

# THE EFFECT OF EATING DIFFERENT CONCENTRATIONS OF SODIUM AND CALCIUM ON THE LEVEL OF ACHIEVEMENT OF CERTAIN EVENTS OF TRACK AND FIELD ACCORDING TO THE DIFFERENT ENERGY SYSTEMS

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## Abstract

The low level of mineral salts in the blood will lead to a certain mechanism done by the body where the body starts to pump water from the blood toward the cells in order to maintain the level of sodium in the blood which must be at level of (135-146) mmol / liter in the blood and this will therefore lead to another negative factor which is water poisoning of the cell and therefore the death of the cell as well as effect of the athletes level and these are the reasons that called the researcher towards the study of using of different concentrations of mineral salts to know the impact of these concentrations to keep the level of salts in the blood and improve the achievement which may be affected by this decrease in the concentrations , the study aimed to identify the effect of taking water that contains different concentrations of sodium and calcium on the level of achievement in the activities of ran (100 m .800 m .3000 m) , the researcher used the experimental curriculum as well as the comparison style in solving the problem of the research , the research sample was selected by the intentional way , as it consisted of nine players representing the team of Diyala University of track and field event (100 m .800 m .3000 m) in accordance with the effectiveness that are commensurate with the energy system and by (3) players for each event and to verify the validity of the assumptions and to achieve the objectives of the research, the researcher adopted a set of biochemical tests in solving the problem of the and the researcher concluded that the mineral salts have significant impact on the sporting achievement in the events of a long time as well as the mineral salts have a positive role in maintaining the speed of sporting hospitalization through calcium role with phosphate component in re-resources of energy to what it was.

**KEYWORDS: Sodium .Calcium. Energy. Blood. Water poisoning**

## 1. INTRODUCTION

Many factors affect the level of physical and athletic achievement and from these factors are mineral salts dissolved in water that taken by the athlete before, during and after delivery, and these salts are essential and important part , some of them do vital processing that have a great importance to the body, so it is necessary to be in accordance with the athletic food , sodium is a mineral which have a significant role in reducing the manifestations of water poisoning as the lack of concentration of sodium in the blood as a result of taking a large amount of fresh water (free of salts) when do vigorous exercise in hot weather and high humidity leads to the entry of a large amount of water into the cells to keep the sodium concentration within the normal level and then destroyed and this so-called water poisoning , scientists have sought to achieve a high level and achieve the standard numbers and this is what encouraged them in the research for all things related to the process of training and through this continuous research , scientists concluded that the athletic food must commensurate with the training process and not in isolation and has been shown that the decrease in the level of mineral salts in the blood is also will lead the body to follow a certain mechanism as the body will pump water from the blood toward the cells in order to maintain the level of sodium in the blood which must be at level (135-146 ) mmol / liter of blood and this consequently will lead to another negative factor which is water poisoning of the cell and therefore the death of the cell as well as the effect of the athletic level (Musa Al-Khatib, 2003) and these are among the reasons that make the researcher to use different concentrations of mineral salts to know the impact of these concentrations to keep the level of salt in the blood within normal limits and thus reduce the manifestations of water poisoning disease as well as to maintain the level of achievement that may be affected due to this fall in concentrations.

### Research Objectives

1. To identify sodium and calcium concentrations in the blood of the players of the track and field in the events of ran 100 m .800 m .3000 m.

- To identify the effect of taking water containing at different concentrations of sodium and calcium on the level of achievement in the run activities (100 m .800 m .3000 m).
- To identify the impact of taking water that contains different concentrations of mineral salts sodium and calcium on the level of blood of the players of running (100 and 800.3000) meters.
- To identify the differences in the concentration of sodium and calcium level in the blood between the players of events of ran (100 and 800.3000) meters.

### Research hypotheses

- There are statistically significant differences in using different concentrations of sodium and calcium and in favor of group that used (10 mg / L) and in favor of the effectiveness of 100 m
- There are significant differences between the use of different concentrations of sodium and calcium on the level of achievement in the effectiveness of 800 m.
- There are statistically significant differences in using different concentrations of sodium and calcium and in favor of the group that used (10 mg / L) and in favor of the effectiveness of 3,000 m.

## 2. MATERIAL AND METHODS

The researcher used the experimental method as well as the comparison method in solving the problem of the research.

**The research sample:** The research sample was selected by the intentional way as it consisted of nine players representing the team of Diyala University in the track and field event (100 m .800 m .3000 m) in accordance with the effectiveness that are commensurate with the energy system and by (3) players per effectiveness, The researcher calculates some variables that will affect the results of experimentation to make sure that the homogeneity of the sample as shown in table 1.

