with magnetized water, the mean value for control was 76.9 ± 2.08 U/L T1 group was 78.0 ± 2.19 U/L and T2 group was 77.6 ± 2.15 U/L respectively, that refers to the absence of a significant change between both (C) and T1 groups ($P > 0.05$) and between (C) and T2 groups ($P > 0.05$).

The third studied parameter is the ALP which also showed the absence of any significant change between control, mean value 115.62 ± 2.9 IU/L and T1 group, mean value 91.53 ± 1.96 IU/L, ($P > 0.05$), moreover no significant difference ($P > 0.05$) was detected between control, and T2 group, mean value= 107.62 ± 1.7 IU/L).

Regarding the ADA which represented the immunological parameter in the study, it was found that water magnetizing with 1000 gauss causes significant increase in ADA activity($P < 0.01$), that the mean values for ADA activity among control and, T1 groups were 36.4 ± 1.6 and 421.4 ± 6.5 , respectively. While water treatment with 2000 gauss did not make a change in ADA activity ($P > 0.05$) since ADA activity among (C) was 36.4 ± 1.6 comparing to 45.13 ± 1.7 among T2 group (Table-2).

(Table-2) differences in glucose level, ALP, AST and ADA activity in three groups of mice control(C), T1 and T2.

Parameters	groups	Mean values	P- value C & T1	interaction	P- value C & T2	interaction
Glucose g/dl	C	130.5	0.008	HS	0.003	HS
	T1	98.17				
	T2	87.96				
ALP IU/L	C	115.62	0.28	NS	0.69	NS
	T1	91.53				
	T2	107.62				
AST U/L	C	76.9	0.92	NS	0.93	NS
	T1	78.0				
	T2	77.6				
ADA	C	36.44	0.003	HS	0.36	NS
	T1	421.4				
	T2	45.13				

HS: Highly significant; NS: Non significant.

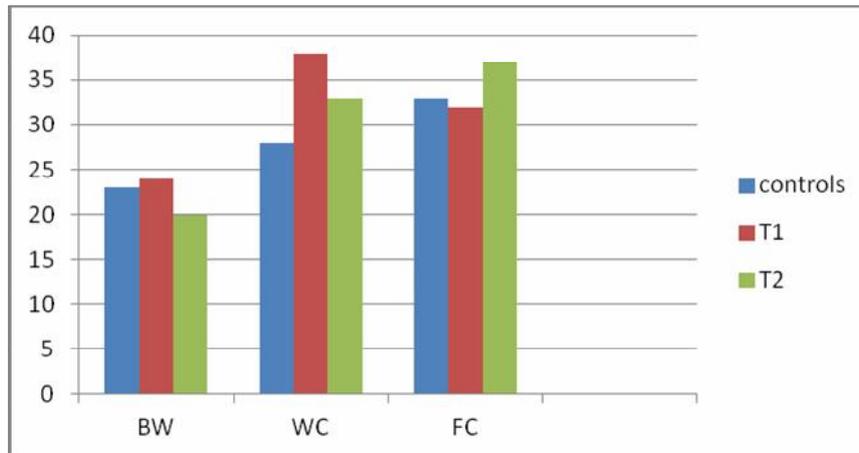
Physical parameters:

Those included four items, body weight, water consumption, feed uptake and metabolism factor. Regarding the weight gain, tests revealed that the average weight (gm) for the three groups control, T1 and T2 was 23.4 ± 0.53 , 24.9 ± 0.71 , 20.33 ± 0.55 , respectively, and by comparing average weight for the control group with T1, no significant change was detected ($P > 0.05$) while significant difference was detected ($P < 0.05$) between control and T2 (Figure-1).

Concerning the water consumption(ml/week) the average values for the three groups (control, T1 and T2) was 28.8 ± 0.44 , 38.3 ± 0.7 , and 33.8 ± 0.54 , respectively, a highly significant increase was detected between control and T1 group and another high significant increase was detected between control and T2 group ($P < 0.001$, $P < 0.01$) respectively.

The third studied parameter is the feed consumption (gm for each mouse/week) the average weight to the three groups control, T1 and T2 group was 33.8 ± 0.44 , 32.7 ± 0.7 , 37.8 ± 0.8 respectively. There were no significant changes between control and T1 ($P > 0.05$) and between control and T2 ($P > 0.05$).

The metabolic factor, average for the three groups were (1.45 ± 0.1 to control, 1.35 ± 0.21 to T1 group, 1.8 ± 0.24 to T2 group), no significant change was detected between averages of control and T1 ($P > 0.05$) while a significant difference was reported between control and T2 ($P < 0.05$) (Figure-2).



(Figure-1) averages for the three studied groups (C, T1, T2) in body weight, water and feed consumption

BW: body weight, WC: water consumption, FC: food consumption.

Discussion:

The results showed that exposure to MTW originated different metabolic and physiological changes, results revealed that MTW had significantly decreased the glucose level, especially among animals provided with 1000 and 2000 gauss magnetized water, literature revealed several outcomes for this parameter, hyperglycemia observed following sub-acute exposure to static magnetic field (SMF) [2], while another study recorded a slight increase on serum glucose[10]. On the other hand other researches showed no effect on glycemia in sub-chronic exposed rats, suggested probably an adaptive response of carbohydrate metabolism subsequent to a long exposure [11]. This discrepancy could be attributed to difference in intensity of SMF and exposure scenario and duration, in this work, mice were supplied with MTW but not direct SMF; according to literature, MTW has increased the water conductivity, this may increase the blood circulation and by which increases the glucose uptake by the cells [12,13].

Both AST and ALP activity did not affect by water magnetizing, previous studies showed that serum protein level and GOT and GPT activity remained unchanged after their exposure to SMF[11] it's important to mention that in nearly all pathological status in which damage or hepatocyte destruction occurs the activity of those two enzymes increase [14].thus it may be concluded that drinking SMW does not harmly affect hepatocytes, while several studies showed that direct exposure to SMF induce structural changes in hepatocytes primarily in mitochondria [11,15].

Regarding ADA activity, magnetizing water with 1000 gauss significantly increased ADA activity while treating water with 2000 gauss did not make any effect on its activity, and this finding is in accordance with results obtained by [16, 1], while these findings disagree with [17] who reported no effect for static magnetic field of 130-20.000 gauss on the immune system of animals. Since ADA represents an immunological parameter, consumption of MTW may improve the immunological status.

No change in diet uptake was detected, body weight decreased this in agreement with [11,18] while [13], found that exposure of rats to SMF had no significant effects on

body weight. As for metabolic factor increased in mice group which gave 2000gauss treated water as it correlates directly with feed consumption and inversely with body weight, more studies are needed to emphasize those findings.

The highest improvement was recorded in water consumption parameter, that both T1 and T2 treatments highly increased the water consumption, this in agreement with [15] who showed that pigs supplied with MTW consumed more water than those which given tap water up to the double. But this disagrees with [4] who recorded significant decrease in drinking water in mice which gave 500 gauss treated water.

Since magnetic treatment has claimed to help body against microbial invaders and improve immune system [18]. Our finding that MTW makes animals thirsty could be used as a strategy to enhance body hygiene and immune system. It could be concluded also that results of 1000 gauss water treatment is collectively better than 2000 gauss treatment; as it improves the biological and physiological status of the living body at least for the studied parameters, further studies are needed to investigate other parameters by using 1000 gauss MTW.

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