

A Comparison of Some Important Biochemical Indicators According to Escalating Physical Effort till Fatigue for Elite Freestyle Wrestlers, 800m Runners, and 200m Freestyle Swimmers

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Abstract

It is the nature of the game and the activity that determines the characteristic of the manifestation of fatigue according to what is required by the neuromuscular work in it, as well as the changes that occur in the functional variables and the time of the differential threshold. The location of each activity and the game of these teams have been studied in a special table for energy production systems as a result of continuous changes in their laws, and are considered within the energy systems such as the anaerobic system (Phosphagine) and lactic acid for (800) m runners - freestyle swimmers (200) m in the physical effort till fatigue. The comparison in the important functional indicators for them, and the research methodology embodied in the way of working through the method used, which is the descriptive method in comparison then, the researchers identified the research community for the young national team athletes for freestyle wrestling, and the national team(800)m runners, as well as of the national team in (200) m swimming for the sports season (2022-2023), A total of 21 athletes were selected in an organized manner and distributed into three equal groups (7 athletes) for each of the three types of sports (wrestler, 200-meter swimming and 800-meter running)., and the researchers would conduct tests for the research variables biochemical for the sample members, as well as some variables that have an impact on the results of the study such as (height, age, weight, and the age of training), and the homogenization of the research sample members was carried out. The results of statistical treatments were presented, analyzed, and discussed, supported by sources.

The most important conclusions were that most of the activities and the variation of values are very essential biochemical indicators. The differences were significant and the positive variation in accordance to the type of sport or activity, and the last variation between the activities in terms of comparison in these variables is due to the nature and specificity in terms of the intensity of the resistances and direct and indirect friction For competitors and the expenditure of energy stored in muscles. Finally, the researchers recommended knowing the most important biochemical indicators in these events and sports as they reflect a clear picture of the individuals' internal preparations and functional responses.

Keywords: Biochemical, indicators, escalated physical effort, elite athletes (wrestling, athletics, swimming).

Introduction:

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The training and educational process has now become more connected and related to the attempt of the scientific method and the formation, distribution and planning of training loads and educational curricula according to the functional indicators of the body considering it is the real indicator for reading those loads on the body of the athlete and that the interest and combination between the science of sports training and the science of physiology is one of the important keys that have great importance in the fields of training as a result of the physiological effects of the load of training on the various organs of the body, which in turn lead to the occurrence of appropriate adaptations to develop the technical level of skill, and The study of these variables is considered one of the most important reasons for raising the level of athletic achievement, and its impact is reflected in the internal functional organs of the body and its ability to implement the requirements of physical performance. Functional body and to delay the fatigue and the onset of the anaerobic threshold.

The anaerobic threshold in the field of sports training is the state of fatigue that the player reaches during physical performance, and this condition differs in terms of the timing of its manifestations in the athletes and the difference in their activities depending on their training, functional and biochemical status that they have reached as a result of the different training operations according to the stresses required by each activity, These sports depend, in their performance, on releasing the necessary energy according to the “lactic” anaerobic system (Salamah, 1999, p. 148), freestyle wrestling as well as effectiveness 800 m, with time that ranges between two minutes or more, as well as the activity of 200 m freestyle swimming, as these activities and sports discussed share within one energy system, which is the system (lactic acid) Within the anaerobic work system, these sports and events are classified as individual sports.

The problem of the study is due to the nature of the game and the activity, which determines the characteristic of the appearance of fatigue according to what is required by the neuromuscular work in it, as well as the changes that occur in the biochemical variables and the time of the differential threshold, and that knowing the common and divergent characteristics and answering questions through which sports and events can be classified with variables within a work system One energy, and showing the location of each activity and game of these teams studied in a special table for energy production systems (lactic acid) as a result of continuous changes in the laws of these sports and events, which are considered within the energy systems, including the anaerobic system (phosphagine) and the lactic acid system, and this matter allows the field To answer a set of scientific facts through which it is possible to know the causes of the rapid and delayed onset of fatigue, as well as knowing the biochemical variables, the similarities and differences in the time of the differential threshold, and the location of each activity and game in the classification table of the energy system for these events.

The purpose of the study was to identify some biochemical indicators for athletes (freestyle wrestling, 800 m running freestyle, and 200 m swimming in the increasing physical effort till fatigue, and the comparison between these sports some biochemical indicators according to the increasing physical effort till fatigue.

Method

The researcher's method used the descriptive approach and the method of comparison between the three groups, with his precise scientific steps to the nature of the research problem and its objectives.