**Table 1: shows the arithmetic means and standard deviations and the coefficient of torsion of the sample shows.**

Rank	Variables	Arithmetic mean	Standard deviation	Mediator	Coefficient of torsion
1	Biological age	23.33	0.3	22	1.3
2	Training age	5.6	0.6	4.6	1.09
3	Weight	63	0.4	64	1.1
4	Height	173.33	0.3	172	1.7

### Field Procedures

To check the validity of the assumptions and achieve the objectives of research, the researcher adopted a set of biochemical tests in solving the problem of the research and started by measuring the sample achievement in each event from the events of the energy system that approved in this study, the researcher did two training units and focused on the first unit to intake normal water that contain salts rations that described on the box by the sample and then conducting the biochemical tests and achievement after the end of the training module, which the researcher considered it a tribal test , then the researcher conducted a posteriori test (second training module) with an emphasis on drinking water that containing added salts by the researcher, the researcher focused on the field follow up of the players after the first effort (tribal test ) and ensure that no adverse physiological manifestations such as high blood pressure.

### Biochemical tests (www.6abib.com)

Measuring the amount of sodium and calcium in the plasma (the researcher measured the ratio of sodium and calcium by following the procedures of each of them)

**Tribal tests :** The researcher conducted a tribal tests after the completion of the training module at 15:10 am at the track and field court in the College of Physical Education -Diyala University, knowing that the training module was a part of the preparation of all events, the researcher role of the researcher in the training module has been confined to the follow-up and giving water to the players (the researcher used Iraqis water , (Sama) type which has a concentration of calcium 70 mg / liter and sodium 13 mg / liter) for each player where each player of the nine players drunk amount of water of 1200 ml and with concentration of (sodium and calcium) (13 mg / 1 / 70 mg /L) respectively, and the researcher focused on urging the players to drink water during a training exercise and in intermittent periods during the training module .

**Posteriori tests :** The researcher conducted a posteriori tests three days after the tribal test to ensure that the players get back to their normal status and full hospitalization, the researcher conducting the tests under the same environmental conditions, the researcher took the results of tribal tests into consideration through readings which shows sodium and calcium concentration level in the blood plasma and based on these readings, the researcher adopted the same water quality (Sama) but by adding the salts to the water at different concentration for each event as the water of the 100 event depended on concentration (18 mg / L) and the water of 800 meters event on concentration (23 mg / L) and the water of 3000 meters on concentration (33 mg / L).

As well as the researcher calculated the achievement of each player from the nine players after the end of the training unit.

### 3. RESULTS

**Table 2: shows the arithmetic means and standard deviations for the two tests (tribal and posteriori) and for the first energy system (the phosagenic system) (100 m)**

Rank	Variables Statistical processors	Unit of measurement	Tribal tests		Posteriori test	
			M	SD	M	SD
1	Na	mmol	92.666	2.516	122.600	3.724
2	Ca	mmol	2.700	0.200	3.140	0.314
3	Achievement	Second	12.36	0.155	11.376	0.142

**Table 3: shows the arithmetic means and standard deviations for the two tests (tribal and posteriori) for the second energy system (lactic acid) system (800 m)**

Rank	Variables Statistical Processors	Unit of measurement	Tribal test		Posteriori test	
			M	SD	M	SD
1	Na	mmol	34.00	2.645	92.8000	2.165
2	Ca	mmol	2.356	0.385	2.616	0.104
3	Achievement	second	164.10	7.794	145.52	4.266

**Table 4: shows the arithmetic means and standard deviations for the two tests (tribal and posteriori) for the third energy system (the oxygenated system) (3000 m)**

Rank	Variables Statistical Processors	Unit of measurement	Tribal test		Posteriori test	
			M	SD	M	SD
1	Na	mmol	17.780	1.700	83.766	2.773
2	Ca	mmol	2.000	0.100	2.760	0.225
3	Achievement	second	567.43	9.419	532.890	21.293

**Table 5: shows arithmetic means differences and standard deviation difference and the value of calculated (T) of the first energy system (100 meter)**

Rank	Variables Statistical Processors	Unit of measurement	f	SD-D	Value of calculated (t)	Significance
1	Na	mmol	29.933	4.278	12.119	significance
2	Ca	mmol	0.440	0.393	1.937	significance
3	Achievement	Second	0.983	0.025	67.678	significance

Value of tabulated (t) (n-1) = 0.816 with level of significance 0.05

**Table 6: shows the arithmetic mean differences and standard deviation difference and value of calculated (T) for the second energy system (800 m).**

Rank	Variables Statistical Processors	Unit of measurement	f	SD-D	Value of calculated (t)	Significance
1	Na	mmol	58.800	4.784	21.287	Significant
2	Ca	mmol	0.26	0.360	1.248	Significant
3	Achievement	second	18.508	8.361	3.849	significant