The researchers identified the research community and they are athletes of the youth national team for freestyle wrestling, and the runners (800) m, as well as the athletes in 200 m freestyle swimming in (2022-2023), and their number is (21) athletes, divided into (7) ath-

letes for each group (freestyle wrestling, 800 m running and 200 m swimming), and it was completed. They were chosen by the intentional method, as they represent the national team for those sports, and the researchers conducted tests for the research variables biochemical for the sample members, as well as some variables that have an impact on the results of the study such as (height, age, weight, and training age), and the homogenization of the research sample members which had been carried out.

Table (1) the measurements of extraneous variables, arithmetic mean, standard deviation, skewness

T	measurements	mean	std	skewness
1	age/year	19,904	0.889	-0.272
2	weight/kg	68,142	4,714	0.857
3	length/cm	174,285	5,478	-0.282
4	Training age/year	7,619	1,359	0.251

After determining the variables of the study, which are the biochemical indicators, a pilot study was conducted on the devices and tools used in this study, and then the main experiment was conducted for conducting tests and measurements for the research sample on athletes (wrestling, athletics, and swimming), and then conducting the appropriate statistical operations to extract the results and compare them.

The variables were determined by the Scientific Committee to approve the subject and interviews with specialists in the field of sports training, sports physiology, wrestling, athletics, and swimming according to the literature and accurate scientific sources, the supervisor and the researchers, it was noted that they contribute to solving the research problem as the study variables include the following:

First/biochemical indicators:

- 1-Sugar level.
- 2-Lactic acid.
- 3-Calcium.
- 4-Potassium.

Second/lactic threshold: Konkani test.

Exploratory experiences:

The exploratory experiment is a preliminary experimental study that aims to stand on the level of the devices used and choose them, as well as to know the negative aspects that will face the work and that the exploratory experiment, And through the foregoing, the researchers worked on conducting exploratory experiments to ensure the validity of the devices and tools used in the tests, and to ensure the validity of the escalating physical effort test till fatigue for the athletes of the sample individuals, and to ensure the efficiency of the work team in conducting measurements and tests and recording the results, as well as completing its field duties represented by drawing The blood and put it in the special containers (Tubes) that are numbered according to the sequence of the athletes, and then transfer it from the place of the experiment to the laboratories for measurement, and to identify the time required and taken to implement the tests to single out the sample and the ease of its application, and to know the validity of (the treadmill and the device of the FIT MET PRO) to work continuously and its efficiency.

Measuring biochemical indicators:

Biochemical indicators (sugar level, lactic acid, calcium, potassium) were measured during rest, as the athlete sits on a chair and the arm is tied with a tourniquet to facilitate the process of drawing blood from it by (5cc) of venous blood by the chemist, as the blood is placed in medical tubes (tubs) numbered according to the sequence and names of the athletes, and placed in a refrigerated box to be transported to the athlete indicator analysis, then the percentage of lactic acid concentration in the blood is measured during rest by taking a blood sample Capillary from the athlete by pricking the finger of the hand and pressing it so that we can extract drops of blood, then it is noted through the device screen the percentage of lactic acid (Lactate Pro2) in the blood, after that the athlete performs the effort (test of physical effort escalating till fatigue) and then the indicators are measured Biochemistry (sugar level, lactic acid, calcium, potassium) Immediately after the effort, the athlete sits on a chair and the arm is tied with a tourniquet to facilitate the process of drawing blood from it (5cc) of venous blood by the chemist, as the blood is placed in tubes Medical tubes numbered according to the sequence and names of the athletes and placed in a refrigerated box to be transported to the analytical athlete for measurement, Then the percentage of lactic acid concentration in the blood is measured after (7) minutes have passed from the implementation of (the escalating physical effort test till fatigue), which is the best period for the transfer and collection of lactic acid from the muscles to the blood (Al-Qat, 1999, p. 27), as the measuring tape is placed In the location designated for it in the device, and after that the bar code number will appear, and then a capillary blood sample is taken from the athlete by pricking the finger of the hand, and pressing it so that we can extract blood drops, then it is noted on the device screen the percentage of lactic acid (Lactate Pro2) in the blood. Then a sample of capillary blood is taken from the athlete by pricking the finger of the hand, and pressing it so that we can extract drops of blood, then it is noted through the screen of the device the percentage of lactic acid (Lactate Pro2) in the blood. Then a sample of capillary blood is taken from the athlete by pricking the finger of the hand, and pressing it so that we can extract drops of blood, then it is noted through the screen of the device the percentage of lactic acid (Lactate Pro2) in the blood.



Image (1) Explain the devices and tools used for biochemical indicators

The escalating physical effort till the fatigue test:

Test name: con coni test (MACENZIE, 97): is a simple measure of an individual's anaerobic and aerobic extremities:

- The required materials:

- * Heart rate monitor.
- * Treadmill.
- * Stopwatch.
- * Assistant.

How to perform the test:

The athlete determines his starting speed and speed increases each (200 meters to complete between (2.5) kilometers and (4) kilometers before he becomes unable to continue using the best time of (10) kilometers, and the time is determined for each (200) meters of the track and the speed of the treadmill test.

Carrying out the treadmill test: The player warms up for ((10) minutes, and by setting the treadmill speed to the required starting speed for the athlete, the athlete sets the heart rate monitoring watch using a recording interval of (5) seconds, the assistant starts the stopwatch timing and the assistant records the time every (200) meters, and the athlete increases his speed every (200 meters and the assistant stops the stopwatch when the athlete cannot follow and records the time, and the athlete stops recording his pulse clock.

As for the test used in the current study, it is a test that was applied to the treadmill for the following reasons:

- 1- Avoid bias because one of the research samples is field and field athletes.
- 2- Providing unified and equivalent conditions for all members of the research sample.
- 3- Controlling the increase in speed with high accuracy, as it is an internationally approved electronic device.
- 4- It is considered one starting line for all members of the research sample to obtain accurate scientific results.
- 5- The possibility of increasing the physical effort in it till reaching the stage of maximum physical effort.
- 6- The possibility of connecting the (FitMeet Pro) device and the real-time and athlete control to extract the results.



Image (2) Demonstrate the Conconi test on a treadmill

The main experiment was conducted on the adult research sample (21) athletes representing the youth national team athletes for freestyle wrestling, (800) m runners, as well as (200) m freestyle swimmers), on the day corresponding to 3/11/2022 till the day corresponding to 5/11/ 2022 at noon, according to the following sequence:

Day 1, 2, and 3: Before conducting the (rising physical effort test till fatigue) for the research sample, the biochemical indicators (sugar level, lactic acid, calcium, potassium) are measured during rest, and then (the escalating physical effort test till fatigue) and then immediately after the effort. Biochemical indicators are measured and a venous blood sample is drawn immediately after the effort to measure the biochemical indicators (sugar level, lactic acid, calcium, potassium) the lactic acid concentration is measured by taking a capillary blood sample seven minutes after the end of the test effort, and the tests and measurements were done in the fitness hall In the College of Physical Education and Sports Sciences - University of Baghdad, with the help of the training staff and the assistant work team, the tests were conducted daily by (7) The athletes of the first day for the freestyle wrestling, the second-day athletics, and the third day for (200) m swimmers.

Discussion

Presentation, analysis, and discussion of the results of some biochemical indicators according to the escalating physical effort test till fatigue for elite athletes in wrestling, 800m running, and 200m freestyle swimming

Table (2) shows the arithmetic means, standard deviations, and the value of (t) calculated for correlated samples, the level of test significance, and the significance of the difference for the tests before and after the effort for the most important biochemical indicators of the elite wrestling athletes

variants surveyed	measuring unit	before effort		after effort		value (t) calculated	Sig
		s	±p	s	±p		
sugar level	mmol/L	100.00	13,416	191.00	8,869	21,009	0.000
lactic acid;	mmol	1,128	0.610	13,800	3,321	5,740	0.001
calcium	mg/dl	11,117	0.693	8,710	0.731	18,975	0.000
potassium	mmol/L	22,104	2,277	19,338	2,350	6,792	0.000

sig < 0.05

Through the table (2) The results of the tests before and after the effort showed the most important biochemical indicators of the elite wrestling athletes, where the (T) values calculated for these variables were respectively (21.009, 5.740, 18.975, 6.792), most of which were significant differences at the level of significance (0.05), which appeared under This level is between (0.000 - 0.001), as this indicates that most of the variables were significant and in favor of post-effort tests by the variables that occur to these variables, whether they are high or low, and this indicates that the efforts made by the wrestlers had an impact In these variables in terms of escalating effort till fatigue, this achieves the first objective of the study.

Table (3) shows the arithmetic means, standard deviations, and the value of (t) calculated for correlated samples, the level of test significance, and the significance of the difference for the tests before and after the effort for the most important biochemical indicators of the 800m runners

variants surveyed	before the effort		after effort		t	significance level Sig
	Sd	mean	Sd	mean		
sugar level	99,285	10,672	189,28	6,993	21,707	0.000
lactic acid;	1,071	0.618	12,257	4,077	5,263	0.002
calcium	11,040	0.858	8,675	0.591	8,736	0.000
potassium	21,414	2,175	18,770	2,360	6,379	0.001

Sig < 0.05

and from table (3) The results of the tests before and after the effort showed the most important biochemical indicators of the athletes (800m) running, where the (T) values calculated for these variables were respectively (21.707, 5.263, 8.736, 6.379), all of which were significant differences at the level of significance (0.05), which It appeared below this level between (0.000 - 0.002), as this indicated that all variables were significant and in favor of post-effort tests, as these variables differ in their significance according to the rise or fall, and this indicates that the efforts exerted by the runners had an effect whether Was positive or negative in these changes that occurred through the escalating effort to reach fatigue, and this achieves the first objective of the study.