Tabulated value of t (n -1) = 0.816 level of significance 0.05 level

**Table 7: shows the arithmetic means differences and standard deviations deference and the value of calculated (T) for the third energy system (3000 m).**

Rank	Variables Statistical Processors	Unit of measurement	f	SD-D	Value of calculated (t)	significance
1	Na	mmol	65.986	2.065	55.345	Significant
2	Ca	mmol	0.760	0.250	5.253	significant
3	Achievement	second	34.540	27.156	2.203	significant

Tabular value of t (n -1) = 0.816 with level of significance 0.05

**Table 8: shows the value of calculated (F) and the significance of the differences of sodium component.**

	Summation of squares	Degree of freedom	average of the squares	F	Significance
Between the groups	9312.879	2	4646.440	861.000	Significant
Inside the groups	32.448	6	5.408	861.000	Significant

**Table 9: shows the value of calculated (F) and the significance of the differences for calcium element.**

	Summation of squares	Degree of freedom	Average of squares	F	Significance
Between the groups	0.802	2	0.401	6224	Significant
Inside the groups	0.387	6	0.064	6224	significant

**Table 10: shows the calculated value of (F) and the significance of the differences of the achievement element.**

	Summation of squares	Degree of freedom	Average of squares	F	Significance
Between squares	493908.58	2	246954.289	5136.759	Significant
Inside squares	288.455	6	48.076	5136.759	Significant

#### 4. DISCUSSION

By observing the results of the research and the statistical transactions of the tribal and posteriori tests , we note that all differences were significant differences where the amount of sodium has increased in the posteriori test as a result of increased sodium concentrations in the water which increased and according to the type of efficiency, the researcher attributes the significant differences of the event of (100 m) as a normal condition in order to increase the sodium element concentration , while for the event of (800 m) , the differences were significant between tribal and posteriori tests and that was as a result of increasing the concentration of sodium in the water intake by the researcher , which is reflected on the achievement where the achievement is also affected by this increase despite the lack of access to normal levels of sodium component in the blood, the researcher also measured the high and low blood pressure and the low for the health of the athlete as may act to increase the salts in the plasma during the increase in the rate of the consumed energy to increase the rate of pressure and this is agreed with what is said by (Abu Al-Ella Abd Al- Fattah) to that the increase of energy wastes in the plasma as a result of increased concentrations of total dissolved substances (salts) .... and thus the cell membrane do not allow these materials to enter and so the salt concentration rises and to maintain osmotic pressure m the body withdraws amount of water from inside the cells to the plasma to maintain the concentration of salts which would raise the amount of pressure (the high) significantly (Abo Al-Ella Abd Al- Fattah, 349: 2003), (Iraq virtual science library, Timothy and Nicolas.)

As well as the researcher attributes the significant differences in the event of 3000 m as a result of increased sodium concentrations that added to the water intake and so its effect on the achievement and also the researcher sees that increasing the concentration of salts in the water is very important and would reflect on the achievement of the player if not calculated accurately and this is agreed with what is said by ( Abo Al-Ella Abd Al-Fattah) "that water and minerals deficiency during training and competition leads to lower the athletic performance level and his ability to endure, it was found that the loss of 5% of the athletic weight as a result of water and salt deficiency leads to decrease the performance level of 30% (Abo Al-Ella Abd Al- Fattah .160: 1999) and this is confirmed by the researcher that it must adjust the amount of the added salt, taking into account the type of the used effort as well as the temperature of the environment where the greater temperature of the environment means greater loss of the salts and so the procedures and the results of this research were in the high intensity training modules and with temperatures 33-35 degrees Celsius.

while for the calcium element, we note that all differences were significant differences between each event and between the achievement, the researchers explain these differences that the decrease in the amount of calcium is also due to the phosphate itself where the two linked to the same work as during the training the body consumes energy and after the effort there is re-building of the energy and this requires the presence of phosphate component but cannot take advantage from phosphate unless exists with it alongside the calcium element .

Here the researcher agrees with what is said by (Safa Al- Moreib) for the organs to be able to absorb phosphate well, the phosphate should be in compounds of phosphate and calcium, therefore there must be a ratio between the amount of phosphate and calcium intake, if the need arose for phosphate also increased the need for calcium (Safa Al-Morieb: 186).

Therefore difference in the calcium have been appeared due to the consumption of phosphate component by the body or the compensatory process may be incomplete and in its early stages and so may require doing calcium test after the completion of the effort by longer period.

#### 5. CONCLUSION

1. Mineral salts have significant impact on improving achievement in sporting events of long time.
2. Mineral salts have a positive role in maintaining the speed of sporting hospitalization through the work of calcium with phosphate component to return the energy sources to what it was.
3. The mineral salts (sodium) have a positive role in maintaining the health of the athlete and avoid the risks of water intoxication.

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