Table (4) shows the arithmetic means, standard deviations, and the value of (t) calculated for correlated samples, the level of test significance, and the significance of the difference for the tests before and after the effort for the most important biochemical indicators of the athletes

200m swimming freestyle

variants	before the effort		after effort		t	sig
	s	±p	s	±p		
sugar level	107.71	6,725	190,428	4,117	19,170	0.000
lactic acid;	1,214	0.536	10,414	1,930	8,632	0.000
calcium	11,482	0.482	9,062	0.330	14,752	0.000
potassium	18,432	4,901	16,662	5,783	5,094	0.002

Sig < 0.05

and table (3-3) Show the results of the tests before and after the effort of the most important biochemical indicators for a swimmer (200m), where the (T) values calculated for these variables were respectively (9.1701, 8.632, 14.752, 5.094) and all of them were significant differences at the level of significance (0.05), which appeared Below this level is between (0.000 - 0.002), as this indicated that all variables were significant and in favor of post-effort tests, as these variables differ in their significance according to the rise or fall because the system used here is the anaerobic system (lactic) and this system and the changes taking place in it As for the blood variables, as they indicate the fatigue of the swimmer according to the special dynamic in this event, and this indicates that the efforts made by the swimmers had a real role in reading the results, whether positive or negative, in these changes that occurred from the escalating effort to fatigue, and this achieves The first objective of the study.

table (5) The analysis of variance shows the analysis of variance after the effort for the most important biochemical indicators according to the escalating physical effort test till fatigue between the three groups (elite athletes, wrestling, and runners).800m and 200m freestyle swimming)

variants	source of contrast	Sum of Squares	grades Free dom	Mean of Squares	F	sig
sugar level	between groups	526,571	2	263,286	4,954	0.019*
	within groups	956,571	18	53,143		
	within groups	70,857	18	3,937		
lactic acid;	between groups	111,350	2	55,675	13,455	0.000*
	within groups	74,480	18	4,138		
calcium	between groups	.142	2	0.071	.152	0.860
	within groups	8,424	18	0.468		
potassium	between groups	117,482	2	58,741	7,026	0.006*
	within groups	150,481	18	8,360		
lactic threshold	between groups	456,000	2	228,000	4,162	0.033*
	within groups	986,000	18	54,778		

Sig < 0.05

and table (5) Show the results between the tests after effort for the most important biochemical indicators (elite wrestling athletes, 800m runners, and 200m freestyle swimmers), where the calculated (F) values for these variables were respectively (4.954, 13.455, .152, 7.026 , 4.162) and most of them were significant differences at the level of

significance (0.05), which appeared below this level between (0.000 - 0.033), as this indicated that most of the variables were significant between these tests for the dimension of effort, and not significant in the variable (calcium), which showed Significance levels between (0.860), although there is a very slight statistically imperceptible difference between these activities in terms of preference in this variable, as this variable varies in its significance according to the increase or decrease between the activities above, and the researchers used the law of the least significant difference (LSD) to find out the preference between these activities in these variables, as in Table (5), and this achieves the second objective of the study.

table (6) Shows the value of differences in the arithmetic mean of the most important biochemical indicators according to the escalating physical effort test till fatigue and the value of the least significant difference (LSD) between the three groups (elite wrestling athletes, 800m runners, and 200m freestyle swimmers)

Variants	totals	Mean of difference	sig
sugar level	Wrestling - running800 m	1.85714	0.639
	Wrestling - swimming200m freestyle	11.42857 *	0.009
	to run800m - 200m freestyle swimming	9.57143*	0.024
lactic acid;	Wrestling - running800 m	2.11429	0.068
	Wrestling - swimming200m freestyle	5.58571*	0.000
	to run800m - 200m freestyle swimming	3.47143*	0.005
Potassium	Wrestling - running800 m	0.98571	0.532
	Wrestling - swimming200m freestyle	5.43714*	0.002
	to run800m - 200m freestyle swimming	4.45143*	0.010
lactic threshold	Wrestling - running800 m	7.71429	0.067
	Wrestling - swimming200m freestyle	11.14286 *	0.011
	to run800m - 200m freestyle swimming	3.42857	0.398

Sig < 0.05

from table (6) The results showed the least significant difference (LSD) Between the three activities (elite wrestling athletes, 800m runners, and 200m freestyle swimmers) in post-exercise tests for the above variables with significant differences (sugar level, lactic acid, potassium, lactic threshold), in the first variable (sugar level The results had the opposite effect, that is, the higher the level of sugar in the blood, the lower the physical activity, as the game (wrestling) was the first in that, and then the effectiveness of (swimming) and finally the effectiveness of running (800m), but in the variable (lactic acid) its results were opposite In terms of effect, i.e. the more lactic acid, the greater the burden on the athletes for these activities, where the game (wrestling) was the first in that, then the activity of running (800m) and finally the activity of (swimming), and in the variable (potassium), where its results showed the opposite effect in terms of The function of his work, that is, the greater the percentage of potassium decrease, the greater the effect on the body of the athletes will be negative, as the (wrestling) game was the first in that, and then the activity of running (800 m) and finallyThe effectiveness of (swimming), and in the variable (the lactic threshold) that has a direct positive effect, that is, the higher the threshold is for the athletes, it is a vital indicator of their efficiency in sports activity, which is considered one of the main variables that the longer the delay in its appearance, the player is in the best efficiency to exhaust the effort, as it was The (wrestling) game is the first in this, then the (800m) running event, and finally the (swimming) event.

The results shown in the tables (4, 5, 6), indicate the existence of significant differences between the results of the tests before and after the effort and in favor of the tests after the effort. The researchers, the reason for this increase in his level, is that the effort exerted by these athletes in terms of increasing metabolic processes and the voltage difference inside and outside the cells has an effect on increasing blood sugar, as blood glucose in addition to muscle glycogen are two main sources of energy that are supplied to the muscles at the beginning Physical effort when the body's supply of oxygen is less than the body's need for it, and the participation of blood glucose as well as glycogen as sources of muscle energy increases with the increase in the intensity of physical effort. which provide energy to the muscles, Where it is not possible at this intensity to use fat as fuel, and the concentration of glucose in the blood is controlled by two hormones secreted by the pancreas gland, namely insulin and glucagon, and each of these two hormones affects blood glucose in an opposite way to the other, in the case of a high concentration of glucose in the blood (after eating, for example), the secretion of the hormone insulin increases, and it reduces the level of glucose in the blood, by facilitating the entry of glucose into the muscles and connective tissues, and activating the process of building glycogen in the liver (i.e. converting some of the glucose in the blood into glycogen in the liver), as well as inhibiting the process of catabolizing glycogen The liver converts it into glucose. As for the hormone glucagon, its secretion increases when the concentration of glucose in the blood decreases from its normal level, as this hormone activates the process of breaking down liver glycogen into glucose and activates the process of manufacturing glucose from other non-carbohydrate sources (amino acids and glycerol), and during physical activity. , The body inhibits the secretion of the hormone insulin (because there is a need for glucose), and in return, the secretion of the following counter hormones increases (glucagon, cortisol, catecholamine, growth hormone). For energy), some of these hormones help in the processing of fatty acids to use them as fuel for the muscles, in addition to the above, the increase in the concentration of the hormone catecholamine in the blood contributes to making muscle glycogen the preferred fuel for muscle contraction, especially with the increase in the intensity of physical activity (Al-

Hazaa, page 217), and in the variable (lactic acid) in the above tables, significant differences were shown in favor of post-exercise tests for the three activities. Growth hormone) These hormones lead to urging the liver to analyze the glycogen contained in it and put it into the blood in the form of glucose (to be used as an energy source), and some of these hormones help in the processing of fatty acids to be used as fuel for the muscles. The hormone catecholamine in the blood contributes to making muscle glycogen the preferred fuel for muscle contraction, especially with an increase in the intensity of physical activity (Al-Hazaa, page 217), and in the variable (lactic acid) in the above tables, significant differences were shown in favor of post-exercise tests for the three activities. Growth hormone) These hormones lead to urging the liver to analyze the glycogen contained in it and put it into the blood in the form of glucose (to be used as an energy source), and some of these hormones help in the processing of fatty acids to be used as fuel for the muscles. The hormone catecholamine in the blood contributes to making muscle glycogen the preferred fuel for muscle contraction, especially with an increase in the intensity of physical activity (Al-Hazaa, page 217), and in the variable (lactic acid) in the above tables, significant differences were shown in favor of post-exercise tests for the three activities. In the variable (lactic acid) in the tables above, significant differences were shown in favor of post-exercise tests for the three activities. In the variable (lactic acid) in the tables above, significant differences were shown in favor of post-exercise tests for the three activities (wrestling, 800m running and 200m freestyle swimming) In this variable, the researchers attributes this as a result of the physical effort exerted by the athletes, as the result of any physical effort increases the percentage of this variable, and it is an actual result of high physical activity, and this is scientifically consistent with the nature of these activities and their use of the nature of the anaerobic system and the energy used in it and the accumulation of the products of metabolic processes in The body of the athletes as a result of the high effort, which needs many sources of energy and oxygen to supply the body with energy as a result of the high physical effort and for the continuity of work, as lactic acid is an indicator of the training status of the athletes, whether the percentage of lactic acid before or after the physical effort, in addition to being an important indicator of the intensity Training as well as the ability of muscles and internal body systems to resist fatigue resulting from high-intensity physical effort, so lactic acid is used in evaluating training programs and identifying their impact on aerobic and anaerobic energy production systems (Hassan,2008, p55).

He sees (Muhammad Othman,1990) that the concentration of lactic acid in the blood is one of the main influences that work on the individual's ability to continue performing, and this means that the individual who has this ratio appears in a lower way has a greater ability to continue to perform than others who have a high concentration of this acid (Othman, 1990, page 230), while (Haitham Al-Rawi, 1996) confirms that long-term sports training results in a decrease in the level of lactic acid in the blood after the maximum training load of athletes or trained individuals without trainers. The results showed that the trainers are characterized by the ability to maintain a lower level of lactic acid in the blood during regular training, and this indicates an improvement in the chemical and biological sufficiency of training, And that the athlete can have a high accumulation rate of lactic acid after violent physical effort compared to the untrained, and the reason for this is because the duration of the performance of the athlete is longer than that of the untrained, and this means that there is an increase in the duration of anaerobic work as well as breaking down the amount of glycogen more than It is in the untrained, so there is a greater accumulation of lactic acid, and it can be a positive indicator of the development of the work of oxidative enzymes, as well as the internal

systems of the body and the ability of the muscle to bear this accumulation, and this is called chemical imprinting (Al-Rawi, 1996, p. 17).

The use of the lactic acid system in energy production is characterized by the rapid supply of the muscle with the direct source of energy ATP, for example, sports activities that perform at high speed during a period from 30 seconds to 3 minutes depending on a large extent on the lactic acid system, and among these activities is the 400-meter and 800-meter run (Aziz, 2018, p. 54).

From the foregoing, we note that the second system of anaerobic decomposition, the lactic acid system, is considered the dominant system for the activities for which the physical and muscular effort is below the maximum, i.e. strongly 90% of any activities that are accompanied by performance endurance, and this is what distinguishes many sports and events, and the coaches must build their training curricula according to the advantages of this system so that the athletes can reach the best achievements, and since the final outcome of the anaerobic decomposition of glycogen in the muscles or glucose in the blood is lactic acid and the efficiency of the athlete increases. Who can perform for the longest period of time with the increase in lactic acid and for this the exercises that are characterized by the specificity of this system raise the efficiency of athletes to achieve the best results, as for the time period that the lactic acid system provides for the energy needed for muscular work, (Hama Najm, 2001) indicated that the system Lactic acid provides energy for a period of time (1-3 minutes) (Al-Jaf and Taha, 2001, page 74). (1994, Costill) confirms that the lactic acid system does not give a large amount of energy (anaerobic), so it gives energy of high intensity, but it is limited in time due to the accumulation of lactic acid in the muscles and blood, and this appears in the effort and sports that last (1-2 minutes) (Costill, 94, p. 98).

As for the variable (calcium and potassium), the results showed the results of the above three activities between the tests before and after the effort, and in favor of the tests after the effort, as their percentage decreased in all these activities. Inside and outside the cells as a result of compensating for the shortfall in energy exchange in the body calcium mineral in the body is divided into two halves, the first in a free state and the other half united with proteins (fit and asheer, 1982, p. 360).

and that (99% of the calcium in the body is found in the skeleton and teeth, while the rest of the calcium is in the body fluids in the form of ions, so it is required vitally by every cell. Muscles and nerves participate in its irritation and that affects the concentration of the free calcium ion in the muscle cells and participates in the irritation of the membrane (Aday and Hanna, 1987, p. 248).

Calcium liberated from the sarcoplasmic reticulum is considered a response to nervous stimulation, and the amount liberated is proportional to the amount present in the sarcoplasmic reticulum, and its liberation is associated with its concentration at certain limits (benign, 1989, p. 71).

It maintains the level of calcium secured in the extracellular fluid and the mineral content of bone over the years despite the variation in the intake of calcium with food, in an effective balance with the functioning of the bone and the control of calcium absorption and excretion. Several kinds of milk are known as (thyroid hormones), but some of these milk are unknown (www.eamg-med.com).

As for potassium, it is considered one of the most positive ions available inside the cells, and also the loss of potassium occurs through sweating as well, as it is excreted with quantities of sodium chloride, potassium is a mono-ketone and has chemical properties similar to the properties of sodium, but its physiological properties inside the body differ from sodium, as the amount of potassium In the blood, it reflects the nature of the metabolism of the cells,

where the concentration of potassium in the plasma increases when the destruction of the body tissues occurs, as well as the increase in acidity in the body leads to a decrease in the concentration of potassium in the cells as a result of the concentration of cells to neutralize the acidity (Al-Shimi and Al-Minawi, page68).

According to the results shown in the table (5), which indicates that there are significant differences between the results of the analysis of variance tests between the three activities (wrestling, 800m running and 200m freestyle swimming) where most of them showed significant differences between the activities in the post-effort test for the variables (sugar level, lactic acid, potassium, lactic threshold), and the researchers attributes the increase or decrease in some of these variables above to the effort exerted by the athletes in these activities according to the high stresses and the nature of muscular work in them, which requires that from the shortage in the natural stock of these elements, which in turn affects directly On the energy sources in the body and the metabolism process for the continuity of muscular work, which in turn compensates for the deficiency in the body and the body's attempt to obtain the largest amount of food to produce energy and to continue the physical effort till the total effort is exhausted, The increase or decrease is due to the escalating physical effort test till the fatigue exerted by the testers to apply the test, as it was distinguished by the energy system, which is the lactic system, and thus this increase in concentration(glucose level, lactic acid, lactic acid threshold) and lowerpotassiumShows the extent of the high physical effort exerted by the player with its connection with the skills performed for each of the three sports (wrestling, 800m running and 200m freestyle swimming) and the physical capabilities associated with it so that the player is under a high physical effort that matches the nature of the prevailing energy system for those sports, as high intensity work is able to increase lactic acid in the blood due to the anaerobic glycolysis process that the body performs to return the ATP compound inside the cell muscles with insufficient oxygen supplied to the working muscles, which leads to the inability of the mitochondria to enter the liberated hydrogen ion into the respiratory chain, and thus the pyruvic acid unites with the hydrogen ion forming lactic acid, as (Brain) confirms that when its glucose molecule is broken down, pyruvic acid is released with an amount little ATP, then the pyruvate reacts with oxygen,And when the muscle contracts severely, in this case, the percentage of oxygen in the blood will decrease, and thus the pyruvate will unite with the liberated hydrogen ions to form lactic acid (Mackenzie). The coach has a large amount of lactic acid due to the presence of glycogen stored in the muscle or because of the ability to work, and this explains that the percentage of lactic acid concentration is large among the wrestling athletes because they are more adapted as a result of the nature of the effort in the game and therefore they were distinguished by the long period of testing with high intensity and fall within the anaerobic system Lactic acid, as this works by insufficient oxygen in the process of energy liberation, and also works to break down the stored glycogen in the muscles and liver, Therefore, the supply of energy to the body is rapid, and in this regard (Bahaa El-Din Salama) indicates and confirms that the muscles build adenosine triphosphate from the fission of creatine, so anaerobic energy is released, i. In it to restore the construction of ATP to release anaerobic energy, and this process results in lactic acid (Salama, 1999, p. 147), and the current study agrees with a study conducted by a group of researchers on (10) college students as they performed an effort on the stationary bike, and the concentration of lactic acid reached after (3) minutes of effort (130 mg / 100 milliliters of blood), as indicated by (Raisan, Ali Turki,2002) indicates that the percentage of lactic acid during strenuous effort can increase its rate in the blood to (100-200 mg / 100 milliliters of blood) (Kharibt and Ali, 2002, page 107), and the researchers also indicates that in the

effort exerted in the escalating physical effort test till Fatigue, and so on, is determined by the nature of the game, its description, and the degree of its distinction, as it is characterized by the nature of strong and decisive competition, and despite the different requirements, characteristics, and duties of each player for each game, but the size and intensity of the physical load exerted by the player may be similar, and thus is also reflected in the biochemical effects caused by this effort. Especially lactic acid, due to muscle fatigue, as the percentage of the contribution of this system increases after the first ten seconds of effort, as the increase in the production of lactic acid in the blood depends on the type and intensity of the muscular work performed by the athlete, where the muscular work was of high intensity and takes place in conditions of insufficient oxygen (anaerobic). Increases the accumulation and accumulation of lactic acid in the blood, and the fatigue felt by the player after performing the test, it is known that the player has been afflicted with fatigue and exhaustion after performing (3 minutes of effort) accompanied by a large percentage of lactic acid in the blood, and therefore the researchers attribute this to the fact that the player when performing a physical effort is not anaerobic (after sufficient oxygen).

As for the other variables that did not appear significant in the differences between these activities for the post-effort test, they did not appear statistically. These imperceptible differences represent differences between these activities, and they come from the physical effort exerted for the studied research sample according to the test used to show the differences in them.

Therefore, when the researchers uses the law of least significant difference in the table (6) The results showed a discrepancy between these activities in these variables with significant differences in terms of increase and decrease according to the effect of these variables, In the first variable (sugar level), the results had a positive effect, that is, the higher the level of sugar in the blood indicates the ability to continue physical activity without the occurrence of fatigue, that is, the level of adaptation to the game had a positive effect for that, and therefore we find that the wrestling game is the most positive effect of the activities, as The physical activity as a result of the escalating physical effort test till fatigue is represented in the muscular contractions that need energy to continue, as glucose and fat are the main source of energy and the importance of glucose appears in short activities and fat in severe and continuous physical loads, where insulin plays a vital role in regulating the transfer of glucose from The blood flow into the tissues of the working skeletal muscles, and a rise in the level of sugar is observed after the performance of the physical effort and is due to the increase in its transmission with the blood to the working muscles.(Batayneh,2002, pp. 35-36).

As for the variable (lactic acid), its results were also positive in terms of effect, that is, the higher the lactic acid, the more evidence of the increased tolerance of fatigue among the athletes for this game compared to the rest of the sports. High lactic acid in the blood because the energy system used is commensurate with the type of training, which led to adaptations that make the wrestler continue to perform with high lactic acid in the blood.2007) the use of anoxic exercises that are characterized by less than maximum intensity causes a deficiency in the oxygen needed to produce energy, and energy is produced with insufficient oxygen, and then an accumulation of lactic acid occurs to a greater degree than the rate of its disposal and as a result the blood becomes acidic, and this condition occurs when exceeding The lactic threshold is (4 mmol), and thus the blood pH decreases, which can become dangerous when the vital organizations are unable to equalize the blood and the internal systems and organs are unable to get rid of lactic acid (Al-Kaabi, 2007, p. 207).

In the (potassium) variable, where its results showed a positive effect in terms of its work function, that is, the greater the percentage of potassium decrease, the more positive the effect on the athletes' body, meaning they have a high endurance. Part of the fluids from the plasma, which leads to a withdrawal from the fluids inside the cell to the fluid outside the cell, to obtain a state of stability in the process of regulating the osmotic pressure on the cell wall, and that the neuromuscular adaptation led to the continuation of muscular work during the physical effort with less breakdown of muscle fibers as a result of performance athlete (Edington, 1987, p. 201), and due to this breakdown, the percentage of (K +) exit from the muscles increases, while a lot of (Na +) goes into the muscle cell with waste from the secretion of the renal channels associated with potassium, making its ratio normal in the blood serum, that is, balanced (Marruy, 1997, p. 688), as he confirms Brouns Sweat secretion reaches its maximum levels at high energy expenditure (Brons, 1991, p. 147).

While carrying out the physical duty of the test, the player must perform the test with the highest degree of performance and as quickly as possible from his maximum capacity, due to the muscle cell's need for the basic elements that contribute to obtaining the maximum contraction of the muscle continuously throughout the basic stages of the test without fatigue with the decrease in the amount of fluid lost as a result of the effort physical.

As for the variable (the lactic threshold), which has a direct positive effect, that is, the higher the threshold is for the athletes, it is a vital indicator of their efficiency in sports activity, which is considered one of the main variables that the longer the delay in its appearance, the player is in the best efficiency to exhaust the effort, as the (wrestling) game was Mostly the first and then the effectiveness of running (800 m) and finally the effectiveness of (swimming), as the continuation of the effort is accompanied by an increase in the anaerobic lactic work and thus an increase in the concentration of lactic acid, but this increase is late in appearance, i. -35), and (Ira Wolinsky & Judy) indicate that the lactic anaerobic threshold is a clear indicator of the value of anaerobic lactic endurance and is of great importance in evaluating the athlete's condition (Driskell, 2008, p. 347).

Except for the variable (sugar level), where the (wrestling) game was the first, then the (swimming) activity, and finally the 800 m running activity and the researchers attribute this to the fact that the wrestling game and the nature of muscular work in it requires very large energy so that the wrestler can maintain the continuity of work in the struggle with the competitor, and this requires him to agree between the energy expended and the energy stored in the muscles and how to balance them, as for the effectiveness of 800m running In this activity, the player must divide the effort during the distance covered by tension and relaxation, and balance by muscular and nervous work between the external and internal resistances of the body to cover the distance in the best possible time. For the 200m freestyle swimming event, the swimmer must balance the energy expended to overcome the resistance of the obstacle, which is water, as well as drain the energy to travel the distance in the best time and balance the internal energy with the external resistances of the water medium.

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